

# Horsemanship Quiz Challenge

## STUDY GUIDE



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# ANATOMY AND PHYSIOLOGY

Anatomy refers to the structure of the horse, including all of the internal systems. Physiology refers to the functions of the horse or any of its parts. The different anatomical systems work together for the horse to function as a whole.

When discussing the body structure of the horse, we use anatomical terms to locate where on the body the part is found. Typical anatomical terms include (see picture on the next page):

**Abaxial:** Used in describing where something is on a limb. If a pin were dropped dead center down the inside of a limb, this would describe something farther away from that line or to the outside of the limb.

**Axial:** Used in describing where something is on a limb. If a pin were dropped dead center down the inside of a limb, something near that pin would be axial.

**Caudal:** Toward the direction of the tail and referring to the back surface of the upper limbs.

**Cranial:** Toward the direction of the head and referring to the front surface of the upper limbs.

**Rostral:** Referring specifically to locations on the head that are in front of the cranium (i.e. nostrils, mouth).

**Dorsal:** Of, on, or relating to the horse's upper side or back.

**Ventral:** Situated on or toward the lower, abdominal plane of the body.

**Lateral:** To the outside of the limb.

**Medial:** To the inside of the limb.

**Near:** Left side of the horse.

**Off:** Right side of the horse.

**Limb:** Appendage from the trunk of the horse that includes the leg.

**Leg:** Portion of the limb from the knee or hock down.

**Digit:** Portion of the leg from the fetlock down.

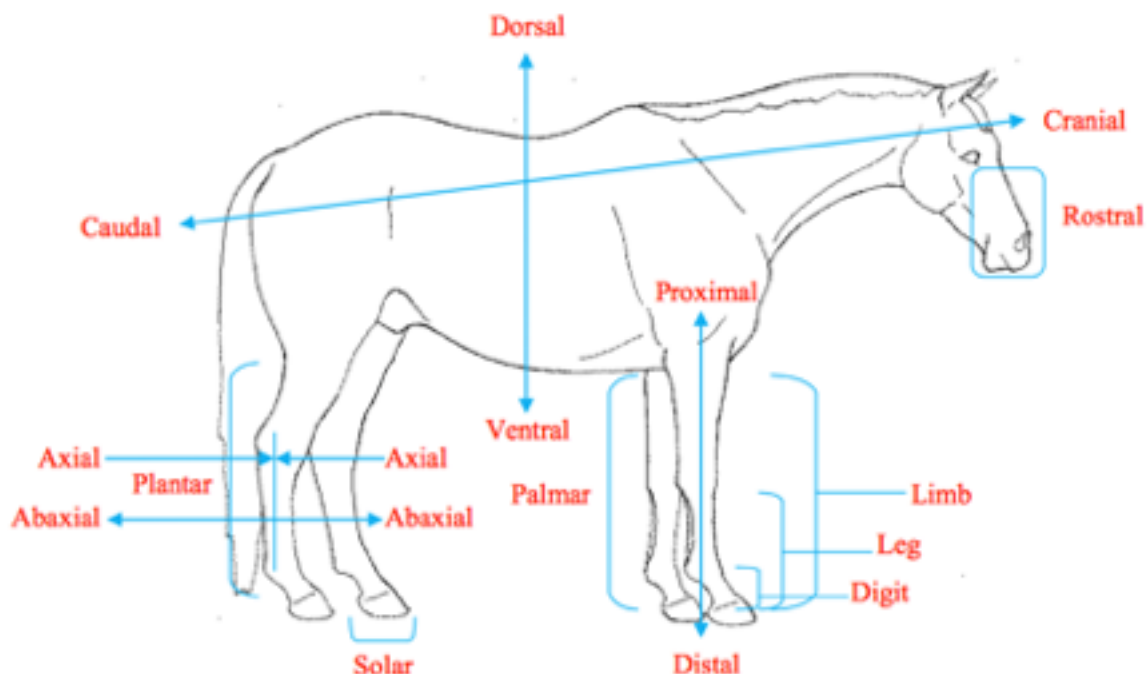
**Palmar:** The back surface of the front legs

**Plantar:** The back surface of the hind legs

**Solar:** Sole of the foot or the bottom aspect of the coffin bone inside the hoof.

**Distal:** Used in reference to the limb, referring to areas below a point of interest.

**Proximal:** Used in reference to the limb, referring to areas above a point of interest.

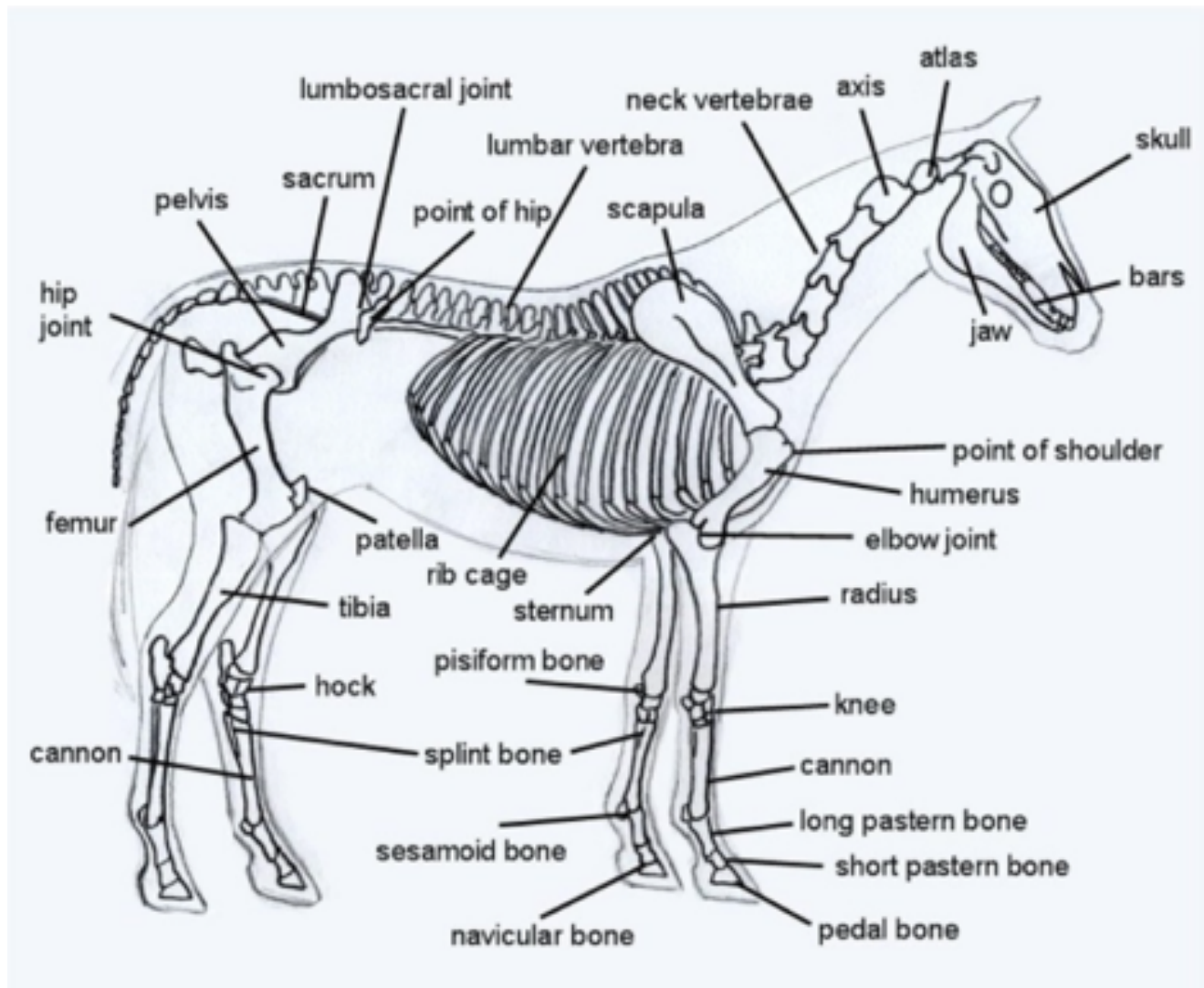




## Musculoskeletal System

The musculoskeletal system, which gives the body its structure and movement, is comprised of bones, joints, muscles, ligaments, tendons, and connective tissues. The musculoskeletal system is also responsible for support and protection of vital internal organs.

The horse's body contains just over 200 bones. The bones are made of a hard mineralized matrix of bone cells, with hollow centers containing bone marrow. The tissue is dynamic and is constantly being reabsorbed and regenerated through epiphyseal plates located at the ends of each bone in a process called remodeling. Remodeling can be caused by compression, tension, or



The axial skeleton consists of the skull, vertebral column, and rib cage.

flexion, and enables bones to develop, mend, and strengthen. Deliberate conditioning that includes progressive loading of anaerobic speed work for very brief intervals of time can improve a horse's bone strength and long term skeletal health.

The alignment of the bones determines the horse's conformation, movement, mechanics, and efficiency.

The skull consists of 34 bones and four cavities: the cranial cavity, the orbital cavity, the oral cavity, and the nasal cavity. The skull bones are mostly flat and are separated by cartilage or fibrous tissue until adulthood. As the horse develops, this tissue changes to bone and the bones become fused to provide protection to the interior structures. The most important bones of the skull are:

**Frontal Bones:** A pair of bones, thinner than the occipital bone, found on the front of the face between the eyes.

**Incisive Bones:** Part of the upper jaw where the incisors attach, found just below the nasal bones.

**Lacrimal Bones:** Found between the zygomatic bones and the nasal bones, in front of the eye.

**Mandible:** Lower portion of the jaw and the largest bone in the skull.

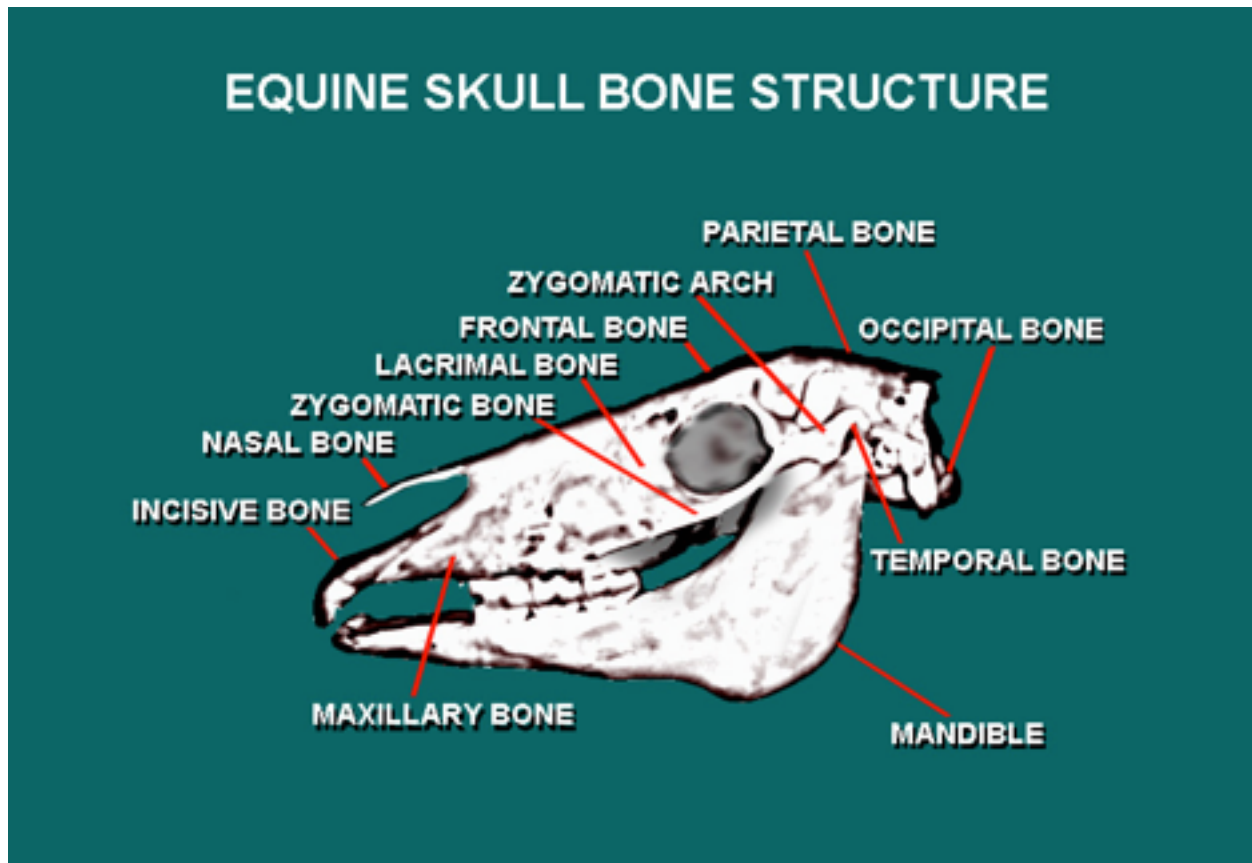
**Maxillary Bones:** Form the sides of the nasal cavity that contains the upper canine, pre-molars, and molars.

**Nasal Bones:** Large bones on the front of the face that cover the nasal and oral cavities.

**Occipital Bone:** A relatively strong and thick bone found at the back of the skull. The occipital bone forms the roof of the cranium.

**Parietal Bones:** Found at the front of the top of the skull just above the frontal bone.

**Zygomatic Bones:** Form the section of the skull just below the eye.



The vertebral column usually consists of 54 irregular bones. Differences in numbers of vertebrae may occur in different breeds, particularly Arabians. The withers are made up of the dorsal spinal processes of the thoracic vertebrae numbers 5 through 9. The column is divided into five parts including:

- 7 cervical (neck) vertebrae including the Atlas (C1) and the Axis (C2)
- 18 thoracic (chest) vertebrae
- 6 lumbar (back) vertebrae
- 5 sacral (loin) vertebrae – these often fuse together to form the sacrum
- 18 to 23 coccygeal (tail) vertebrae

The ribcage consists of 18 pairs of ribs, each connected to a thoracic vertebra, protecting the heart, lungs, and other vital organs. The first eight pairs of ribs are known as the “true” ribs as they are composed entirely of bone and connect to the sternum. The final 10 pairs of ribs are known as “false” or “floating” ribs, as they do not attach at the midline.

The appendicular skeleton consists of the bones making up the front and hind limbs, and the pelvis. These bones provide for support and movement.

At rest, a horse bears approximately 55-60 percent of its body weight on the front legs. The center of gravity is a balance point located close to the heart girth which shifts as the horse puts more weight on the hindquarters or the forehand.

## The bones of the front leg from the shoulder to the ground are:

- Scapula or Shoulder Blade
- Humerus (upper arm)
- Radius (larger forearm bone)
- Ulna (smaller forearm bone that lies caudal to the radius and is usually partially fused to the radius)
- Carpus or Knee (made up of seven or eight small bones placed in two rows to form three joints)
- 3rd Metacarpal (also known as the cannon bone)
- 2nd and 4th Metacarpals (also known as the splint bones)
- Proximal Sesamoids (two)
- 1st Phalanx (also known as the proximal phalanx or long pastern bone)
- 2nd Phalanx (also known as the middle phalanx or short pastern bone)
- Distal Sesamoid (also known as the navicular bone)
- 3rd Phalanx (also known as the distal phalanx or coffin bone)

## The bones of the hind leg from the lumbosacral joint to the ground are:

- Ilium, ischium and pubis (these bones fuse together to form the pelvis or pelvic girdle)
- Femur
- Patella (kneecap)
- Tibia (larger upper leg bone)
- Fibula (smaller upper leg bone)
- Tarsal or hock (made up of six small bones placed in three rows to form four joints)

Below the tarsal bones, the front and hind legs have the same structures; however, the hind cannon and splint bones are known as metatarsal bones.

Bones are covered by a thick layer of connective tissue called the periosteum. Inflammation of this layer is called periostitis. Injuries to the periosteum result in fibrous scar tissue that contracts, calcifies and becomes incorporated into the bone at the site of the injury, creating new bone formation.

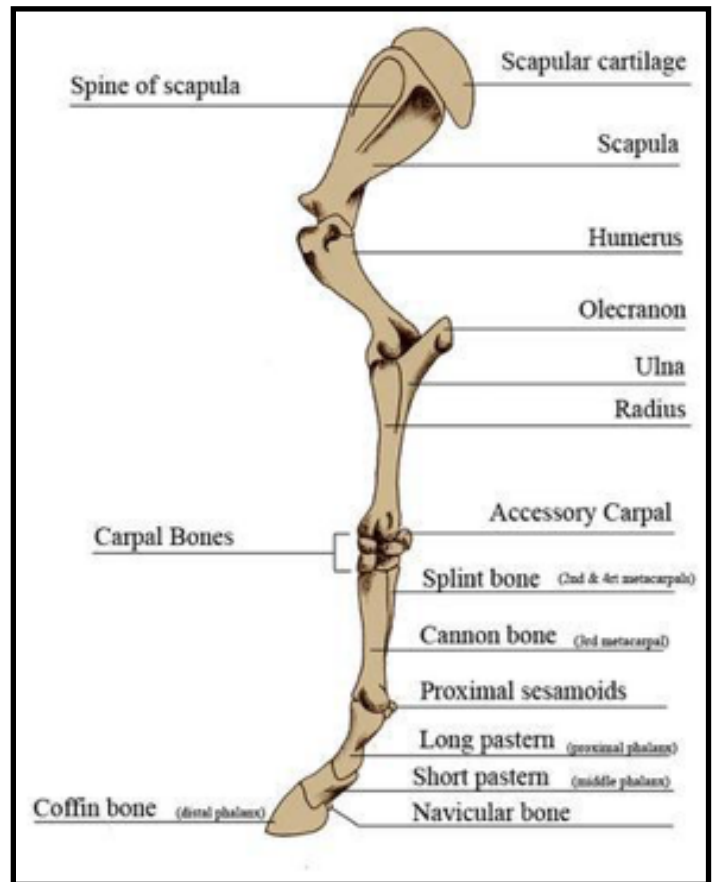
Joints occur every place two or more bones meet. They minimize the frictional forces between bones, stabilize the skeletal structures during the loading phase as the horse bears weight on each limb and act as hinges during locomotion.

## Joints are categorized by their ability to move. The three types of joints are:

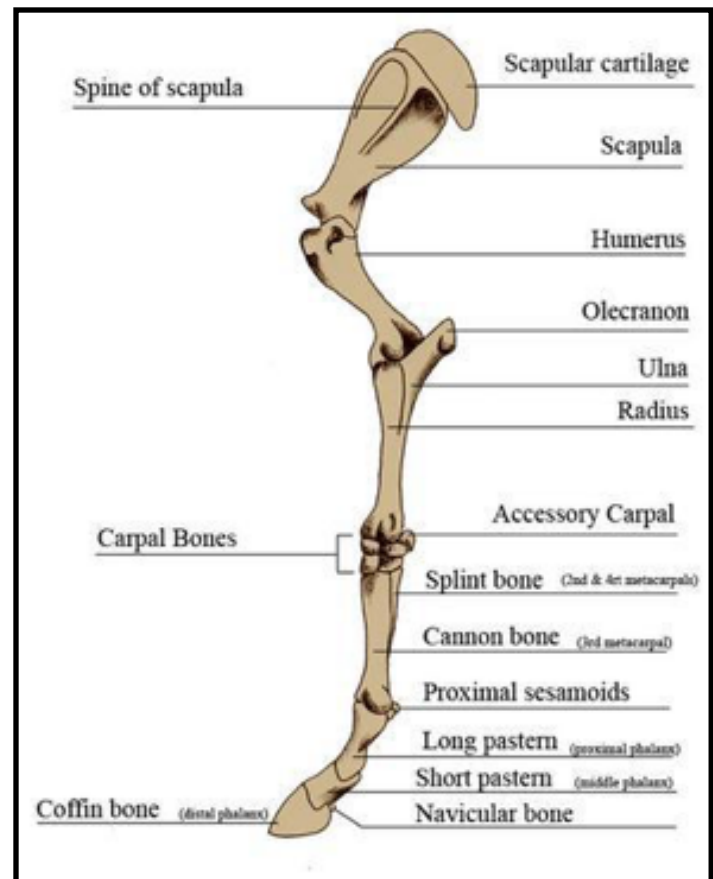
**Fibrous:** Immoveable joints that fuse with age. Least likely to be affected by disease. Example: Skull

**Cartilaginous:** Limited movement joints. United by fibrocartilage or hyaline cartilage. Example: Pelvis and vertebrae

**Synovial:** Moveable joints. Most likely to be affected by disease and suffer injuries. Example: Leg joints



**Bones of the Front Leg**



**Bones of the Hind Leg**

Joints do not have the ability to remodel as bones do, so they are more prone to injuries. Joints benefit from moderate exercise, but become stressed under excessively strenuous exercise. Torque and uneven loading are key factors in joint injuries. The more movement a joint makes, the more wear it experiences and the more susceptible it is to inflammation and injury. The bulk of joint problems for horses that jump occurs in the coffin and pastern joints in the form of degenerative joint disease.

Synovial joints produce synovial fluid, a lubricating fluid within the joint that assists with movement. When a joint is injured, the body increases production of synovial fluid to protect the joint from further damage. Veterinarians can analyze the viscosity of the synovial fluid to assist with diagnosing certain joint diseases.

Many joints are named for the bones they attach together. For example, the fetlock joint in the leg is more accurately named the metacarpophalangeal joint for the two bones that connect in that joint.

Ligaments are short bands of tough, flexible, fibrous connective tissue that connect the periosteum of two bones, or the periosteum of a bone to the cartilage of another bone across a joint. Ligaments stabilize the joint and prevent over-stretching, over-flexing, or twisting. They are not as elastic as tendons, and consequently they stretch or tear more easily. Injury to a ligament is known as *desmitis*.

Tendons are flexible but inelastic cords of strong fibrous collagen tissue that connect muscles to bones. Tendons are more elastic than ligaments. They stretch and contract to help disperse the concussive forces that the skeletal system encounters. Tendons are protected by a tendon sheath where they cross a joint, and by a bursa sac where they cross over a bone. Tendon sheaths are filled with synovial fluid like a joint capsule. Elasticity is compromised in damaged tendons, which are prone to re-injury.

Tendon injuries come in the following forms:

**Tendonitis:** Any clinical or pathological disorder that involves inflammation within the tendon and paratendon (loose connective tissue filling the interstices of the fascial compartment in which a tendon is situated which allows the tendon to move freely), but does not involve the tendon sheath

**Tendosynovitis:** Inflammation within the tendon sheath

**Tendon rupture or bowed tendon:** The most severe of stress-induced inflammatory reactions resulting in hemorrhage and edema

Muscles are a band or bundle of fibrous tissues that have the ability to contract, producing movement in, or maintaining the position of, parts of the body. Muscles make up nearly half of the horse's body weight and are attached to bone either by tendons or fascia. Most muscles are arranged in pairs and are named for their attachments, shapes and/or actions.

The *stay apparatus* is a system of muscles, tendons and ligaments at the front and back of each limb that allows the horse to lock all limbs and remain upright even while asleep. This system includes:

**The check apparatus:** This refers to ligaments that restrain the knee and hock points, and to the superficial and deep flexor tendons in all four limbs. The check apparatus allows the horse to sleep on its feet by locking (or checking) its lower legs in extension with little muscular effort.

**The reciprocal apparatus of the hind limb:** This insures there will be reciprocal flexing and extending of the hock and stifle joints (when the stifle flexes, the hock flexes as well). This apparatus also aids in preventing fatigue when the horse is standing.

**The suspensory apparatus** is the system of ligaments in the lower leg that supports the fetlock joint. This apparatus:

- Carries most of the horse's weight during certain phases of the stride
- Prevents the fetlock joint from overextending or sinking too far toward the ground
- Has a rebound effect which helps the horse's foot leave the ground at each stride
- Is essential to the horse's ability to move and bear weight even at a standstill
- Is slow to heal from injury due to limited blood supply

## Circulatory System

The circulatory system is responsible for effective transmission of oxygen and/or nutrients to all organs and tissues within the body. It is composed of the heart and blood vessels located within the chest, or thoracic, cavity, and the blood vessels that carry blood and lymph throughout the body. The heart is a pump made up of four chambers: the right atrium and right ventricle, and the left atrium and left ventricle. The atria receive blood, and the ventricles pump blood. Blood is pumped from one chamber of the heart to another, and then outward through arteries. Valves prevent blood from flowing in the wrong direction. Arteries carry oxygenated blood away from the heart, and veins carry deoxygenated blood back to the heart. The amount of blood within the circulatory system of an adult horse is approximately nine gallons.

Blood is pumped out of the left ventricle into the aorta, the largest artery in the body. From the aorta, blood passes through progressively smaller arteries until it reaches the capillary beds of the organs, skin, brain, and muscles. Here, oxygen and nutrients are exchanged for carbon dioxide and water. The blood then travels back to the heart through a series of progressively larger diameter veins, ultimately reaching the anterior and posterior venae cavae, then entering the right atrium.

From the right atrium, the blood passes through the right ventricle and into the pulmonary artery. This is the only artery in



the body which carries deoxygenated blood. The pulmonary artery branches into smaller vessels and finally into capillaries surrounding alveoli, or air sacs, in the lungs. Here, carbon dioxide is exchanged for oxygen. Once oxygenated, the blood travels back to the heart via the pulmonary vein, the only vein in the body that carries oxygenated blood, into the left atrium, and then the left ventricle to start the cycle again.

Blood is composed of 65 percent plasma and 35 percent red and white blood cells. Plasma contains water nutrients, waste products, hormones, enzymes, electrolytes and three plasma proteins. The red blood cells, erythrocytes, are produced in the bone marrow and are responsible for carrying oxygen to the body. The white blood cells, leukocytes, are responsible for fighting infections in the event of injury or disease.

The horse's pulse is the rhythmic expansion of the arteries in time with the beating of the heart, or a reflection of the heart rate. The pulse can be taken any place where a large artery is located just beneath the skin. Mature horses run a heart rate of 35 to 45 beats per minute. The pulse should be strong, steady and regular.

## Respiratory System

The respiratory system works in conjunction with the circulatory system to provide oxygen to and remove carbon dioxide from the body tissues. The respiratory system is divided into two parts: the upper and lower tracts.

### The upper respiratory tracts consists of:

**Nostrils and nasal cavity:** Horses breathe through their nostrils and the air enters the nasal cavity which is divided in half by the nasal septum, a partition of cartilage and bone. The nasal cavities are separated from the mouth by the hard and soft palates

**Nasal turbinates:** Located inside the nasal passages, these thin curling bones are covered with mucous membranes and help to warm incoming air as it proceeds to the lungs

**Paranasal sinuses:** Air-filled cavities in the bones of the skull that connect to the nasal cavities. They serve to reduce the weight of the skull and help warm air as it passes toward the lungs

**Pharynx:** A common passage for food and air that is connected to the larynx

**Larynx:** Located between the branches of the lower jaw, the larynx contains the vocal cords, controls air flow, and prevents food, water, and foreign objects from entering the lungs

**Epiglottis:** The flap covering the opening to the windpipe (glottis) when the horse swallows

**Trachea:** A long, cylindrical structure lined with rings of tough cartilage that runs from the larynx to the lungs

### The lower respiratory tract consists of:

**Lungs:** Two organs filling the thoracic (chest) cavity

**Bronchi:** The trachea divides into two bronchi (one for each lung). These bronchi divide into smaller bronchioles inside the lung

**Alveoli:** Air sacs at the end of the bronchioles responsible for the exchange of oxygen and carbon dioxide

**Pleura:** Protective covering of the lungs

**Diaphragm:** A large sheet of muscle running from the underside of the back to the ribs. The diaphragm separates the thoracic cavity from the abdominal cavity. When more air intake is needed, the diaphragm contracts to expand the lungs and allow for greater oxygen intake.

The horse breathes by the contraction and flattening of the diaphragm and the expansion of the ribs. This action pulls air through the nostrils and down into the lungs. The relaxation of the diaphragm causes it to expand and the rib cage to contract, pressing against the lungs to expel air. This action is furthered by the muscles of the rib cage, trunk and abdomen. At the gallop, the hind legs are pulled under the body by the strong action of the abdominal muscles. This action pushes the intestines forward against the diaphragm and lungs, causing the horse to exhale in rhythm with each stride.

## Digestive System

The digestive system is a collective network of organs designed to supply the body with nutrition needed for growth, maintenance and repair. The system is also an elimination system to rid the body of waste. As digestive nutrients are absorbed by the digestive system, they enter either the circulatory or lymphatic systems. Food moves along the digestive tract through muscular contractions called peristalsis. It takes approximately 72 hours for food to pass all the way through the digestive tract.

### The digestive tract of a full size horse is approximately 100 feet long. It consists of:

**Oral cavity:** The teeth cut and grind food. The food is mixed with saliva, which contains enzymes that change plant starch into animal starch that horses can absorb. The tongue pushes the food back toward the esophagus and starts the swallowing process.

**Esophagus:** A musculomembranous tube 49 to 59 inches long which contracts in rhythmic fashion to move the food toward the stomach. Horses are unable to vomit because the esophagus moves only one way.

**Stomach:** A small, muscular sac capable of holding two to four gallons. Food is mixed with saliva and digestive juices and churned into a liquid form in the stomach. Food is chemically broken down by the stomach's secretions of hydrochloric acid,



pepsin, rennin and lipase. The bloodstream then begins to absorb proteins and minerals. The stomach works best when it is approximately two-thirds full. Food then passes through the pyloric valve into the small intestine.

**Small intestine:** A looping, folding tube approximately 70 feet long and covered with villi (small, hair-like projections that increase the surface area for the absorption of nutrients). The pancreas and liver provide digestive juices that break down nutrients including proteins, carbohydrates, fats and minerals and allow them to be absorbed by the bloodstream. The small intestine consists of three parts:

**Duodenum:** Receives the secretion of pancreatic juice from ducts in the pancreas and the liver which changes the food from an acid concentration to a more basic form. The added enzymes aid in the breakdown of proteins, fats and starches. Most chemical digestion occurs in the duodenum.

**Jejunum:** This main part of the small intestine is where most proteins are absorbed into the bloodstream.

**Ileum:** The last 40" or so of the small intestine. A valve at the end of the ileum controls the flow of food into the cecum.

**Large intestine:** A tube about 25 feet long where most grass, hay and bulky plant material are digested by bacteria and converted to fatty acids. The bacteria also manufacture some essential vitamins and amino acids. Solid wastes are collected here.

The large intestine consists of four parts:

**Cecum:** a four foot long pouch where roughage is broken down by fermentation

**Large colon:** A 12 foot long tube where the last of the nutrients are broken down and absorbed. These nutrients are mostly carbohydrates that have been derived from cellulose

**Small colon:** A 10 foot long tube where manure balls are formed and water is absorbed

**Rectum:** a 12 inch long holding chamber located at the end of the digestive tract

**Anus:** Terminal structure of the digestive system

## Integumentary System

The integumentary system is made up of the skin and hair of the horse and provides structural, photo-protective, immunologic and metabolic barrier protection. The skin is the largest organ of the body. It is composed of three layers:

**Epidermis:** The thin outer layer of highly cellular tissue

**Dermis:** A thicker layer under the epidermis that contains sweat glands, sebaceous glands, hair follicles, blood vessels and nerves

**Subcutaneous fat:** A layer of loose connective tissue that attaches the skin to the underlying structures and aids in insulating the body

The hair and skin serve several critical functions for the horse:

- Provide an immune barrier to potentially dangerous foreign bodies and toxic substances
- Regulate the internal temperature through the use of sweat glands
- Protect the body from ultraviolet radiation
- Provide insulation in cold temperature
- Excrete waste
- Synthesize vitamin D

## Nervous System

The nervous system is the command and control center for the horse's body. It is a complex interaction between elements designed to originate or carry electrochemical charges to and from organs to initiate and regulate bodily functions, and to allow the horse to functionally relate to its environment. A horse is born with a full complement of nerves and does not produce any more during its lifetime.

The nervous system is divided into two parts: the central nervous system (CNS) and the peripheral nervous system (PNS). The CNS lies within a series of protective bones and is the center of all nerve control. The PNS controls the activity of smooth muscle, cardiac muscle, and glandular functions.

### The central nervous system consists of:

**Brain:** Located within the skull, the brain is divided into two halves. These cerebral hemispheres are the control center for the entire nervous system. The brain is made of three sections:

**Cerebrum:** The largest of the three parts. Responsible for memory, sensory awareness, learning and muscle movement

**Cerebellum:** Coordinates muscle activity and movements and controls body posture

**Brainstem:** The intermediary between the cerebrum, cerebellum and spinal cord. Influences heartbeat, breathing, vision and learning. The brainstem contains the hypothalamus, which is the link between the nervous system and the endocrine system

**Spinal cord:** The path of activity for transmission of nerve impulses between the brain and the rest of the body.

The peripheral nervous system acts as the communication between the CNS and the body. It consists of nerve bundles extending out from the CNS to the body and limbs. These nerve bundles may be classified by function into afferent and efferent nerves. The afferent nerves carry signals from the body to the CNS, while the efferent nerves carry signals out from the CNS to the body.

The spinal cord acts as a path of activity for transmission of nerve impulses between the brain and the rest of the body. It is held within the vertebral column, and acts as the coordinator for certain reflex activities involving muscles of limbs without first having to go through the brain. The large spinal nerves contain numerous smaller nerves that are classified into two types of nerve fibers: somatic nerve fibers and autonomic nerve fibers.

Somatic nerve fibers carry information to and from skeletal muscles, skin, joints and appendages. They act on voluntary control from the brain and their action leads to contraction of muscle.

Autonomic nerve fibers act mainly on reflex with little voluntary control from the brain. They control body functions such as blood pressure, breathing, temperature, et cetera. Autonomic nerves make connections to smooth muscles in blood vessels and glands throughout the body.

The CNS is supplied with input from an extensive array of sensory receptor cells scattered throughout the body. These pick up changes in mechanical trains and keep the brain updated about relative positions of the limbs, the neck and the head. The horse has extremely sensitive vision, hearing and smell which allow it to remain alert and ready to respond to danger.

## Endocrine System

The endocrine system is a complex network of glands responsible for production and secretion of special proteins and lipids called hormones. Hormones are chemical messengers secreted into circulation by an endocrine gland. They serve to regulate many vital functions within the body, from growth and development to digestion and utilization of the nutrients. Their proper function is vital to overall health.

There are two types of glands within the endocrine system: endocrine and exocrine. Endocrine glands secrete hormones directly into the blood. Exocrine glands secrete products into ducts which lead directly to the external environment.

### Endocrine glands include:

**Pituitary gland:** Produces hormones that affect other endocrine organs

**Thyroid gland:** Works with the parathyroid to maintain proper level of calcium and produces hormones that control the rate of growth and the metabolic rate

**Adrenal gland:** Produces adrenaline, noradrenaline, cortisol and corticosterone which control the metabolism and respond to stress and exercise

**Pineal gland:** Produces melatonin which affects the circadian rhythm

**Pancreas:** Produces pancreatic juice and insulin to control glucose levels in body

**Ovaries and testicles:** Produce hormones that regulate reproduction

**Thymus:** Influences cells of the immune system

Certain organs also assist the endocrine system in maintaining balance with the body's functions. The liver converts amino acids into proteins, stores glycogen, produces bile and regulates the nutrients carried in the blood. The kidneys produce renin, which regulates blood pressure. The stomach produces gastrin and secretin to aid in digestion.

The hypothalamus is located at the bottom portion of the brainstem and functions as an integration center between the nervous system and the endocrine system. The main function of the hypothalamus is to control the hormones released by the pituitary gland and to regulate the nervous system functions.

## Immune System

The immune system is a network of cells, organs, and special chemicals that work together to protect against infectious invaders and eliminate foreign matter or cells. Stem cells, located within the bone marrow found in the bones of the musculoskeletal system, give rise to all cells of the immune system.

When a horse is exposed to an infectious agent to which it does not have any immunity, it becomes ill and starts to make antibodies against that particular germ. This creates protection against reinfection and creates immunity to that particular infection.

### There are five different types of white blood cells in the horse:

**Neutrophils:** The most common white blood cells. These cells move rapidly to sites of infection or inflammation within the body and will destroy bacteria entering the body

**Monocytes:** Cells that are important in the breakdown of damaged tissue

**Eosinophils:** Cells that are most commonly associated with parasitic disease and allergic conditions

**Basophils:** Cells that indicate long standing allergic disease or ongoing recovery from colic

**Lymphocytes:** Cells with the greatest responsibility for managing the immune system. They produce antibodies to attack infectious organisms. Lymphocytes possess “memory” or the ability to remember organisms they fight against and attack them if they show up again in the body. There are two types of lymphocytes:

**B lymphocytes:** Responsible for producing antibodies that coat invading organisms or foreign substances to make them easier to identify

**T lymphocytes:** Responsible for producing antibodies to viral infections and cancer

#### **The tissues of the immune system include:**

**Bone marrow:** Produces all cells of the system. Some cells stay in the bone marrow and mature there, while others go to the thymus.

**Thymus:** Organ located in the neck region of young horses where most T cells mature. The thymus gradually disappears as horses age.

**Lymph nodes and lymph tissue:** Lymph nodes are clusters of germinal cells within a connective tissue framework that occur along lymph vessels. Lymph tissue provides the first line of defense against foreign invaders along the respiratory tract.

**Lymph:** Colorless fluid containing white blood cells. Lymph bathes the tissues and drains through the lymphatic system into the bloodstream.

**Lymphatic vessel:** Channels that carry lymph throughout the body.

#### **The chemicals of the immune system include:**

**Interferon:** A protein produced and released by cells that have been invaded by or come in contact with a virus. Interferon is quick-acting and surrounds healthy cells while prompting the immune system to react.

**Interleukins:** Chemicals produced by white blood cells that control and modulate the activity of T cells during an immune response.

**Complements:** Special proteins produced by the body that attach to the surface of antibodies. When antibodies bind to bacterium or an infected cell, complements burn a hole in the cell membrane, which leads to cell destruction.

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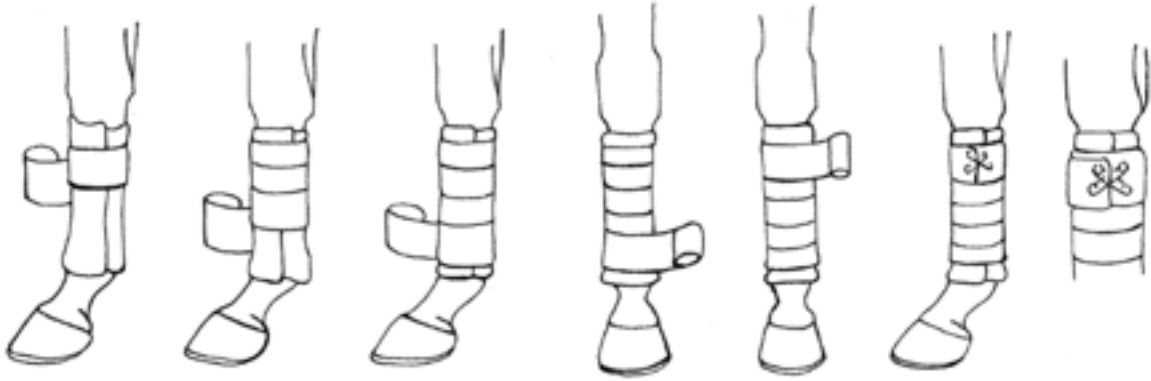
USHJA Trainer Certification Manual and Study Guide, 2010

# BANDAGING

Bandaging is a very important skill. Bandages must be applied correctly; otherwise, they can do more harm than good. The best way to learn to bandage is by observing an experienced horseman. Once you understand the basics of bandaging, practice under supervision until your bandages pass muster. Know what type of bandage you are applying and understand its purpose. If you are in doubt, no bandage at all is better than a poorly or improperly done bandage.

Bandages should be applied in pairs (either both front or both hind legs), and all the legs should be bandaged by the same person to make sure the same amount of tension is used.

Common bandages consist of two parts: the inner padding and the outer wrap. The inner padding is commonly known as the cottons. Depending on the job, cottons can be ready-made cotton leg quilts, no-bow quilts, sheet cotton or Fybagees®. The outer wrap is commonly referred to as the flannel, but may be made out of flannel, knit or stockinette (track bandages). The flannel is between four to six inches wide and nine to 16 feet long. Most commercially available flannels come in a nine-foot length.



## Correct Bandaging

When you are learning to bandage, start with thick cottons and 100 percent flannel bandages. The horse's leg and bandage materials should be dry.

### To bandage a leg:

1. Start the bandage at the top of the leg, wrap toward the bottom, then back up again and end at the top of the leg. Wrap both the bandage and cotton in the same direction around the horse's leg. The cotton should be smooth and free of ridges and wrinkles.
2. Legs should be wrapped front to back and outside to inside, or counterclockwise on the left legs and clockwise on the right legs.
3. The bandage should have a firm, uniform pressure on the entire leg, and the tension should be applied to the front of the leg, never across the tendon.
4. The bandage should go to the edge of the cotton but not completely over it. When finished, the bandage may be fastened with bandage pins, masking tape or Velcro. The tension of the closure should match the tension of the bandage.

When removing a bandage, squat down and rapidly pass the bandage from hand to hand until it is completely removed from the leg. Never re-roll the bandage as it comes off the horse's leg. This is an awkward action that increases the potential of injury.

## Types of Bandages

Horses may wear bandages for a number of reasons. The most common bandage types are:

- Stable
- Shipping
- Exercise
- Treatment

### STABLE BANDAGE

A stable bandage can be used to provide warmth or support, prevent swelling, treat injuries, or hold a dressing in place. It also acts as a base for a hock or knee bandage.

Stable bandages are always applied in pairs and must be reset at least every 12 hours. The bandages cover the area from the top of the cannon bone to the bottom of the fetlock. When applying the bandage, make sure to drop the wrap around the bottom of

the fetlock joint and bring it up on an angle in front. This should create an upside-down “V” at the front of the joint, providing support to the joint and allowing the leg to bend.

## SHIPPING BANDAGE

A shipping bandage is used to support and protect a horse's legs when the horse is in transit. This bandage covers the area from the top of the cannon bone down past the coronet band and sometimes over the heels. It should be fastened securely to avoid the bandage slipping or coming undone in travel.

## EXERCISE BANDAGE

An exercise bandage is used to provide support and protection during exercise and is generally less bulky than other bandages. It is important to apply exercise bandages properly to avoid great harm to the horse's legs. When applying the bandage, make sure to drop the wrap around the bottom of the fetlock joint and bring it up on an angle in front. This should create an upside-down “V” at the front of the joint, providing support to the joint and allowing the leg to bend. Again, the inner padding and the outer wrap should always be wrapped in the same direction and no pressure put on the tendon.

Another form of exercise bandage is the polo wrap. Polo wraps are made out of polar fleece and are not intended for use while galloping or jumping. They do not provide as much support or protection as a traditional exercise bandage. They also absorb water and tend to slip during wet conditions.

## TREATMENT BANDAGES

### Ice Bandages

Ice bandages can be used to reduce inflammation and swelling. This topic is covered more in the Therapies chapter.

### Heat Bandages

Heat can be used in the form of either a hot poultice or a sweat wrap. Both methods draw heat to an area and increase circulation to promote healing.

The easiest form of a hot poultice is a commercially prepared ready-to-use poultice. Care must be taken to not heat the poultice to a temperature that will burn the horse's leg. Poultices should not be applied to a leg that has broken skin.

Sweat wraps, or sweat bandages, are usually used on injuries that are older than 48 hours and have sustained swelling. Sweat bandages should not be left on the horse for longer than eight hours. Do not apply sweat bandages over liniments, blistering agents or topical ointments that heat upon application, as this may burn the horse's skin.

### To apply a sweat bandage:

1. Start with a clean leg.
2. Apply the sweat recommended by your veterinarian. Nitrofurazone is a common sweat.
3. Cover the area with sheet cotton.
4. Apply the cotton inner wrap.
5. Cover with plastic wrap, which holds in heat and stops evaporative cooling. This creates a fluid barrier and heats the leg rapidly. If plastic wrap is not available, disposable diapers or brown paper bags may be used. If using a brown paper bag, cut it to fit the leg.
6. Apply flannel outer wrap.

### Pressure Bandage

A pressure bandage is used to control swelling after an acute injury, stop bleeding, help the reattachment of a skin flap and inhibit the formation of proud flesh. The idea behind this bandage is the application of firm counter-pressure that stops bleeding and prevents swelling. Unlike other bandages, it is wrapped in whichever direction supports closure of the wound.

Unless the wound is bleeding profusely, start by cleaning it. Use a running hose above the injury to flush any contaminants from the wound. Place a sterile gauze pad on the wound and bandage with Vetrap™. Use firm, even pressure. If blood soaks through the wrap, bandage over top of the earlier bandage. Only allow the veterinarian to remove the pressure bandage. This type of pressure bandage cannot be left on more than a few hours to avoid compromising circulation.

To inhibit the growth of proud flesh, control swelling, or aid in the reattachment of a skin flap, cover the wound with a sterile dressing and wrap the leg with cling gauze. Next, wrap sheet cotton around the leg and then bandage over top with an elastic dressing such as Elastikon® or Vetrap™. If the wound needs air, it is better to use Elastikon® because it breathes better than Vetrap™.

### Figure Eight Bandage

A figure eight bandage is used to stabilize the knee or hock after an injury. It is generally used after the first 48 hours of an injury have passed and creates more pressure points than a spider bandage (see p. 15 for more information on the spider bandage).



**To wrap a knee:**

1. Start by wrapping the lower leg with a stable bandage. Place the padding from mid-forearm to mid-cannon.
2. Start wrapping from the bottom of the wrap. Tuck the end of the bandage in the cotton and wrap over once or twice for security.
3. Take the wrap up across the front of the knee, wrap once across the top of the padding and then back down diagonally across the front of the knee. This forms a figure eight. Never wrap over the bony part at the back of the knee.
4. Continue until you reach the end of the bandage.
5. It may be necessary to finish with a second bandage over top of the first. The bandage should end at the bottom on the outside of the leg. Secure the bandage with bandage pins.

**To wrap a hock:**

1. Start with a stable bandage on the lower leg. Start as you did for the knee, making sure to go diagonally across the front of the hock.
2. As you are making the first wrap at the top of the hock, place a rolled bandage or thick sanitary napkin in the hollows by the Achilles tendon at the top of the hock. Bandage over this extra padding.
3. Continue wrapping diagonally across the hock and end at the bottom of the bandage.
4. It may be necessary to use a second bandage. Never bandage over the point of the hock. Secure the bandage with bandage pins.

**Spider Bandage**

A spider, or many tailed, bandage is used to stabilize a joint for the first 24 to 48 hours after an injury. The bandage gets its name from the “legs” at either end of the bandage attached to the solid middle. You can make a homemade spider bandage by using a 24 by 30 inch piece of flannel, T- shirt, or blanket. Cut the two ends into strips of approximately 10 inches long and 1½ inches wide. This will leave a section of about 10 to 12 inches in the center of the bandage.

**To apply a spider bandage:**

1. Start by wrapping the lower leg with a stable bandage. Pad the joint with sheet cotton or terry cloth towels. The padding must be able to conform to the joint and should cover the area from mid-forearm or mid-gaskin to mid-cannon. Be careful to use enough padding to avoid pressure damage to the Achilles tendon above the hock, the point of hock, or the bony prominence behind the knee.
2. Place the spider bandage so that it covers the point of the hock or the front of the knee.
3. Tie the tails of the spider bandage on the outside of the joint. Start by tying the middle so that the bandage stays in place.
4. Starting at the top, tie square knots all the way down the leg and tuck the ends under the next knot to eliminate loose ends. Another way to secure the bandage is to French braid the tails down the leg. This method conforms well to the leg and produces fewer pressure points.

**Hoof Bandaging**

Hoof bandages protect the horse's feet, hold topical medications on the foot and treat a heel grab. To protect the foot after losing a shoe, use an elastic adhesive, such as Elastikon®, to protect the hoof from chipping and breaking up. For medication purposes, use a hoof pad to hold medication on the hoof. This is created by placing a disposable diaper with the plastic side out over the topical medication. Once the diaper is in place, the foot can be wrapped with a bandage such as Vetrap™. Do not bandage over the coronary band with duct tape as it can cause loss of circulation to the foot.

For heel grabs, clean the wound and apply a topical ointment. Cover the injury with a sterile gauze dressing and wrap the heel, coronary band and foot with elastic adhesive tape. Wrap tightly enough to hold the edges of the wound together and cover the bottom of the hoof with duct tape to make the wrap more durable.

**Wound Bandaging**

Most leg wounds benefit from being bandaged. Healthy granulation tissue forms more quickly in a bandaged wound, which leads to accelerated healing. A bandage provides support to the wound as the new skin cells migrate across its surface, and the slight pressure reduces the growth of proud flesh. Most wounds should stay bandaged until a healthy granulation bed is present. Bandaging is no longer necessary when the injured area has contracted down to the size of a nickel.

Bandages help stop the environmental contamination of wounds, preventing irritants such as manure, soil and clay from getting into the wound. The bandage keeps the wound warm, which promotes healing. Wrapping a wound also helps prevent evaporative fluid loss. A moist wound heals more quickly than a dry wound.

When a skin flap is present, the slight pressure of a bandage may help encourage reattachment. A light pressure bandage helps to relieve swelling, which, if present, would restrict circulation and oxygen supply to the wound. Wounds that are bandaged with cotton pads and breathable elastic tape (such as Elastikon®) can still receive oxygen.

Bandaged wounds do not tend to form the same thick, hard scabs that unbandaged wounds produce. Bandaged wounds are less inflamed, dehydrated, and contaminated than if they were left open. Although bandaged wounds can form more granulation tissue than their unbandaged counterparts, they are less susceptible to scar tissue.

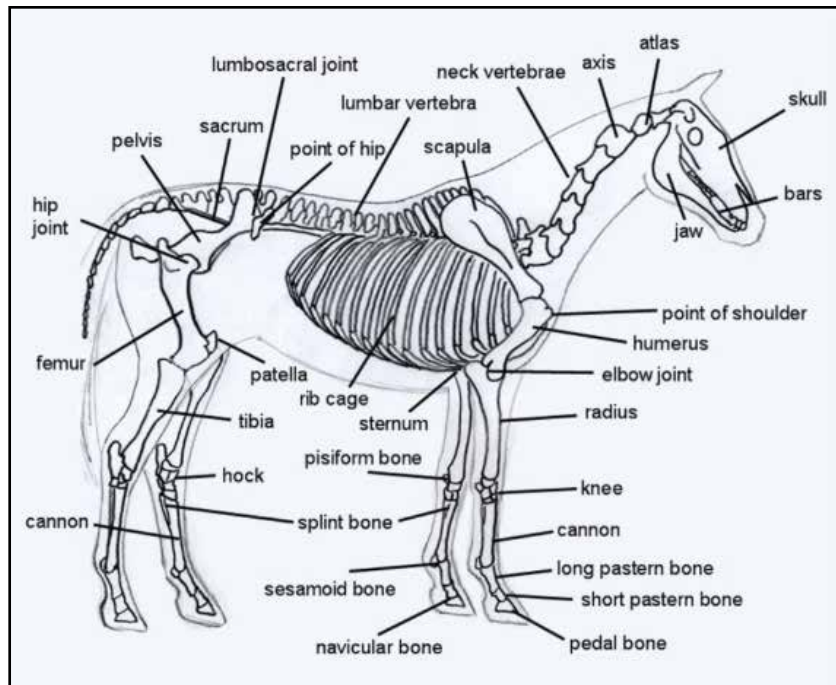
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## CONFORMATION

Conformation refers to the horse's physically inherited structure. A horse's conformation can have a direct impact on its soundness, movement and athletic ability.

When evaluating conformation, stand the horse squarely on a flat, level surface. Observe the horse from both sides, from the front and from the rear.

A horse with excellent conformation is well-suited to perform a variety of tasks.

Ideal conformation may vary somewhat, depending upon the particular sport or discipline.

Excellent conformation does not guarantee excellence in performance, but poor conformation invariably contributes to structural weakness, unsoundness, or impaired performance.

### Ideal Conformation

When it comes to equine conformation, perfection will always be something to be pursued rather than produced. However, it is possible to find horses that display varying degrees of ideal conformation.

Ideal conformation allows the horse to more readily:

- Exhibit connected, ground-covering movement.
- Develop self-carriage and balance.
- Learn to lighten its forehand.
- Shift its center of gravity toward the haunches.
- Deliver impulsion, power and acceleration.
- Distribute weight more equally between front and rear.
- Develop agility and flexibility.
- Remain sound when working.

### GENERAL ASPECTS OF IDEAL CONFORMATION

In general, a horse exhibiting ideal conformation is square, even, balanced, and symmetrical.

The ideal horse is square. This means that without including the head and neck, the horse is as long as it is tall. The distance from the point of shoulder to the buttocks should be equal to the distance from the top of the withers to the ground.

The ideal horse's body is even. A straight line drawn from the withers to the croup should be level with (or slightly higher than) the croup.

The ideal horse's body is balanced. Excluding the head and neck, the shoulders, barrel and hindquarters should each make up approximately one-third of the horse's overall body area.

The ideal horse's body is symmetrical. When viewed from the front or the rear, both left and right sides look the same. The hips are both at the same height. The legs on the left are the same length as the legs on the right. The shoulders exhibit the same slope and muscling. The spine runs straight from the horse's ears to its tail.

Ideal conformation takes into consideration all aspects of the horse's structure including the head, neck, chest, shoulders, back, body, hindquarters and legs.

## **HEAD**

The head should be in proportion to the horse's body.

A broad forehead should separate large eyes situated at the corners.

The ears are well-set on top of the horse's head, and not overly large.

When viewed head-on, both sides of the head are symmetrical.

## **NECK**

The throatlatch, where the head attaches to the neck, is clean and clearly defined, allowing the head full range of motion.

The neck is flexible and graceful.

When viewed from the side, the neck should be slightly longer along the crest than from throatlatch to shoulder.

The neck should join the chest just above the point of shoulder.

For optimum balance and agility, the neck should account for approximately one-third of the horse's overall length.

## **CHEST**

The chest should be deep enough to allow adequate room for good heart and lung development.

The chest should be symmetrical when viewed from the front.

## **SHOULDERS**

The shoulders should slope evenly, with each side inclined at the same angle.

approximately one-third of the horse's overall body (excluding the head and neck).

A horizontally sloping shoulder generally results in a more forward-reaching, ground covering stride.

A vertically sloping shoulder generally results in greater knee action through the gaits.

## **BACK**

When viewed from the side, the withers should be well-defined and level with (or slightly higher than) the horse's croup.

When viewed from above (as when astride), the withers should be symmetrical in both placement and definition.

The back is of medium length, neither too long nor too short.

The loins are short and well-muscled.

The back is relatively straight in young horses. It drops slightly and changes in contour and muscle development as the horse matures.

## **BODY**

The barrel is well-rounded and symmetrical when viewed from the front.

When viewed from the side, the body should account for roughly one-third of the horse's mass.

For optimum weight-bearing, coordination and overall soundness, the horse's topline (from withers to croup) is slightly shorter than the underline (from elbow to stifle).

## **HINDQUARTERS**

A more horizontal croup and pelvis result in increased speed and longer stride.

The more steeply sloped the croup and pelvis, the more strength and power in the horse's hindquarters.

Long croup muscles are necessary for speed and impulsion.

The hindquarters should be rounded, even and symmetrical when viewed from behind.

## **LEGS**

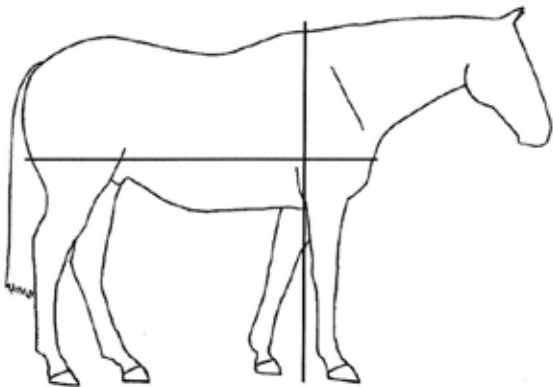
The forelegs should be vertically aligned with the point of shoulder when viewed from the front.

Forelegs should be straight, with flat knees and no rotation of the cannon bone.

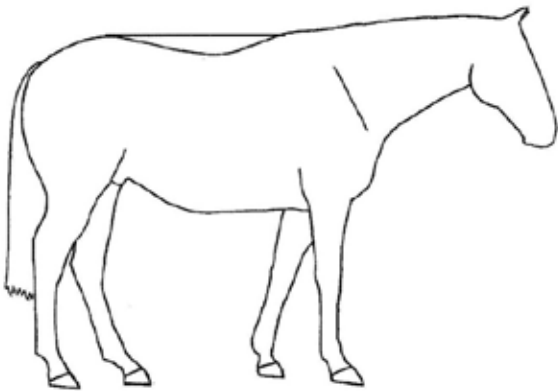
The upper forearm should move freely back and forth, with unrestricted elbow movement.

The cannon bone should be shorter than the forearm on the front legs. The cannon bone is longer in the hind legs.

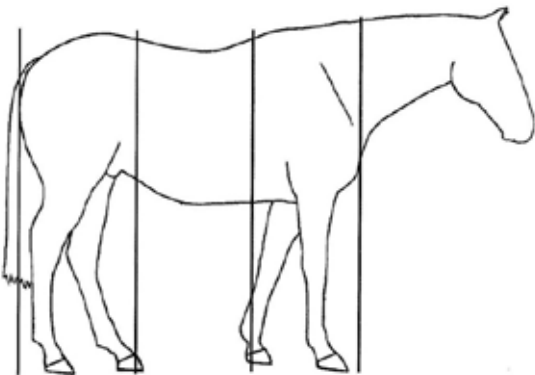
## Ideal Conformation



The ideal horse is square.

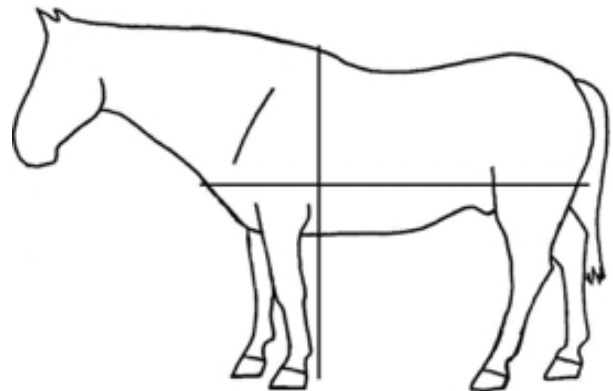


The ideal horse's body is even.

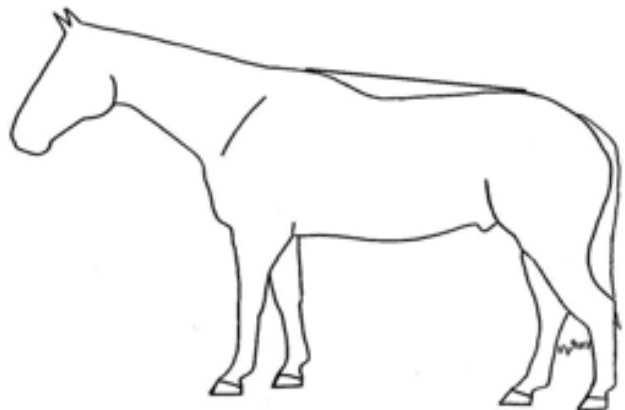


The ideal horse's body is balanced.

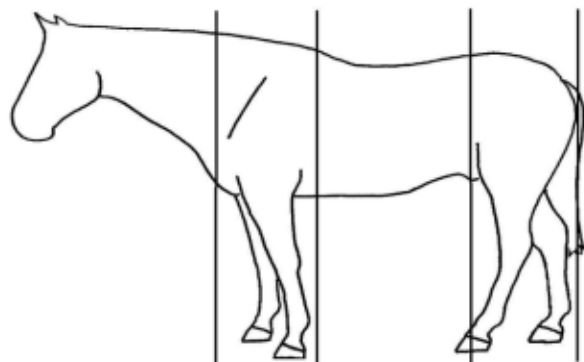
## Poor Conformation



Body too long and legs too short. The line from the point of shoulder to the buttocks is longer than the line from the top of the withers to the hoof.



A high-withered horse is unbalanced and runs "downhill." A horizontal line from the croup to the withers is not level.



A poorly balanced horse. Four vertical lines dissect the horse's body into three unequal sections.



When viewed from the side, a line connecting stifle and elbow should be horizontal.

The gaskin should be slightly shorter than the thigh.

When viewed from the side, the hind leg should be straight and in line with the point of the buttock.

When viewed from the side, the hock should be wide from front to back.

When viewed from behind, the hind legs should be straight (though the hind feet may naturally toe out slightly).

In general, the angles of hooves, pasterns and shoulders should be the same.

A moderately long, sloping pastern provides suspension and concussion absorption.

## Common Conformation Faults

No horse is without flaw. Some faults and flaws are merely cosmetic, while others are more serious structural defects.

### Poor conformation can contribute to many undesirable traits, including:

- Lack of coordination
- Rough gaits
- Chronic soreness and/or fatigue
- Unsoundness
- Instability
- Poor jumping technique
- Limited athletic ability

An important part of any equestrian's education is an awareness of conformation shortcomings that may affect the horse's performance or soundness.

## GENERAL ASPECTS OF POOR CONFORMATION

In general, a horse with poor conformation is rectangular, uneven, unbalanced, or asymmetrical. Often, such a horse will exhibit one or more of the following faults:

The poorly constructed horse's body is rectangular. If the horse's body is longer than it is tall, the back, loins, and body may be elongated and prone to weakness. If the body is proportionate, the legs may be too short. If the horse is extremely leggy, and taller than it is long, it is almost certain to have issues with soundness and consistency.

The poorly constructed horse's body is uneven. A straight line drawn from withers to croup is several degrees from the horizontal. Problems with saddle fit will invariably result. Such conformation often contributes to fatigue, unsoundness and difficulties in balance and weight-bearing.

The poorly constructed horse's body is unbalanced. If the shoulders, barrel, or haunches each account for significantly more or less than one-third of the horse's overall body area, the horse's weight will be disproportionately distributed. Lack of coordination, unsoundness, uncomfortable gaits and structural weakness can result.

The poorly constructed horse's body is asymmetrical. When viewed from the front or the rear, there is a noticeable difference between the structure or development of the left and right sides. Asymmetry is a greater structural defect than matching flaws.

Uneven hips, differently sloping shoulders, discrepancies in length of legs, inconsistent muscling and a spine that twists or curves on its way from the horse's ears to the tail are all examples of asymmetrical conformation. Lameness, chronic discomfort and gait inconsistencies are to be expected.

Undesirable conformation can affect the horse's performance in a variety of ways. Some of the most common faults include:

## HEAD

An overly large, coarse head may load significant weight and stress on the horse's front end.

A deep, pronounced dish to the horse's profile constricts the nasal passages and can interfere with the horse's athletic performance.

Parrot mouth refers to when the horse's upper jaw extends well past the lower jaw. This genetic trait is considered an unsoundness. Horses with parrot mouths require frequent competent dental care.

Small eyes set close together can point to impaired vision and/or depth perception.

When viewed head-on, asymmetry may indicate teeth, jaw, or nasal problems.

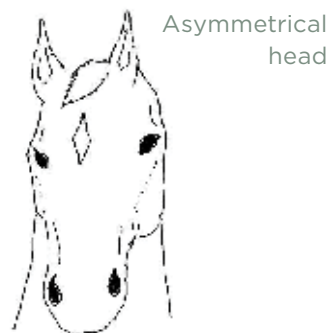
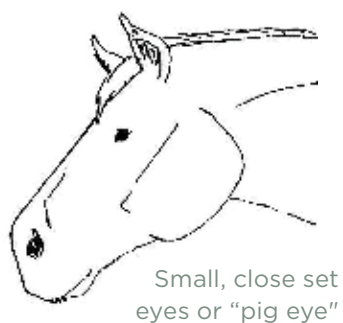
## NECK

A very narrow throatlatch can limit the horse's ability to take in enough air or to breathe efficiently.

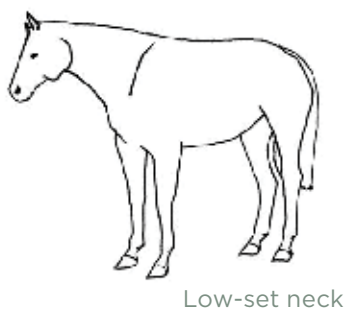
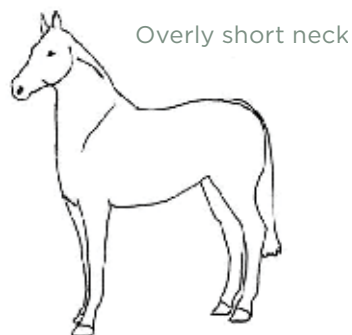
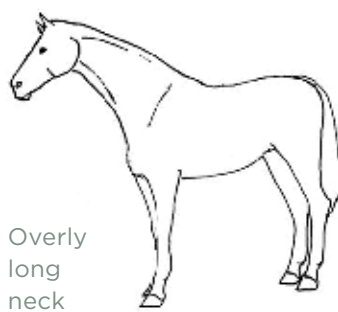
An overly long neck can contribute to fatigued neck muscles, front-heavy weight distribution and inefficient body use.

A very short neck reduces fluidity, flexibility and maneuverability. It restricts the foreleg's range of motion and can result in short-strided, rough gaits.

## HEAD



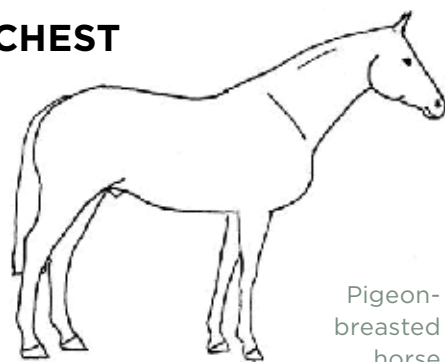
## NECK



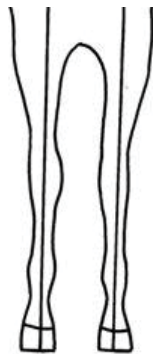
A very low-set neck restricts the horse's freedom of shoulder movement. It also causes the horse to carry more weight in front, and to strike the ground with greater concussive force.

An ewe neck (a short crest resulting in an "upside down" appearance to the neck) is often compounded by elevated head carriage and a braced, hollowed back, making correct engagement and impulsion impossible.

## CHEST



Pigeon-breasted horse



Correct Stance



Base Narrow Stance



Base Wide Stance

## CHEST

When viewed from the side, a pigeon-breasted horse appears front-heavy, with a prominent, protruding chest, and with front legs positioned too far under the body. In motion, the horse exhibits a marked lack of agility and coordination.

The base-wide chest is wider in front of, rather than behind, the girth area. Elbow movement is restricted and girth sores often result.

A very narrow chest is generally associated with sore knees, splints and decreased front-end coordination.

A shallow chest affords no room for a well-developed heart or lungs. Shallow chests are usually also poorly developed.

## SHOULDERS

An excessively straight, upright shoulder leads to exaggerated knee action, limits a horse's ground-covering ability and results in more concussion with every stride.

A short humerus (from point of shoulder to elbow) will result in short strides and limited agility.

## BACK

A very short back limits the horse's scope.

An overly long back is prone to fatigue and weakness. It also limits a horse's coordination and collection.

Long loins reduce the horse's ability to use the hindquarters properly for impulsion.

A sway back indicates weakened ligaments and muscular attachment. It is often associated with chronic pain.

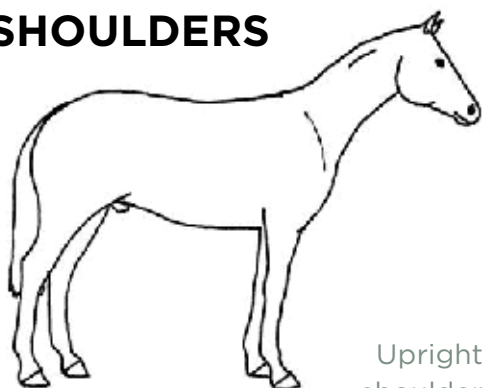
A roached back occurs when the spine rounds up in an "arch." A roached back inhibits a horse's flexibility. Riding a roached back horse for any significant length of time may result in chronic soreness and soft tissue damage.

## BODY

The ribs of a slab-sided horse are more straight up and down than wide and curved. They inhibit the horse's respiration and heart development.

Low, mutton withers and/or a very high croup will cause the saddle and rider to shift forward, affecting the horse's balance and agility and inhibiting the shoulders.

## SHOULDERS



Upright shoulder

## HINDQUARTERS



Hunter's bump

Excessively high, prominent withers will tend to shift the saddle and rider out of position and onto the horse's loins, where the horse's back is least capable of weight bearing. If the girth also shifts toward the back, the horse's lung capacity may be compromised.

## HINDQUARTERS

A short croup will limit the horse's impulsion, leverage and power.

A hunter's bump on the croup may indicate strained ligaments and damage to the sacroiliac joint.

When viewed from behind, one hip higher than the other can indicate uneven legs or chronic favoring of one side.

## LEGS

When viewed from the front or the side, any deviation in foreleg straightness—including the horse being bench-kneed, bow-legged, calf-kneed, knock-kneed, over at the knee, pigeon-toed, splayfooted, or toeing out—indicates potential structural and soundness issues.

A pigeon-toed horse is likely to paddle.

A splayfooted horse "wings out."

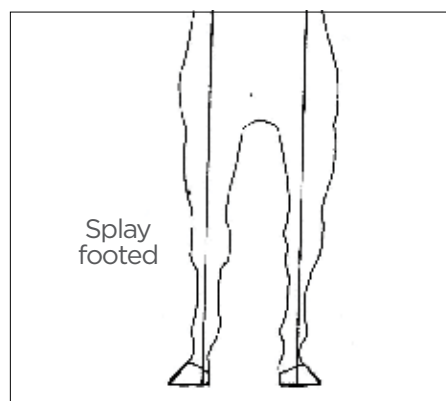
When viewed from the front or the side, any deviation in hind leg straightness—including the horse being bowlegged, cow-hocked, camped out, post-legged, or sickle-hocked—indicates potential problems with structure, soundness, power and impulsion.

Very short, upright pasterns make for poor shock absorption. They increase the horse's tendency for developing ringbone, or arthritis of the pastern, and are associated with navicular disease.

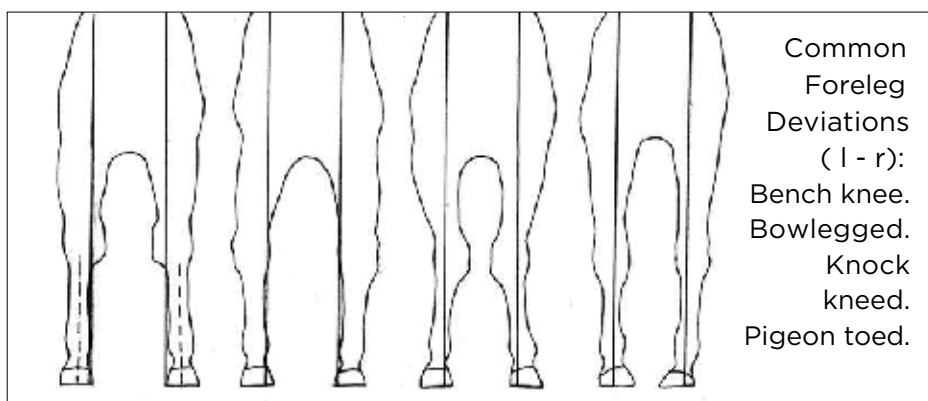
A horse with very long, sloping pasterns has a greater tendency to develop lamenesses including soft tissue injuries and bowed tendons.

Excessively sloping pasterns are structurally weak and tend to deteriorate.

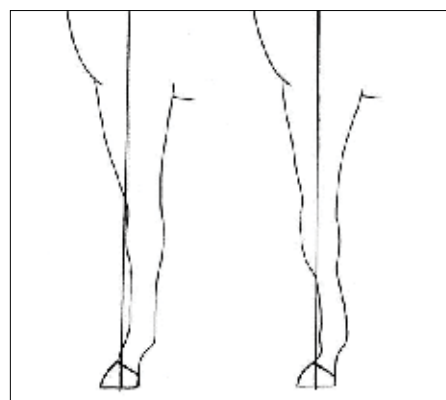
## LEGS



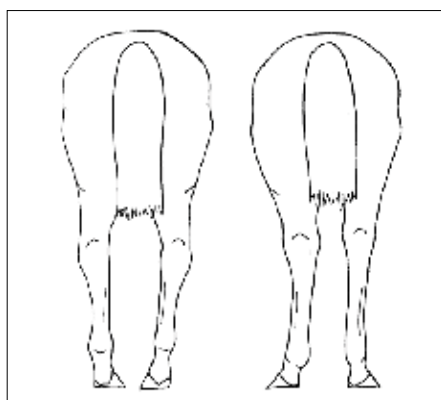
Splay footed



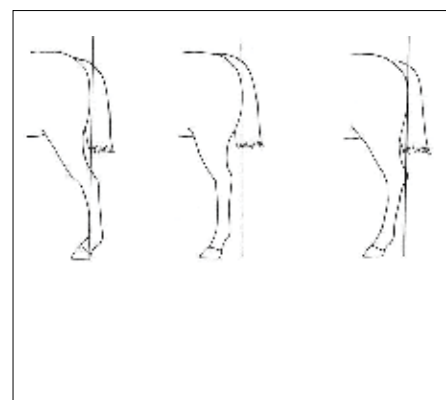
Common Foreleg Deviations (l - r): Bench knee. Bowlegged. Knock kneed. Pigeon toed.



(l - r): Calf kneed (back at the knee). Buck kneed (over at the knee).



(l - r): Bowlegged. Cow hocked.



(l - r): Camped out. Post-legged. Sickle hocked.

## Common Blemishes

A blemish is not necessarily a conformation fault or an unsoundness. A blemish is a visible imperfection generally caused by stress or injury.

Some “blemishes” are in the eye of the beholder. For instance, some may consider a Roman nose or overly large ears an unsightly blemish, while others may find such features aristocratic or endearing.

Cosmetic blemishes do not significantly affect the horse's soundness or athletic abilities.

Common blemishes (which may or may not render a horse unsound or unrideable) include:

### BOG SPAVIN

Bog spavin occurs when fluid builds up in the hock joint as a result of inflammation.

Bog spavin is generally only unsightly. It may, however, be an indicator of a far more serious condition such as osteochondrosis (OCD) and require surgical removal.

Bog spavin is not to be confused with bone spavin, which is due to degenerative arthritis.

### BOWED TENDON

When a tendon and its surrounding tissues stretch too far, they can tear or rupture, and fail to return to their original length. A bowed tendon results.

Poor physical condition, quick turns, excessive concussion, and work on poor footing can all contribute to the acute injury that results in a tendon bow.

Conformation that includes long, upright pasterns or a foot with a long toe and low heel can cause the fetlock joint to overextend upon impact—leading to ligament tearing and tendon bows.

### CAPPED HOCKS AND ELBOWS

Injury or irritation of the hock or elbow may result in a noticeable swelling or cap.

Generally, after the initial trauma subsides, the resulting cap is merely a cosmetic blemish. Occasionally, however, a cap may impair performance.

A capped hock occurs from a localized injury at the point of hock or from damage to the Achilles tendon.

A capped elbow or shoe boil may result from the horse repeatedly hitting itself in the elbow while shod.

### CLOUDY EYES

A spot or larger “cloudy” appearance on a horse's eye can indicate a corneal ulcer or laceration. Vision may be negatively affected.

Equine Recurrent Uveitis (ERU), also known as moon blindness or periodic ophthalmia is a common cause of equine blindness. Cataracts develop from recurring irritation and inflammation and turn the lens opaque. Any breed may be affected. An estimated eight to 25 percent of all horses in the U.S. have ERU.

### CLUB FOOT

Club-footed horses have a hoof angle that is usually greater than 61 degrees. Because of the high heel and short toe, they tend to land heel-first. Lameness is not always the end result. However, the coffin bones, navicular bones and soles of club-footed horses are more prone to bruising and stress.

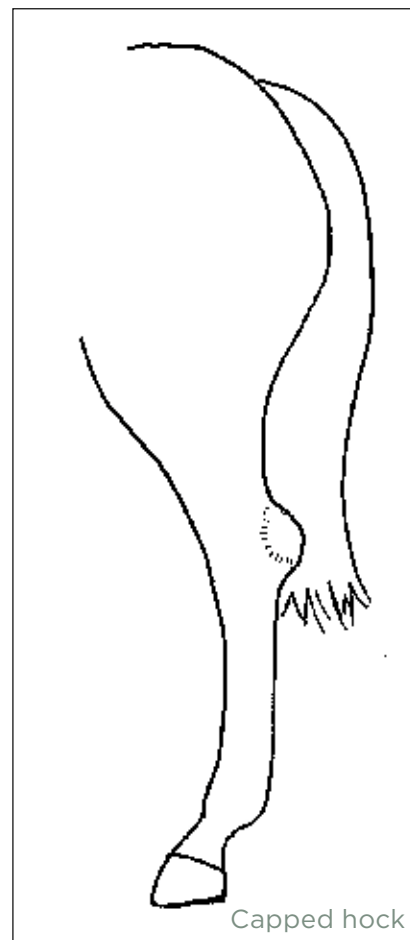
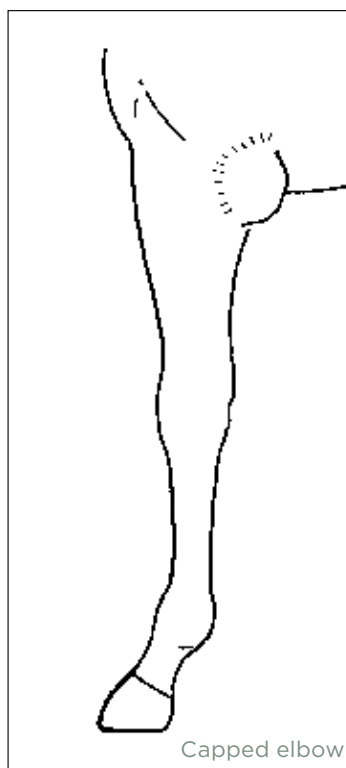
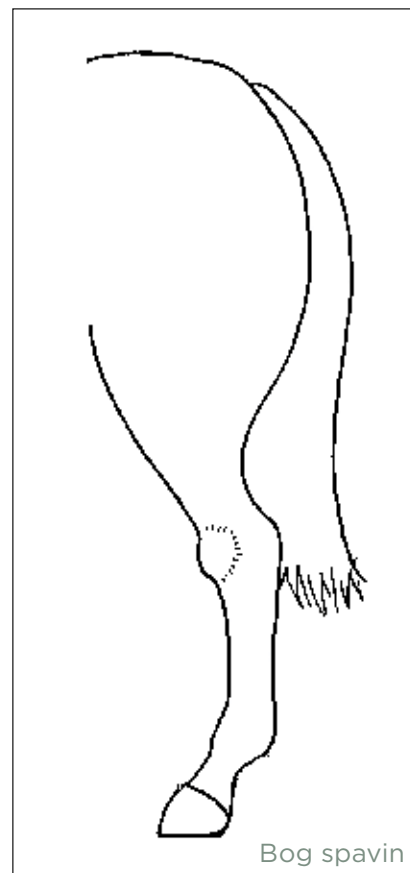
### CONTRACTED HEELS

Contracted heels are narrow heels that close in near the frog.

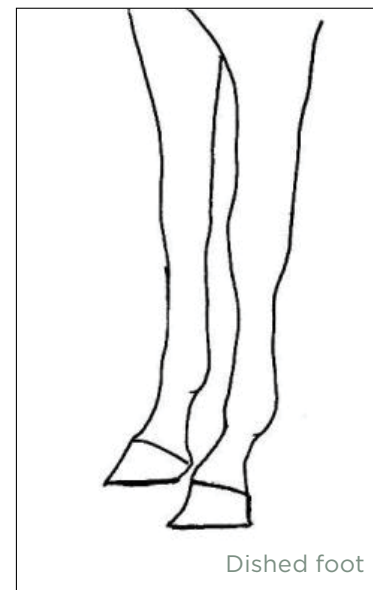
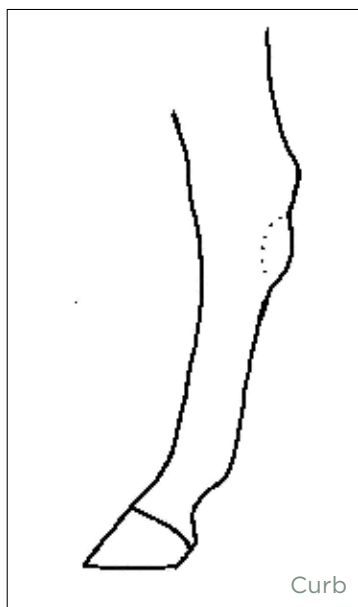
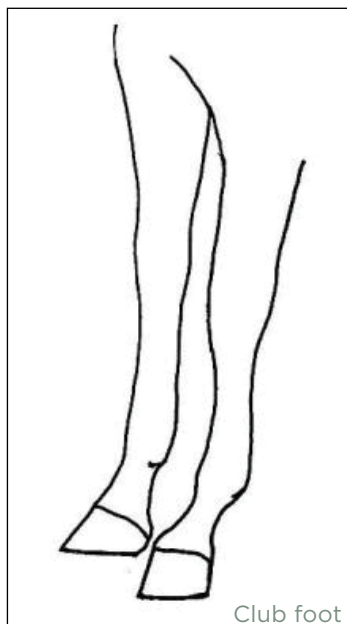
A contracted heel indicates the horse's unwillingness to fully support its weight on that foot.

Contracted heels often occur in horses with chronic lameness.

Contracted heels indicate a marked lack of hoof flexibility and a horse that distributes its weight unevenly on all four feet.







## CRACKED HOOVES

A hoof that is unbalanced from poor conformation or poor trimming is prone to cracking. Dry hoof walls further contribute to the problem.

Cracks that start at the ground and work their way up the hoof are of less importance than cracks that start at the coronet band and work their way down.

Cracks are named according to where they occur. Common cracks include toe cracks, quarter cracks and heel cracks.

Deep cracks can permanently affect the horse's weight-bearing ability and may also allow infection to enter the foot.



## CURB

Curb is an inflammation or tearing of the plantar tarsal ligament at the back of the hock.

Sickle-hocked horses are predisposed to curb development.

Curbs may form from the trauma experienced with a sudden loss of traction, from overexertion up a steep hill, or from the forces associated with sprinting.

## DISHED FOOT

A dished foot is a hoof that is concave, rather than straight, in front from the coronary band to the toe.

## GIRTH GALL

Girth galls are sores caused by chafing and abrasion.

Causes of girth galls include dirty girths, ill-fitting girths, poorly constructed girths, poor grooming before girthing, poor grooming after riding, pinched skin beneath the girth and friction from rigorous athletic activity.

Thin-skinned horses are especially susceptible to girth galls.

In time, girth galls will generally heal completely. However, unless the root cause of the galling is removed, they will recur.

## HOOF FLARES

An unbalanced foot results in steepness on one side and a flare on the other.

The flare develops on the side of the hoof bearing the least amount of weight.

Flares can result from poor trimming, poorly fitting shoes, or unbalanced hoof and leg conformation.

Proper trimming and shoeing can often correct flares resulting from poor farriery.

## SADDLE SORE

Saddle sores occur from ill-fitting, improperly positioned or poorly cleaned tack.

An unbalanced saddle, horse or rider can contribute to saddle sores.

A poor-fitting saddle may produce dry pressure points caused by the skin's inability to breathe and cool the horse. Over time, the hair over the pressure points may irreversibly change color.

Open sores on withers may be due to saddle slippage, concussion, abrasion, or compression.

Without prompt, competent attention, withers' sores can become fistulous, or chronically infected.

## SPLINTS

A splint is a hard, visible bump alongside the cannon bone caused by injury or inflammation of the splint bone. Splints most commonly occur on the inside of the leg.

Stress on legs with poor conformation may cause the occurrence of splints.

Splints may also arise due to acute injury, such as striking the inside of the leg with the opposite hoof.

Once the initial injury to the bone has healed, a splint is primarily a cosmetic blemish.

Surgical removal of splints for cosmetic reasons is not always a final resolution to the problem, as they tend to recur. Each instance should be discussed with the treating veterinarian.

## THOROUGHPIN

A windpuff of the Achilles tendon, below the hock, is a thoroughpin.

Thoroughpin is a chronic inflammation of the tendon sheath around the deep flexor tendon where the tendon attaches above the hock.

Horses prone to thoroughpin may be sickle-hocked or post-legged. Very straight hind limbs tend to place excessive stress on the stifle and hock joints.

## WINDPUFF

A windpuff is a balloon-like fluid swelling of the deep digital flexor tendon sheath near the back of the fetlocks.

They usually indicate that the tendon sheath has been injured or stretched due to over-exertion, but may signal future arthritis, tendonitis or other lameness issues.

## WEIGHT MANAGEMENT ISSUES

Obesity and malnutrition are not technically blemishes, though both conditions are unsightly. Both can also contribute to long-term health and performance problems.

Often, however, horses suffering from severe weight management issues exhibit blemishes incurred from poor care and ill-informed owners.

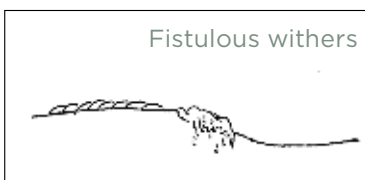
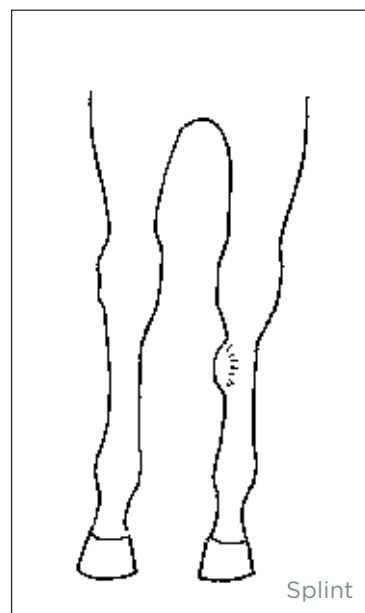
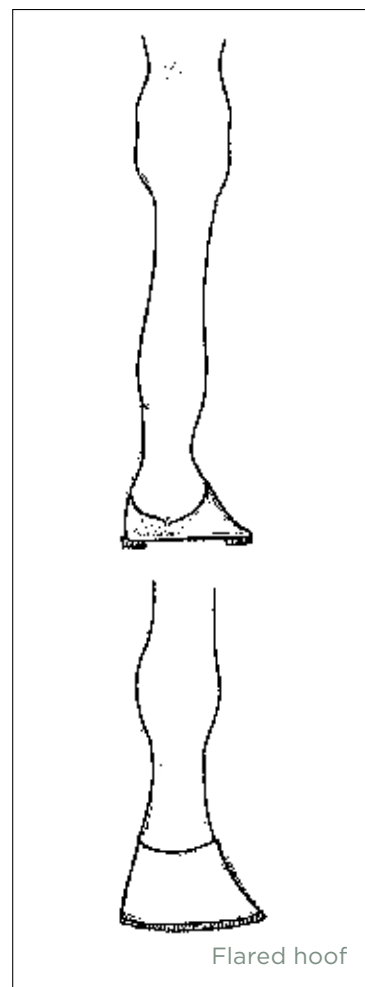
## Color and Breed Registry Considerations

Though some breed standards consider certain colors or markings blemishes, a horse's coloring and marking are of little to no importance in the Hunter, Jumper or Equitation ring.

Breed-specific requirements for a horse's appearance may affect the horse's eligibility for breed registry. However, pedigree and registration have no bearing on the horse's performance in the hunter jumper sport. The sport is judged strictly on the horse's performance and/or conformation.

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# CONDITIONING

Conditioning is a system of bringing a horse to a level of fitness that is sufficient for it to do its job efficiently and correctly. Conditioning horses takes experience and judgment. The level of conditioning for intense physical activity takes an understanding of exercise physiology and modern conditioning methods. A conditioning program should be individualized for each horse.

It takes approximately four to six weeks to bring an unfit horse to the point of regular work. The basic principles of conditioning are:

**Training effect:** This refers to physical development. All of the horse's systems are involved, but the cardiovascular system (heart and blood vessels) and the musculoskeletal system (soft tissues and bones) are the two systems that are the most affected during deliberate conditioning.

**Demand:** Work creates a demand for more oxygen and fuel in the cells of the body. The body adapts by increasing the number of red blood cells and improving its efficiency in delivering oxygen and fuel to the cells, removing waste products and producing energy. The purpose of conditioning exercise is to increase demand enough to stimulate a training effect.

**Progressive loading:** Small, measured increases in exercise. Too little exercise does not create a demand and stimulate conditioning, while too much leads to overloading, injuries and breakdown. Interval training is based on progressive loading.

**Overloading:** This occurs when a body or some part of the body is subjected to work or stress beyond its limits. This may be caused by pushing the muscles too hard and too soon without allowing them the opportunity to strengthen and develop, or working at a gait or speed past the horse's current level of conditioning. Overloading may cause a temporary setback or result in permanent damage. Overtraining predisposes horses to a compromised immune system, illness and injury. Signs of overtraining include:

- Dull coat
- Poor appetite
- Weight loss
- Lack of energy
- Disinterest in work or sourness
- Heat and/or filling in the legs

**Rest:** The horse requires periods of rest as part of the conditioning schedule. Rest allows the replenishment of depleted oxygen and aids in mental stability and attitude. Regular turn out and short training sessions help to keep a horse fresh.

**Nutrition:** Proper nutrition gives a horse fuel for energy and enough liquids to be properly hydrated. A horse doing a larger amount of work requires more food and water.

**Peaking:** When a horse reaches peak condition, ability or performance cannot be improved. A horse cannot remain in peak condition indefinitely. After peaking, a horse's performance will inevitably decline a bit.

## General Conditioning

Conditioning contains a mixture of aerobic and anaerobic exercise.

## AEROBIC CONDITIONING

Aerobic exercise is characterized by long, slow to moderate, consistent activity that elevates the horse's heart rate to a pre-determined target for a period of time while maintaining adequate oxygenation of muscle tissues. It increases the heart rate and, subsequently, increases the circulation of oxygen through the blood. Aerobic metabolism, or production of energy, uses oxygen and glycogen to create energy to move muscles.

Over time, aerobic exercise improves the horse's cardiovascular system, increases the horse's ability to oxygenate its tissues and builds endurance. During aerobic exercise, the horse relies on carbohydrates and fats as fuel to generate energy to meet the body's increased demand for oxygen.

One type of aerobic conditioning is long, slow distance work (LSD). It usually consists of trotting and slow cantering with periods of walking. As the horse's fitness grows, the length of the workout and distance traveled are increased instead of increasing the speed. This type of work lays the foundation for all other conditioning, providing a base of cardiovascular fitness and endurance.

Once a horse has developed a solid LSD foundation, strength training exercise can be added. Not only is strength training a muscular response to cardiovascular conditioning, but a horse derives other benefits as well, including reduction in the risk of musculoskeletal injuries and overall improvements in performance.

As muscular endurance improves, a horse should be able to perform repeated submaximal muscular contractions for longer periods. This is accomplished through repetition of low to moderate intensity work such as hill climbs, trotting gymnastic grids or cavalletti and cautious work in deeper than normal footing. Hill climbs should be started at the walk, gradually adding the trot and finally the canter as the horse's strength improves over months of graduated demands. Ideally, strength

training should be incorporated three times per week and reduced to twice a week when workouts increase in intensity.

Strength training can be targeted to certain muscles. Hill climbs develop hind leg, forearm and shoulder muscles. Walking or trotting a hill develops independent muscles in each hind leg. As the horse accelerates into a canter or gallop, it propels itself forward by pushing off the ground with both hind legs at the same time. This exercises the hind legs in unison with considerable strain on the rump and back muscles. Downhill work strengthens pectoral, shoulder and forearm muscles, while braking strengthens the quadriceps muscles in the hind legs.

A horse gains as much training effect on the muscles and cardiovascular system doing a hill climb as it would covering three times the distance on flat ground. Bones and joints receive less impact stress with hill work than with flatwork, which attempts to reach the same heart rate by increasing speed.

## ANAEROBIC CONDITIONING

**Anaerobic** means “without oxygen.” Anaerobic metabolism produces energy faster but less efficiently than aerobic metabolism.

Anaerobic exercise is brief and intense. It occurs above the aerobic threshold, which means that oxygen in the blood is used more quickly than it is replenished, resulting in the production of lactate or lactic acid. Lactic acid is a toxic waste product that causes a burning sensation and fatigue when it is present in sufficient quantities. During anaerobic exercise, the horse relies on stored energy sources that do not need oxygen in order to be released. Anaerobic exercise involves relatively few repetitions at high levels of resistance for short periods of time (less than 30 seconds). Muscles trained under anaerobic conditions increase in mass, bulk, strength, and power, leading to greater performance in short, highly intense activities. Areas most readily affected by anaerobic conditioning include the chest, forearm, hip, and thigh muscles. Muscles must rest and recover after anaerobic exercise. The cycle of energy depletion and recovery results in an increase in the mass of fast-twitch muscle fibers. Resistance training can be added to anaerobic exercise in the form of faster gaits and hill work.

Anaerobic exercise should not be used until a horse has a base of fitness that has been obtained by aerobic conditioning. Anaerobic exercise is used to prepare muscles for certain functions such as jumping. Skill drills condition certain muscles anaerobically and improve strength, coordination, and fluency in those skills.

The horse's body is designed for movement. Skeletal muscles produce locomotion through the process of contracting or shortening. They work in pairs, with one muscle flexing a joint and the other extending it. These contractions are caused by a chemical reaction between the actin filaments and the myosin filaments, which is triggered by a motor nerve impulse.

Muscles are made of fibers. Each fiber contains thousands of threadlike filaments called myofibrils. Muscle fibers are arranged in bundles, which in turn make up the muscle belly. Muscles store glycogen and triglycerides as sources of energy for contractions. Muscle contractions require energy, which is produced as either aerobic metabolism, anaerobic alactic metabolism or anaerobic lactic metabolism. Each type of metabolism produces energy suitable for a certain type of exercise. A horse uses all three metabolism types, depending on the type of work it performs.

**Aerobic metabolism:** Produces energy at a fairly low rate, which is sustainable for a long period of time. A slow trot or canter over level ground is considered aerobic exercise because the oxygen inhaled by the horse can supply all the energy it needs. Muscles can utilize dietary fats for fuel at these speeds. Aerobic metabolism is fueled mostly by carbohydrates and fats and creates energy using oxygen and glycogen.

**Anaerobic alactic metabolism:** Produces energy in short but intense bursts that last for only 10 to 20 seconds. This energy is used for brief, intensive efforts such as jumping or breaking into a run from a standstill. Anaerobic means “without air,” and alactic means “without lactate.” This energy is produced using creatinine phosphokinase and glycogen. Anaerobic alactic energy ends when the muscle's supply of creatinine phosphokinase is exhausted.

**Anaerobic lactic metabolism:** Produces energy for strenuous exertion that lasts more than 20 seconds, such as show jumping and racing. Anaerobic lactic metabolism produces energy using glycogen, such as carbohydrates, as fuel. No oxygen is used. It also produces lactate (lactic acid), which is a toxic waste product. The lactate is carried away by the circulatory system, but as more lactate is produced than can be carried away, it builds up in the muscle tissues and produces a burning sensation and fatigue.

**There are two types of muscle fibers:** slow-twitch fibers are best suited for aerobic metabolism, and fast-twitch fibers are suited for anaerobic metabolism. Horses with mostly slow-twitch fibers are most suited for long distance work, which requires endurance. Horses with mostly fast-twitch fibers are most suited for sports requiring brief, strenuous exercise such as jumping and sprinting.

**Intentional systemic conditioning** affects virtually all of the horse's systems, allowing the muscles to gain both size and strength. The skeletal muscles are one of the most adaptable tissues in the body. All skeletal muscles are capable of responding to training over time.

**Muscular conditioning** results in improved reflexes, leading to improved muscle coordination and more efficient movement. Because muscles develop more quickly than any other structure, beware of mistaking good muscular development as a sign of excellent overall body conditioning. Injuries are likely to occur when a horse's body is overloaded.

## HEART STRENGTH AND EFFICIENCY

Regular cardiovascular conditioning improves a horse's aerobic capacity. Targeted conditioning strengthens the horse's heart,

allowing it to work efficiently at a higher rate. It also builds and strengthens capillaries, improving overall circulatory efficiency, allowing the blood to carry more oxygen and nutrients. The spleen serves as a reservoir for red blood cells, which are released to circulation when the spleen contracts during exercise. This increases the horse's aerobic capacity and gives it endurance.

## LUNG CAPACITY

A horse's consumption of oxygen during exercise is 30 times greater than when at rest. Conditioning improves a horse's aerobic efficiency, both when exercising and when at rest. The horse's ability to take in oxygen and expel carbon dioxide improves, allowing it to go longer distances at faster speeds without becoming winded. Gas exchange refers to the exchange of oxygen for carbon dioxide, which takes place in the alveoli and small blood vessels of the lungs.

The mechanics of the canter and gallop cause the horse to breathe one time for each stride. This "locks" the respiration rate to the stride rate. The horse does not breathe in unison with each stride at other gaits, but is more aerobically efficient when moving at a regular stride rate, which allows it to breathe evenly in rhythm with its strides.

At the trot, the horse often breathes once every two strides. At the canter and gallop, the movement of the hind legs, gut diaphragm, chest and neck are interconnected. During the first phase of the stride, the hind legs are under the horse, the ribs expand, the gut contents move backward in the abdomen and the diaphragm moves back. These actions create more space in the lungs and make the horse inhale. During the second phase of the stride, the neck is extended and lowered, the rib cage is compressed, the hind legs extend backward, and the gut contents move forward, pushing against the diaphragm, which causes the horse to exhale.

## BONE, TENDON AND LIGAMENT STRENGTH AND ELASTICITY

Bone tissue takes the longest to develop to maximum strength. Tendons and ligaments also require a lengthy conditioning time. It takes years to develop bones, tendons and ligaments to peak condition when conditioning a young horse or reconditioning a horse after a lengthy injury.

Some concussion is necessary to strengthen bone, but extreme concussive forces can cause overloading and damage. Progressive loading to gradually increase the stresses on bone, tendons and ligaments stimulates these tissues and, over time, strengthens them.

Bone fatigue occurs when elasticity is lost due to overloading or uneven loading. Methodical, intentional warm-up and cool-down periods before and after exercise are critical to building and maintaining bone and soft tissue condition.

When conditioning a horse, it is extremely important to examine the horse's legs every day before and after the training session. In addition, the day after a hard workout, the horse should be brought out of its stall to be checked for heat, swelling, lameness or injury. These actions help prevent small problems from developing into large ones.

## Cooling

Horses primarily cool themselves by evaporative heat loss through sweating. Sweating is sufficient to disperse approximately 70 percent of a horse's excess heat. A smaller percentage of heat is dissipated by rapid exhalations and panting. Efficient cooling depends on circulation and is adversely affected both by dehydration and by the insulating effect of the hair coat and the subcutaneous fat layer.

Evaporative cooling starts when the horse sweats by pulling heat from the core of the body. Sweat glands produce water vapor on the skin, which the outside air evaporates. This process can be aided by applying cool water onto the hot surface of the horse's body. The horse's chest, neck and legs should be repeatedly drenched with water. The water should be continuously applied and scraped off until the horse reaches a normal body temperature. Leaving the water in the coat causes an insulating effect that causes the horse to retain heat.

The horse also gets rid of heat by radiating it into cooler air. This does not work when the horse is covered by tack or a cooler, or when the air temperature is hotter than the horse. Fans or breezes can aid in convective cooling. A horse can suffer from heat stress once its body cannot dissipate heat quickly enough through sweating. Heat stress occurs when the body temperature climbs above 105 degrees Fahrenheit, usually from overexertion rather than the heating effect of the sun's rays.

The heat index should be considered when choosing a work level for a horse. Horses work comfortably when the heat index is around 125. At a heat index of 140, the horse relies mostly on sweating to dissipate body heat. At a heat index of greater than 150 (especially if humidity is more than half of this number), evaporative cooling is severely compromised. At 180, there is no natural way for the body to cool itself; internal temperatures will continue to rise, causing heat stress.

Some horses do not sweat, especially in excessive heat and humidity. This condition is known as anhidrosis and can lead to dangerous heat exhaustion. Anhidrosis can be treated with products such as One AC. Clenbuterol may also be administered by a veterinarian to stimulate the sweat glands.

## COOL DOWN

The purpose of a cool down period is to dissipate the heat the working muscles generated. During a cool down period, the muscle and body temperature gradually decline as the horse's body:

- Redirects the blood flow from the muscles to the internal organs
- Replenishes the oxygen in muscles that reached an oxygen debt
- Flushes lactic acid from the horse's system.



Proper cool down also gives the ligaments, joints and tendons a chance to recover from the stress of work. Walking maintains flexibility in these structures and helps to minimize the potential for injury. Walk the horse until its body temperature and respiration returns to normal. This is why it is important to know your horse's normal body temperature and respiratory rate.

Depending on the ambient temperature and the amount of work performed by the horse, the cool down period can take from 15 to 30 minutes.

## Factors that affect cooling include:

- Ambient temperature and humidity level
- Degree of body fat
- Length of the hair coat

The horse may require more help to bring its body temperature down in hot or humid conditions. First, sponge the large blood vessels of the neck, chest and legs with water to improve evaporative cooling. Then, bring the horse into the shade and direct a fan on its body.

Do not minimize the importance of a cool down period on cool days, as a horse's skeletal muscles generate a large amount of heat even in cold weather. Improper cool down or exposure to cold rain can cause the muscles in the hindquarters to spasm and cramp. Horses that are prone to such cramps may benefit from a quarter sheet when cooling down.

A horse should wear a light cooler in cold or windy weather, especially if body clipped. Consider partially or fully body clipping a horse that is expected to work during the cold months because a long winter coat may take a significant amount of time to dry. A horse may be fully cooled down but still have a wet coat. Conversely, a dry horse is not necessarily cooled out properly. If the horse is wet, rubbing its coat briskly with a towel removes moisture from the coat and exposes more hair surface to the air to allow a quicker drying time.

Overweight horses or those with a heavy winter coat may break into a sweat after they appear to be cool, due to the insulation of the fat layer and/or the loft of the horse's coat. This is a normal occurrence, but the horse must be monitored closely after working and be protected from drafts and chill when it is damp.

Do not blanket a wet horse unless the blanket is made out of a wicking fabric such as Gore-Tex™. A non-breathable fabric retains moisture and becomes soaked, causing the horse to remain chilled for a prolonged period of time. This "refrigerator effect" evaporates moisture from the skin faster than the body can warm the skin. In effect, the skin temperature and, eventually, the horse's body temperature will drop.

A horse should not be allowed to eat grain until at least 30 minutes after it is fully cool. This allows the normal blood flow to return to the intestines and reduces the risk of gas colic. The horse may have full access to hay and water once the body temperature returns to normal.

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# FIRST AID

It is important to have a good working relationship with your veterinarian. Veterinarians are professionals who have studied horse health and care for years and can best answer questions you have about your horse.

However, it is also important to have a working knowledge of the many things that can go wrong with your horse and understand how to care for minor injuries. Most importantly, it is essential to know when to call the veterinarian.

## Common Illnesses and Injuries

This section of the study guide will discuss a variety of illnesses and injuries that can occur, notes on how to prevent them, and common treatments.

### COLIC

Colic is defined as abdominal pain. Call your veterinarian immediately if you notice any of the following symptoms of colic:

- Depression
- Lying down at unusual times
- Restlessness
- General discomfort
- Pawing
- Kicking or biting at the belly
- Flehmen (curling of the upper lip)
- Sweating
- Increased pulse and respiration
- Disinterest in eating
- Yawning and grinding of teeth

Colic can be caused by a variety of things. The digestive tract of the horse is very long and involves many different organs. Many of the organs have loops through which the digested material must pass, offering many opportunities for food to get caught. Since the horse cannot vomit, all eaten material must pass through the digestive tract prior to being expelled in the manure.

Colic can be caused by either diet or management. An overabundance of feed, such as grain, alfalfa hay, or a rich pasture, may trigger a colic episode. Sudden feed changes, or moldy feed, may upset the delicate bacterial balance in the digestive tract. Feeding or dehydration after exercise may lead to an impaction, as there is not enough water in the digestive tract to allow for proper passage of food. Cribbing may cause a gas colic. Gastric ulcers may cause intermittent colic.

#### Types of colic include:

**Spasmodic:** Caused by spasms of the smooth muscles of the intestines. Spasmodic colic can be brought on by weather or barometric pressure changes, shipping, competition, toxic plants, blister beetles, or organophosphate de-wormers. Spasmodic colic can cause an intussusception where the bowel telescopes into an adjacent section. This acts as an impaction colic and must be surgically addressed.

**Impaction:** Stems from dry intestinal contents when intestinal motility is slow or when there is insufficient intestinal water present. Impaction colic can be brought on by dehydration, electrolyte imbalances that affect gut motility, or an obstruction. It generally starts off very mildly with intermittent pain. Manure may be non-existent, dry, or covered in mucous. The predominant causes of impaction colic are limited exercise, decreased water intake, consumption of coarse food, bedding or foreign materials, enteroliths, or heavy parasite infestation.

**Gaseous:** Originates from gas build up in the intestine, causing over-distention and pain. Gaseous colic is caused by any change to the normal movement patterns in the intestines. Bacterial overgrowth occurs in the stagnant gut, resulting in the death of the bacteria. The death of certain bacteria releases endotoxins which may result in shock, laminitis, or death.

**Intestinal displacement or torsion:** Stems from a loop of bowel that has moved into an inappropriate position in the body. The bowel may become trapped or twisted. In some cases, a strangulation obstruction may occur, which can be caused by:

- Torsion (large intestinal twist)
- Volvulus (small intestine twist)
- Incarcerated (trapped) bowel
- Intestinal lipoma
- Nephrosplenic entrapment (pelvic flexure becomes entrapped behind the splenic ligaments)

- Intussusception (telescoped bowel)
- Intestinal torsion (abnormal contractions aided by gravity)

**Sand:** Sand colic, which causes impaction, stems from the accumulation of ingested sand. The heavy and abrasive sand can erode through the intestinal lining at the location of the obstruction. Early diagnosis is of the utmost importance.

## CHOKE

This condition is also known as esophageal obstruction. This generally occurs when a horse eats too fast and does not chew the food well. The food becomes trapped in the esophagus.

Symptoms include the inability to swallow, excessive drooling, copious amounts of nasal discharge, anxiety and general discomfort. Call your veterinarian immediately if you suspect your horse is choking, as choking horses are at risk for aspiration pneumonia.

## RESPIRATORY CONDITIONS

Some diseases and problems that affect the equine respiratory system include:

**Heaves:** This condition is also known as recurrent airway obstruction (RAO), equine chronic pulmonary obstructive disease (COPD), or broken wind. Heaves can be caused by allergies or environmental issues. The main contributors are moldy hay and dusty stable conditions. Legume hay has a high concentration of mold spores and is often linked to the development of heaves. Symptoms include: coughing, flared nostrils, depression, increased breathing rate, white nasal discharge, labored breathing and markedly decreased stamina. Treatments include removing the horse from the allergen, soaking hay and grain, moving the horse to live outside, and bronchodilator treatments.

**Influenza:** This disease is spread by coughing, direct nose-to-nose contact, contaminated housing and substances capable of transferring disease such as food, water, human hands, buckets, rakes and clothing. Symptoms include: lethargy, depression, lack of interest in food, body temperatures from 103 to 106 degrees, increased respiration rate (up to 60 breaths per minute), watery nasal discharge and a dry, hacking cough. A horse with influenza should be isolated for at least two to three weeks. A vaccination for influenza exists. Horses that travel and are exposed to large numbers of horses should be vaccinated more frequently. Ask your veterinarian for their recommendation.

**Roaring:** Also known as laryngeal hemiplegia or recurrent laryngeal neuropathy, roaring is characterized by the paralysis of muscles of the vocal cords due to nerve damage. During exercise, the paralyzed muscles partially obstruct the larynx, diminishing air intake and resulting in an audible roaring noise. Roaring is common in large breed horses and horses with narrow jaws. Surgical repair, known as a tie back, may be successful in improving performance.

**Strangles:** Strangles is the common name for an infection caused by *Streptococcus equi*. This condition is seen most often in very young and very old horses. The bacteria invade the respiratory tract and cause swelling of the lymph nodes around the head and neck. Inflammation surrounding the pharynx may cause the horse to feel as if it is strangling. Symptoms include: depression, body ache, nasal discharge, swollen lymph glands under the jaw and in the throatlatch area, edema of the face, and slightly labored breathing. As the disease progresses, the lymph nodes break open to drain a thick, creamy pus. Strangles is highly contagious and can remain in the soil for several years. Once a horse is suspected to have strangles, it must be quarantined for approximately six weeks. Nursing care and quarantine protocols are very important. An intranasal vaccine is the most effective form of prevention.

## TYING UP

Tying up is also known as exertional rhabdomyolysis (ER), myositis, azoturia, or Monday morning syndrome. An inflammatory event in the muscle is known as myositis, while a muscular cramp is known as tying up syndrome.

Tying up occurs when muscle tissues undergo damage, especially from exercise. Symptoms include a higher than normal heart rate during exercise and a poor heart rate recovery. Muscles may visibly cramp, spasm, or swell. Sweating from pain or colic-like symptoms may also be present. The horse may not want to move and may stand with a hunched back. In severe cases, myoglobin released from damaged muscle tissue turns the urine brown or red. Kidney failure may result.

The cause of tying up is almost always overexertion. Other factors include dehydration, electrolyte depletion, alkaline blood pH and reduced oxygenation of muscles. Avoid overfeeding carbohydrates.

If a horse shows signs of tying up, immediately stop exercise, and cover the hindquarters with a cooler or saddle pad. If there is water available, sponge the neck and shoulders. Do not make the horse walk until it is able to do so of its own free will. Call your veterinarian immediately.

## EQUINE PROTOZOAL MYELITIS (EPM)

Equine Protozoal Myelitis (EPM) is caused by a parasitic migration in the spinal cord that results in significant nerve damage. Horses become infected when they ingest food or water that is contaminated with animal droppings containing the sporocysts of EPM-causing parasites. The parasite migrates into the central nervous system and creates lesions in the spinal cord.

The disease is diagnosed by blood tests and spinal taps. The horse is the “end host” of the protozoal parasite, therefore, the infected horse cannot infect other horses.

Treatment requires aggressive veterinary attention. Prevention is better than cure. Keep the barn and its surrounding areas free of opossums, skunks and other possible intermediate hosts.

Symptoms include a localized lack of coordination, gait abnormalities, weakness and muscle atrophy. The horse may present symptoms in the front legs, the hind legs, or only on one side. Depending on the severity of the case, the horse may exhibit any of the following symptoms:

- High head carriage
- Falling on the forehand
- Head tossing
- Refusals
- Run outs
- Noticeable reduction in stride length
- Falling
- Collapsing of the hindquarters
- Asymmetrical muscle atrophy

If the protozoan parasites affect the brain stem, behaviors may include:

- Aggression
- Laziness
- Anxiety
- Hyper-sensitivity
- Unpredictability

## ANAEROBIC BACTERIA

Anaerobic bacteria grow in places with little to no oxygen and are commonly found in soil, manure and even the horse's intestinal tract. They can remain dormant for many years, but it only takes 20 minutes of oxygen exposure to activate the spores.

Anaerobic bacteria are especially dangerous in the case of puncture wounds due to the fact that a puncture may heal on the surface without healing from within. This creates an oxygen-depleted atmosphere in which these bacteria flourish. Some examples of anaerobic bacteria are:

**Clostridium tetani:** Responsible for causing tetanus.

**Clostridium septicum:** Responsible for malignant edema (a wound that is swollen with edema and gas). Fevers can spike to 106 degrees.

If your horse receives a puncture injury, it is important to have it examined by a veterinarian to be sure the wound does not close over. The veterinarian will probably place the horse on antibiotics to prevent such an infection.

## FEVER

A horse with a fever is said to be febrile. For every degree elevation in temperature, a horse's caloric requirements increase by 13 percent, potentially debilitating a horse that goes off its feed, or does not eat.

A horse with a fever of 103.5 degrees or higher requires active assistance to cool down. Sponge the neck and chest with tepid water, and move the horse out of the sun into the shade or a barn. Take off any blankets unless there is a wind or the coat is body clipped.

Prolonged fevers can cause a horse to stop eating and drinking, which may bring on dehydration and impaction colic. Call your veterinarian if your horse spikes a fever over 103.5 degrees.

### Some common causes of fever are:

- Viral respiratory disease
- Bacterial infection
- Infection in the chest (pleuritic) or abdomen (peritonitis)
- Wounds that have developed cellulitis
- Heat stress or heat exhaustion
- Medication reaction
- Allergic reaction

## HEMORRHAGE

Bleeding injuries can be frightening to the handler, but a horse is able to lose two gallons of blood before the situation becomes life threatening.

If a horse hemorrhages, offer water to replace the fluids that have been lost from the body. It may be necessary to give intravenous (IV) fluids.

A bleeding wound takes approximately 12 minutes to clot if a small blood vessel is involved, while the clotting time for larger blood vessels and arteries is one hour. Keep a light and steady pressure on the wound to help it clot. Resist “peeking” to see if the bleeding has stopped. If the horse bleeds through the material being used to exert pressure on the wound, add a second or third layer instead of removing the bottom layer.

## PROUD FLESH

Proud flesh is the common term for exuberant granulation. It is an angry-looking tissue that bleeds very easily.

Corticosteroids may be used to slow the growth of proud flesh, but can also slow healing. Pressure bandages may also help control the formation of proud flesh. Proud flesh that cannot be controlled by corticosteroids or bandaging should be surgically removed.

Occasionally, a keloid will form as a fragile, dry, skin-like covering over proud flesh. This scar protrudes above skin level and is subject to cracking and peeling. The keloid lacks elasticity because it does not have an underlying skin layer and may require a skin graft for reparation.

## RINGWORM

Ringworm is a skin disease caused by a fungus. Many kinds are highly contagious to other horses and humans, so care should be used when sharing equipment.

The fungus sends out spores that enter the skin. Lesions appear within a week to a month as circular areas in which the hair falls out or breaks off. Sometimes, thick crusts form on the lesions. Ringworm can be very itchy, and the horse may scratch the lesions open.

Incubation time for ringworm can vary from several days to a month, so take precautions to keep it from spreading. Treat and disinfect anything that has come in contact with an infected horse, and continue to do so until the infection is cured. Topical treatments are available from your veterinarian.

## RAINROT

Rainrot, or rain scald, is a skin problem that appears during wet weather. After a rain, you may see small patches of the horse's hair standing up in odd patterns on the areas of the body that got wet. You may feel heat in these areas, and the horse's back may be sore. Small, tight scabs will develop in these areas within 24-48 hours, and the bumps may come loose when you brush the horse. As the disease progresses, the bumps become more raised, tufts of hair may stand erect, clumps of hair may fall out and raw spots or crusty patches may develop where the horse's body was exposed to the rain.

Rainrot is not contagious; rather, it is spread through organisms in the dirt and dust that are activated with moisture. Treatment consists of cleaning the skin and hair with an iodine shampoo (or human dandruff shampoo), massaging the shampoo into the skin, and gently working the scabs and crusts loose. Leave the shampoo on for 5-10 minutes so the iodine has time to permeate the skin. Be sure the horse dries thoroughly after the bath, and coat the area with an antibacterial ointment.

## ANHIDROSIS

Anhidrosis is the decreased ability of a horse to sweat in response to increased body temperature. It manifests primarily in hot, humid climates. Anhidrosis usually develops during the summer, and may come on gradually or quickly.

When a horse works, it maintains a consistent body temperature through sweating. An increased respiratory rate and failure to cool after exercise are the most common initial findings when a horse has anhidrosis. In hot, humid weather, there may not be much difference between the air temperature and the horse's body temperature, which makes it hard for sweat to evaporate. This may affect the horse's cooling system, causing it to quit sweating entirely. In chronic cases, the sweat glands may atrophy.

has no proven treatment, but moving the horse to a cooler climate may entice the cooling system to start working again. If it is not possible to move the horse, the owner must take extreme measures to manage the horse's body temperature. Horses with anhidrosis should be kept in a stall or a shaded paddock during the day. Access to fans, misters, or sprinklers can also help keep these horses cool. Clean, cool drinking water should always be available.

## Injections

Injections can be given in several forms, depending on the medication being injected. While injection sites are discussed below, you should always confer with your veterinarian about giving an injection and have a veterinary professional demonstrate the proper technique prior to you attempting to give an injection yourself. This guide is not meant to replace professional education.

Proper preparations for injections include:

- Reading the label of the medication to make sure the medication is not expired and that you are administering it correctly



- Using a new, sterile syringe and needle for each injection
- Selecting the correct size of needle (both length and gauge)
- Cleaning the injection site with a combination of either Nolvasan® or Betadine® and 70 percent alcohol. This mixture must remain on the skin for two minutes to be effective.

### INTRAMUSCULAR (IM)

Intramuscular injections may be given in the neck, rump, thigh or pectoral muscles of the chest. The neck and the rump are the two most common sites.

Neck injections should be given within a triangle bordered by the nuchal ligament on the top, the cervical spine below, and in front of the shoulder blade (see diagram). Care must be taken not to place an IM injection near the jugular furrow.

Injections in the rump should be placed in the gluteals. The location for the injection is the intersection of two lines – one from the top of the croup to the point of the buttocks and the other from the point of the hip to the dock (see diagram).

One drawback of a rump injection is the risk of an abscess forming below the muscle fascia and spreading up to the loin and back. The area is hard to drain if an abscess does form. The handler must be cautious around the rump area of the horse to avoid being kicked while administering the injection.

Injections given in the thigh should be placed in one of the large strap muscles of the thigh (see diagram). Since the muscles are active in locomotion, exercise reduces muscle soreness. Abscesses that form in this area are easily drained. The major drawback to injecting in this area is the high probability of being kicked.

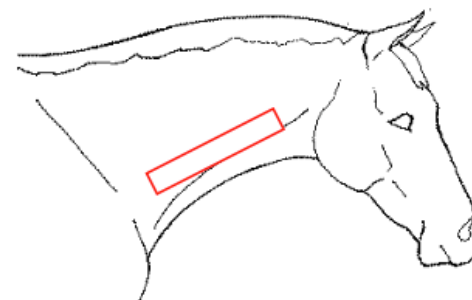
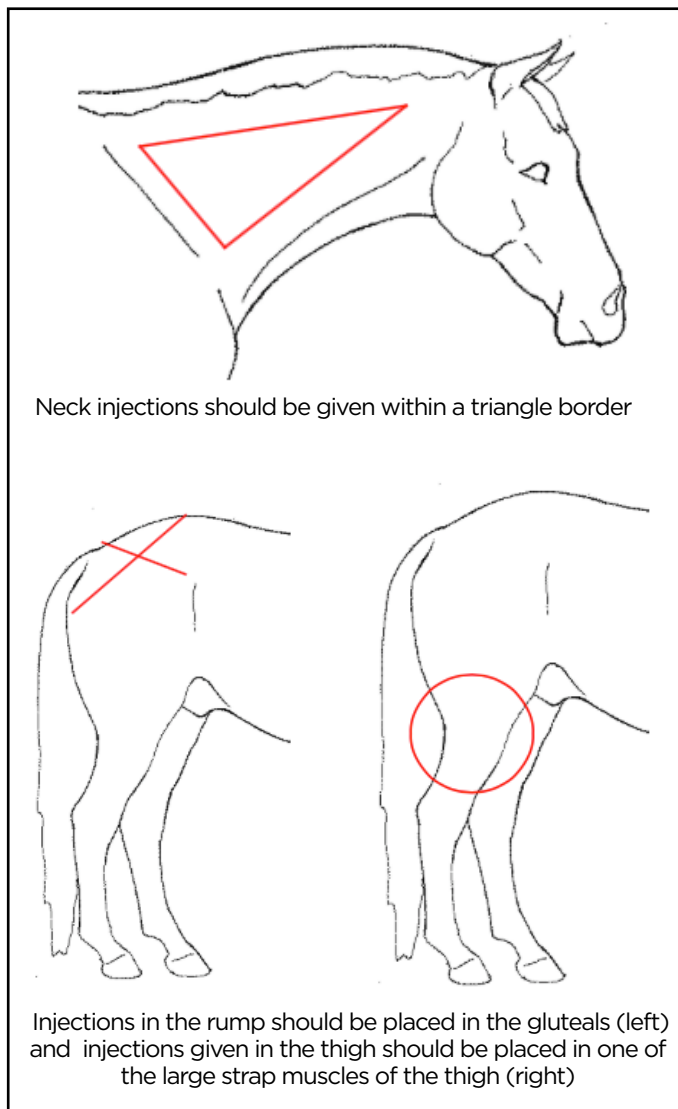
Injecting into the pectoral muscles of the chest works well because the area is easy to reach, drains well and does not cause soreness that interferes with eating or drinking (see diagram).

### INTRAVENOUS (IV)

IV injections are placed in the jugular vein, which runs parallel to the underside of the neck (see diagram). The needle may be inserted facing either toward the head or the heart. If blood spurts vigorously from the needle when the vein is not compressed, the needle is likely inserted into the carotid artery and should be removed. Medications should never be injected directly into the carotid artery because they would go directly to the brain or central nervous system, causing convulsions or instant death.

### SUBCUTANEOUS (SUB Q)

Subcutaneous injections are given just beneath the skin into the subcutis. The loose skin behind the elbow is a good choice of site for this injection. The needle is placed just underneath the skin and the medication is injected slowly. The needle may be fanned back and forth for a greater distribution of the medication. Medication or fluids placed under the skin are absorbed very slowly. This method of injection may cause a lump that may be present for several hours. One common Sub Q application is injecting a local anesthetic to numb an area for suturing or a scalpel incision.



Subcutaneous (Sub Q)

## INTRADERMAL

Intradermal injections are given by placing a needle inside the uppermost layer of the skin. These injections are not common and are used for local anesthetics, sarcoid tumors and treatment of skin lesions with corticosteroids.

### Some problems that may be associated with injections include:

- The onset of anaphylactic shock when the horse is injected with penicillin, certain vitamins, or a medication/vaccine to which it is allergic
- Abscess of the injection site
- Cellulitis
- Fibrotic myopathy: muscle infection that is replaced by scar tissue
- Sore neck
- Thrombophlebitis stemming from IV medication that leaks into tissue

## Wounds

Horses are prone to a variety of wounds, ranging from small scrapes to large lacerations. It is important to know how to properly care for a wound, and when timely veterinary intervention is necessary to assist in care and healing.

There are different types of wounds:

**Incision:** A clean cut caused by a sharp object. This wound may bleed profusely and may require stitches.

**Laceration:** A tear with jagged edges caused by a rough or irregular surface. This wound may require stitches.

**Abrasion:** A scrape or sore that resembles road rash. This wound is generally full of dirt and requires careful cleaning.

**Puncture:** A narrow, deep wound. This wound is predisposed to tetanus.

**Contusion or bruise:** Often caused by a kick or a blow. The skin may remain intact, but the underlying blood vessels and tissues are damaged. There can be bleeding under the skin, causing a hematoma, which is a swelling filled with blood. Application of an ice pack for 20 minutes helps to control the swelling.

**Burns:** These can be created by chemicals, heat or irritants.

When managing wounds, it is important to use the correct product for the task at hand. The initial treatment of a wound often affects the end result and the time of healing.

The skin is the body's defense against environmental and skin contaminants. When the skin is broken open, the body is assaulted by dirt, gravel and other contaminants. Certain soils and clays inhibit the immune actions of white blood cells and antibodies, which leads to infection. A wound should be cleaned of all contamination and foreign matter as quickly as possible.

## ROPE BURNS

A horse tangled in a rope generally panics, making the burn far more severe than if the horse remained quiet.

Rope burns are classified as superficial, partial thickness, or full thickness.

- A superficial burn is generally only reddened, thickened skin.
- A partial thickness burn has edema under the skin, intense inflammation and pain. Such wounds have a strong chance of becoming infected. Even the mildest rope burn should be treated with immediate applications of ice to reduce heat.
- A full thickness burn displays leathery and tanned tissue, extensive limb swelling, and may be numb. Considerable time is required for heat to dissipate from the burned tissue.
  - A partial thickness burn can become a full thickness burn if treated with inappropriate topical medications, or if bacteria invade the site.
  - An eschar, or coagulated crust of skin debris, may form over the top of the burn. It delays antibiotics reaching the wound and delays healing due to encouragement of harmful bacteria. An eschar that is brown-black in color is probably infected with bacteria.

## CLEANING A WOUND

The first step to cleaning a wound is to gently hose away any dirt or other contaminants that are present on the skin's surface. If possible, clip and shave any hair away from the margins of the wound. Hair makes it difficult to assess the nature of the wound, interferes with thorough cleaning, does not allow for proper drainage and acts as a foreign body to the wound.

Call your veterinarian if the wound smells bad or contains a foreign body. Ascertain that the wound is not a puncture wound that may be concealed by hair, mud or dirt.

Punctures should be thoroughly investigated to see how deep they are and what structures are involved. They can seal over on top, creating an excellent chance for the growth of anaerobic bacteria. A puncture wound that has depth, heat, swelling or pain should be seen by a veterinarian. A tendon or joint puncture is a true emergency that requires immediate veterinary assistance. Cover the wound with sterile gauze pads to prevent hair from further contaminating it while waiting for the veterinarian to arrive.

The wound should be scrubbed with antiseptic soap and gauze sponges. Scrub for a minimum of 10 minutes if the horse will allow you to do so. If not, gently hose the area for five to 10 minutes. Alternately scrub and rinse the wound until it is bleeding and shows healthy pink and glistening tissue.

If the wound is deep, it may require lavage with saline solution. As a general principle, any product that is put into a wound should be so mild that if it were used in the horse's eye it would not irritate the mucous membranes or the eye itself.

When cleaning a wound, it is preferable to use saline solution rather than water because the salt content of saline solution approximates the salt content of the horse's tissues. When water is used, the salt content of the body's tissues tends to pull water into the wound, causing edema. This interferes with circulation and slows healing.

Saline solution can be made at home by mixing a ½ tablespoon of table salt into one quart of water. An antiseptic, such as povidone iodine (Betadine®) or chlorhexidine (Nolvasan®), may be added to improve the antibacterial quality of the solution. Add enough povidone iodine to the saline solution to make the solution the color of weak tea. Wear gloves when you are using povidone iodine to avoid absorbing toxic amounts of iodine. Chlorhexidine works on a broad spectrum of bacteria, and its effects outlast those of povidone iodine.

### **Some topical preparations actually retard wound healing. Try to avoid using:**

**Tincture of iodine:** Destroys tissue and slows healing. It should only be used to toughen the hoof's sole or control thrush.

**Soaps and detergents:** Most are toxic to cells, causing them to swell and rupture.

**Hydrogen peroxide:** Toxic to equine cells.

**Alcohol (rubbing or isopropyl):** Destroys exposed tissue protein. It may be used to wipe around the margins of wounds only.

## **Healing**

Healing begins with the production of collagen. Fibroblasts, which manufacture fibrin, appear on the third day after an injury. Blood vessels are the next to appear. Granulation tissue made of fibroblasts and capillaries starts to fill in a wound. Skin cells grow across the granulation tissue in a process called epithelialization.

Wound healing finishes by contraction. As wound margins contract, the skin is pulled toward the center of the wound via myofibroblast cells. The rate of contraction is not affected by wound size, but rather by skin tension, dehydration, edema and movement of the wound. Lower leg wounds heal slowly due to lack of blood supply and muscle tissue.

Wounds heal much more quickly if they are kept warm and moist. This is especially true in the early stages of healing. The horse's body is approximately 70 percent water, and wounds that are left open to the air dehydrate quickly.

The decision to suture a wound depends on:

- Location
- Skin tension
- Configuration
- Degree of damage
- Contamination

## **TOPICAL OINTMENTS**

Topical ointments should be used with care. You may apply a water soluble dressing, such as silver sulfadiazine or triple antibiotic ointment, and a light bandage to a clean wound. Do not apply any topical ointments to a wound that may require sutures unless the ointment is water based.

To avoid contamination, be sure to use tongue depressors or clean rubber gloves when scooping ointment from jars.

Topical antibiotics are not likely to prevent infection with wounds that are deep, or those more than a few hours old, because they are already contaminated with bacteria. Antiseptic powders and sprays have a tendency to obstruct wound drainage, leading to the accumulation of exudates and drying the wound edges.

Topical ointments cannot speed the healing process. Instead, they may actually delay healing if used improperly. Petroleum-based products interfere with drainage, attract manure and dirt, slow skin growth, and retard healing. Nitrofurazone, which is petroleum-based, can delay new skin growth by as much as 30 percent. The wound forms a thick scab that prevents it from healing from the inside out. Nitrofurazone is a carcinogen, and therefore, gloves should always be worn when using it around the barn. However, petroleum-based products may be used under weeping wounds to protect from skin scald.

Several antiseptic products have proven to be safe and effective on horses:

- Silver Sulfadiazine: Water soluble cream
- Nolvasan (chlorhexidine)
- Triple antibiotic ointment
- Povidone iodine
- Vitamin A&D® ointment

- Aloe vera
- Unprocessed honey: Has antibacterial properties and promotes healing
- Sugardine (sugar and povidone iodine in a 50:50 ratio): Has antibacterial properties

A deep or traumatic wound that affects underlying bone may create a sequestrum, a bone fragment that has broken off or become devitalized due to a lack of blood flow. This acts as a foreign body to the wound. A sequestrum may require surgical removal if it forms a chronic draining wound.

Some leg wounds may need bandaging. Please refer to the section on bandaging for further information.

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# GROOMING AND BLANKETING

## General Grooming

Grooming is a job that should be performed daily on a horse. The best time to give your horse a thorough grooming is after exercise when the pores are open. This allows the oils to be spread through the horse's coat and brings out a deep luster.

### Daily grooming:

- Promotes circulation and health
- Checks for injuries and skin conditions
- Brings sheen to the coat through the distribution of oil
- Cleans the coat of sweat, dirt and dandruff
- Removes bot eggs, which are small yellow specks on a horse's legs and shoulders that are deposited by bot flies in the summer time
- Allows additional time for training on ground manners
- Allows the groom to develop rapport with the horse

### Common grooming tools include:

**Rubber curry comb:** Used in large circles on the body to loosen dirt, dried sweat and hair. Should not be used on the face, legs or other bony or sensitive areas of the body.

**Metal or plastic curry comb:** Used to clean out brushes. Should not be used on the horse.

**Rubber mitt:** Used to curry the legs, face and bony areas of the horse's body or as a curry comb on ticklish horses.

**Dandy brush:** A medium stiff brush that is used to knock mud and crusted dirt off the horse's body. Wet mud should not be brushed off. The best practice is to let it dry before brushing it off. If this is not practical, the mud may be hosed off. Many horses are too ticklish to have this brush used on clipped areas.

**Mud brush:** A coarse brush with stiff bristles that knocks heavy mud out of the horse's coat. This brush may also be used on a horse's hooves. It is not suitable for ticklish, clipped or fine coated horses.

**Body brush:** A short bristled dense brush. It is often oval in shape and has a handle across the back. It is used to get deep into the coat to extract dandruff, oil and dirt that are against the skin.

**Face brush:** A soft brush that is often made of horsehair.

**Mane and tail brush:** Used to detangle the mane and tail. Care should be taken to not pull out or break off the horse's tail hair.

**Hoof pick:** Used to clean out the horse's feet. It has a hook and may have a brush attached to the other side. When picking out the foot, care must be taken to work from the heel to the toe. Working from the toe to the heel increases the likelihood of injury.

**Rub rag:** A rag that may be anything from a towel to a cactus cloth that is used to put a final polish on the horse's coat.

**Sponges:** One sponge is used to wipe out the eyes and nostrils and the other one to wipe the horse's dock area.

**Shedding blade:** Used to remove winter coats during shedding season.

**Bot egg knife:** Used to scrape bot eggs off the horse's coat.

**Pulling comb:** Used to shorten and thin the mane.

## GROOMING ROUTINE

Bathing is no replacement for daily grooming. Although bathing is often necessary, the overuse of soap strips the natural oils from the horse's coat and dulls it.

Grooming promotes good circulation for the horse, which in turn stimulates a healthy hair coat. It also gives you a chance to get to know your horse and develop a relationship. Additionally, it is a time to check for any wounds, skin conditions, rubs, or loose shoes before and after riding.

A thorough grooming takes approximately 45 minutes. The British Horse Society teaches that the horse should be "quartered" before a ride. Quartering means that you give the horse a 15-minute grooming that includes picking its feet, removing surface dirt from the horse's coat, spot removal, and neatening the mane and tail.

After you ride, give your horse the remainder of the full 45 minutes of deep grooming. The best time to deeply groom your horse is after you have ridden. When your horse has finished exercising and has cooled down, its pores are still open, thereby allowing the natural coat oils to be distributed by grooming. This is the time when a little elbow grease goes a long way.

To start your grooming, make sure the horse is dry. A wet horse cannot be groomed properly. Assemble all of your tools, and make sure they are clean. Brushes should be washed in a mild soap once a week. Rinse them thoroughly, shake out the water, and leave them on a towel to dry.

If your horse is not showing, start out by spraying the tail with ShowSheen® so it will have time to dry before you untangle it.

Tie or cross tie your horse and start out by picking out the feet. In some barns, the horse's feet are picked out before the horse leaves the stall. Horses are creatures of routine and many appreciate their feet being cleaned out in an order. Some people clean the horse's feet out left front, left hind, right front and right hind. Others use the racetrack method of cleaning out all four feet from the left side of the horse in the order of left front, right front, left hind and right hind. Check your horse for loose shoes, loose or missing nails and thrush. Feet should be picked out both before and after riding.

**Several areas on the horse's body require special attention:**

- Elbows
- Legs
- Belly
- Dock
- Sheath
- Udders
- Inside of the ears
- Between the hind legs

Pick up the curry comb, and mentally divide your horse into sections. It is helpful to think of grooming your horse top to bottom and front to back. Grooming traditionally starts on the left side of the body behind the horse's ear. Curry the horse in large circles, pushing as hard as the horse will allow you to. Thoroughly loosen the dirt on each area before moving to the next. Tap the dirt out of the curry comb on the floor or on your boot after each section. Do not tap the curry comb out on the stall walls. Be careful not to curry on any bony area of the horse's body. Respect your horse's ticklish areas, and remember that horses can cow kick (kick out to the side).

Once you have curried the entire body, take the dandy brush and brush the body in sections. The best way to brush a horse is to have the brush in one hand and the metal curry comb in the other. If a metal curry comb is not available, a rubber one will suffice. Brush the horse by drawing the brush through the coat in the direction of the hair growth. Flick the brush up away from the horse at the end of each stroke to take the dirt out of the horse's coat. Every few strokes, run the brush across the metal curry comb to remove the dirt from the brush. Try to find a rhythm – brush, brush, brush, clean. Put some muscle into it and lean into the horse while grooming. Pay attention to the direction of the hair growth, especially by the horse's hips. It is helpful to groom the left side of the horse with your left hand and the right side with your right hand. If you practice this skill, you will notice that your body becomes more symmetrical, and your grooming will be of higher quality.

Next, go over the horse in the same fashion with the body brush. A good body brush should fit your hand well. Most body brushes have a strap across the back to provide leverage.

Some horses are very dirty in their stalls. Manure stains that cannot be brushed out require either spot washing or spraying with alcohol and rubbing out with a towel.

Continue on to the horse's legs with a mud brush or dandy brush. A mud brush should be used on thick-coated horses or caked-on mud or manure. Keep one hand on the horse's leg and brush with the other hand. Keeping one hand on the horse's leg helps you feel if a horse is going to move its leg suddenly and helps you push away in an emergency. For safety, never kneel down while grooming or put your hands on the floor where they could be stepped on. Clean your brush after each leg. Pay special attention to the horse's heels and behind the fetlocks. Check for burrs, cuts and skin irritations.

Gently clean the horse's face with the face brush. Some horses enjoy having their face gently scrubbed with a rubber grooming mitt. Each horse is an individual, and a good groom learns to work with the horse. Make sure to unclip the throat latch of the halter and groom under the horse's head. Check for ticks that like to embed themselves under the jaw.

Brush the mane flat. If the horse's mane won't stay on one side of the neck, it can be put in training braids.

The best way to work with the tail is to untangle it by hand. Never rip out the tangles. If you must use a brush, gently brush the tail starting at the bottom and working toward the top. Make sure to remove any shavings, hay, or straw from the tail. Look at the roots of the mane and tail as you brush. If the horse has scurf, which is the equivalent of human dandruff, the mane and tail need to be washed. Check for ticks in the mane and the tail, indicated by a yellow, crusty serum. Wash the area thoroughly.

Finish your grooming by wiping out your horse's eyes and nostrils with a clean, damp sponge. Wipe under the tail with a separate damp sponge. Then wipe your horse down with a clean rub rag. You may put a small amount of baby oil on the muzzle to enhance appearance.

After riding, allow your horse to go into its stall to urinate. If it is muddy or sweaty, you can either allow the horse to dry and brush the mud and sweat from its coat, or bathe it. Wet mud should not be brushed.

**QUARTER MARKS**

Quarter marks are decorative markings brushed into the horse's coat at the hindquarters. These marks can enhance the conformation of a well-muscled hip and croup and draw attention to the cleanliness and shine of a well-conditioned horse.

Quarter marks can be done with a stencil or freehand. Some grooms produce the effect by spraying the area with fly spray and using a pulling comb, while others use a damp sponge and a body brush.



## BATHING

In general, it is far better to groom a horse than to bathe it. Bathing strips the horse's coat of oil and makes the coat dull. A horse that has the sweat groomed out, rather than washed out, will generally have a shinier coat. In addition, bathing can weaken a horse's feet.

### A horse should be bathed:

- To help with cool down
- Before a show
- To remove stains that cannot be brushed out

Products containing bluing can help remove stains. Bon Ami scouring powder may also be used on white markings. Mix the powder with water into a thick paste and rub it into the stain. Once it dries, it should be thoroughly brushed out. Do not use other scouring powders because they are too abrasive or contain toxic ingredients.

The mane and tail should be scrubbed to the roots during a bath. A dirty tail can irritate a horse, encouraging it to rub and break off the tail hair. Use a mild shampoo, and work the lather deep into the mane or tail. Be sure to rinse away all of the soap to avoid irritation. This is an excellent time to check for ticks that burrow into the mane or tail. The horse's body creates more dandruff or scurf during the winter months.

## HOT TOWELING

A horse may be hot toweled when it is too cold to bathe.

To hot towel, fill a large bucket with extremely hot water and one half teaspoon of shampoo. Put on dishwashing gloves, and use a large, light-colored towel. Dip one end of the towel in the bucket, and wring it out until it is nearly dry.

Use the damp end of the towel in a side-to-side motion, accumulating the dirt and scurf. Follow up by using the dry end of the towel to dry the area.

## CLEANING SHEATHS AND UDDERS

A gelding's or stallion's sheath and a mare's udder should be cleaned on a regular basis.

The body secretes oils from the skin glands which combine with urine and dirt to form a waxy buildup known as smegma that lines the sheath and coats the penis or folds of the udder. If the sheath is not kept clean, the outer covering of the sheath, or prepuce, may develop a bacterial infection, which causes swelling and provides a feeding area for flies.

Clean udders and sheaths with a mild soap such as Ivory® or a sheath-cleaning product such as Excalibur®.

## CLIPPING AND TRIMMING

When showing, a horse should be clean, neat and well turned out. Part of this requires attention to the mane, tail, muzzle, ears and lower legs. Most show horses are clipped in the following areas:

- Ears, muzzle, bridle path and legs: size 40 blades.
- Under the jaw: size 10 blades.
- In addition, wounds are generally clipped using size 40 blades.
- The eye whiskers should never be trimmed. They protect the horse's eyes from injuries and foreign objects.

## BODY CLIPPING

If body clipping is necessary, there are a variety of patterns to choose from:

**Full body:** The entire body is clipped. The saddle area may be left unclipped for protection.

**Hunter:** The legs and saddle area are left unclipped.

**Trace:** The horse is clipped below the level of the traces, as if it were wearing a harness.

**Strip:** The area under the throat, chest, and belly is clipped.

## MANE AND TAIL CARE

Pull the mane or thin it to keep it neat. The mane should not be cut with scissors. The mane should be approximately four to six inches long so that it either lays flat or can be neatly braided. Horses with a very wide crest need their manes left slightly longer in order for the mane to lay flat.

To pull a mane, hold a small section of the mane, and tease back the hair that you do not wish to pull. Wrap the remainder around a pulling comb, and give a sharp yank to remove the hair.

Most horses tolerate mane pulling without any problem, while some horses are sensitive and need to be restrained. The horse's tail can be cut so it does not drag on the ground. Care must be taken to not over-shorten the tail. Tails can be banded (cut straight across) or switched (cut in a downward "V").

A tail bandage may be used to smooth down the top of the tail or to protect a braided tail from loosening or being rubbed. Tail bandages are made out of cotton, synthetics, or stretchy material such as an ace bandage. Use caution when using a tail bandage to avoid cutting off the circulation to the tail.

## Blanketing Basics

Horses that live in stalls often need help to keep their bodies at a comfortable temperature. In the wild, horses huddle together when they are cold and roll in the mud or go into rivers when they are too hot. Stabled horses need help controlling their body temperature with blankets, fans, heaters, or whatever else may be necessary.

A horse should wear a blanket that fits properly. Blanket measurements are taken from the center of the chest to the dock. Specific brands of blankets may fit certain conformation types (i.e., horses with narrow shoulders or high withers) better than others. Blankets should be kept in good repair and cleaned on a regular basis.

To put a blanket on a horse, place it high on the horse's neck. Slide it back, in the direction of the hair growth, and fasten the chest buckles. Next, fasten the surcingles and leg straps (if any). To remove a blanket, undo the surcingles and leg straps first. Then undo the chest buckles and lift the blanket off of the horse's body.

### Blanketing a horse depends on several factors:

**Coat:** Horses that live in colder climates and are kept in work during the winter months may need to be body clipped in order to cool them out efficiently following work. A blanket or combination of blankets is necessary to retain their body warmth.

**Climate:** Although the horse's coat provides good natural insulation, more blankets may be necessary in wet or windy, cold conditions.

**Living conditions:** In general, a horse living in a warm, draft-free barn requires fewer blankets.

**Internal thermostat:** Like people, some horses are warmer or colder than others. Each horse is an individual and should be treated as such. Some horses dislike blankets and will take them off regardless of the temperature.

## HORSE CLOTHING

Blankets and horse clothing come in many types:

**Rugs:** Blankets used for turn out. The old-fashioned rug was the New Zealand, which was made out of water resistant canvas with a wool lining. Today's rugs are more high-tech and include such features as waterproofing and breathable fabrics. Rugs come in light, medium and heavy and generally have leg straps to keep them securely in place when the horse is moving around in turn out. Some rugs may have a built-in neck feature, belly band and/or a tail or storm flap for extra protection.

**Heavy stable blanket:** The most insulating blanket. Usually made out of a synthetic material. May be lined with nylon, fleece or polar fleece. Can be used in combination with other blankets. May have leg straps.

**Under blankets:** Heavy wool blankets (generally a golden yellow or baby blue with contrasting color stripes) that are worn under a stable blanket. Due to their rectangular shape, they are placed high on the neck, and the front corners are folded up toward the withers. This makes the front of the blanket into a triangle that is folded back over top of the horse's blanket. Sometimes worn with a surcingle over top of the outer blanket. Very warm and insulating, but tends to slip out from under the top layer. Not as common as they once were.

**Mid-weight stable or baker blanket:** Heavier and more insulating than a sheet. Can be a cotton blend or a synthetic and can be used in combination with other blankets. May have leg straps.

**Stable sheet:** The lightest blanket; may be worn alone or under a mid-weight or heavy blanket as an insulating layer. Usually 100 percent cotton and seldom has leg straps. It helps to keep the underside of the top blankets clean and is easier to launder than the bulkier heavy blankets.

**Scrim:** A light, mesh-like blanket that is generally used at horse shows to shield the horse's coat from the sun and flies.

**Ring sheet:** Similar to a scrim, but usually made of cotton or a cotton blend.

**Fly sheet:** Worn either in the barn or in turn out to shield a horse from flies and UV rays.

**Irish knit:** A waffle weave sheet that is used to wick moisture away from a horse's coat.

**Cooler:** A large, non-fitted rectangular cover that is used to keep the horse warm while cooling out. It is made of wool, wool blend or polar fleece and is attached by ties under the horse's neck.

**Dress sheet:** A wool, wool blend or polar fleece sheet that is used to keep the horse warm while tacked up but not yet working or cooling out. A cooler may be used for the same purpose, but due to its rectangular non-fitted design, it does not have as polished an appearance as a dress sheet.

**Quarter sheet:** Worn underneath and extending behind the saddle, it keeps the horse's hindquarters warm in cold temperatures.

**Rain sheet:** Usually used at horse shows to shield a horse and the saddle from rain.

**Hood:** Worn over the horse's head and neck to keep those areas warm. Hoods can be made of canvas or synthetic. Some hoods are made of Lycra and are used to keep a horse clean and/or keep braids neat overnight.

**Nightwear:** Lycra shoulder protectors, hoods or full body suits used to keep horses clean. Shoulder protectors and full body suits also help minimize blanket rubs.

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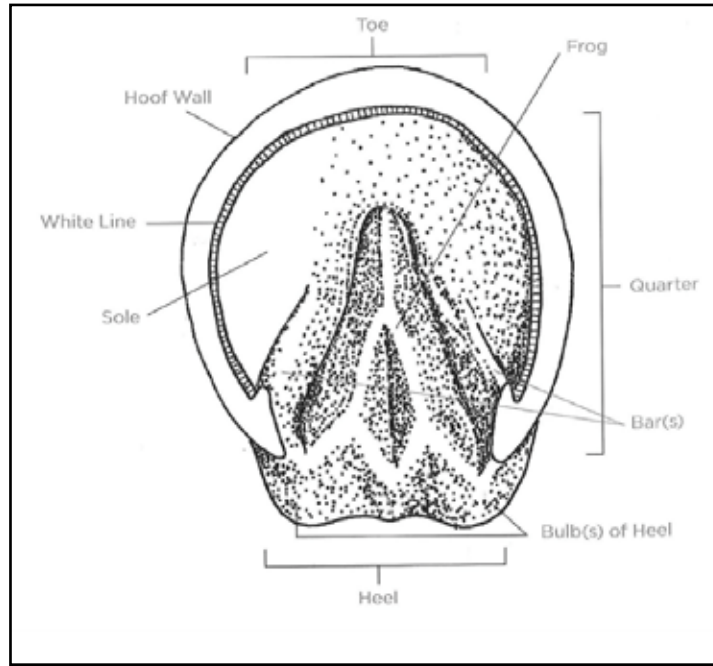
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# HOOVES AND SHOEING

An old saying states, “no hoof, no horse,” as a testament to how vital hooves are to a horse’s overall health. Given the stress a hoof endures on a daily basis, proper hoof health and hoof care are of utmost importance.

Understanding the hoof’s structure helps in knowing why healthy feet are so important to the horse. The horse’s hoof corresponds to the last digit of our middle finger. It has evolved over time to support the full load of the horse as it propels itself across uneven terrain, over jumps and through spins and turns. On average, the horse’s hoof grows at the rate of approximately ¼ inch per month. The rate of growth changes with the time of year and the horse’s health.



## Exterior Anatomy of the Hoof

The hoof grows downward from the coronary band. The coronary band is a very tough, vascular structure that sits at the top of the hoof wall. This important structure produces the tubules of the outer hoof wall. It also acts as a band of support to add strength to the internal structures as the hoof distorts during every stride.

**The coronary band** is attached to the periople, a protective covering for the area of newly-formed hoof wall just below the coronary band. In the early stages of growth, this horn material is quite soft, preventing the coronary band from becoming bruised as shock is transferred upward through the hoof wall during the weight bearing stage of the stride. The periople is produced by the perioplic corium, also called the perioplic ring, and serves to connect two dissimilar structures: the hard hoof wall and supple skin. The periople also creates protection for the coronary band and allows for movement of the hoof as the horse moves. As the hoof grows downward, the periople sometimes stays attached for approximately an inch. In wet environments, the periople can become engorged with moisture. This manifests as a thick, white, skin-like tissue on the outside of the foot that extends downward for up to an inch from the coronary band.

**The outer hoof wall** is pigmented and much stronger than the inner wall. Its purpose is to bear the weight of the horse, protect the internal structures, and act like a spring, storing and releasing energy during the different phases of the stride and assisting in propulsion. A healthy outer wall will be slightly thicker at the toe and have no growth rings or cracks. A healthy outer hoof wall is almost impermeable to things it comes into contact with; however, if the outer wall is damaged, substances coming into contact with it may seep through and cause harm.

**The inner hoof wall** is usually white, as it does not contain pigment, and is more pliable than the outer hoof wall. The inner hoof wall has a higher moisture content, which enables it to stretch more as the outer hoof wall moves. This ensures that the inner workings of the hoof are protected from shock and allows movement between the third phalanx bone and the outer hoof wall without losing strength of attachment. The inner hoof wall can be seen when looking at the bottom of the hoof, appearing as a white line just to the interior of the outer hoof wall.



Coronary Band

**The white line** joins the sole to the inner hoof wall and seals off the border of the third phalanx bone. This structure can be seen just inside the inner hoof wall when looking at the bottom of the hoof, and actually has a more golden coloring than the name implies. The white line creates a shallow crease in the bottom of the hoof, which, as it fills with dirt, creates traction for the foot. (See sensitive and insensitive laminae in the interior anatomy of the hoof)

**The sole** of the hoof is the area inside the white line on the bottom of the foot, not including the bars and the frog. The primary function of the sole is to protect the sensitive structures beneath it; however, the outer perimeter also provides support in the toe area.

**The bar** of the hoof is an extension of the inner and outer hoof walls that runs along the side of the frog, ending approximately halfway along the frog. The primary purpose of the bar is to control the movement of the back of the hoof. It also adds strength to the heel area and protects it from excess distortion.

**The collateral grooves** run alongside the frog. The outer wall of the grooves are made up of the wall of the bar and sole, and the inner wall consists of the wall of the frog.

**The frog** works with the coronary band, the bars, and the sole to provide resistance to distortion of the hoof during the stride. The frog should be wide and made up of a thick, leathery material. Pressure placed on the frog during a stride directly influences the health of the digital cushion located internally directly above it. The frog also assists in protecting the sensitive structures inside the hoof capsule, providing traction, assisting circulation and absorbing shock. Containing many nerves, the frog enables the horse to feel what it is standing on and to be aware of where its feet are in relation to the rest of the body. An unhealthy frog is susceptible to infection, which can lead to significant loss of structure in the back of the hoof, causing severe lameness.

**In the center of the frog**, towards the rear of the hoof, is the central sulcus, a triangular groove between the frog and the heel. A healthy sulcus is wide and shallow, but if the frog is weak and narrow, the sulcus can become a deep crease that collects bacteria and fungus.

**The heel** of the hoof is designed to receive the initial impact of the horse's weight during a normal stride. Also known as the angle of the bar, this area primarily consists of pliable inner wall, enabling it to dissipate excess shock with ease. This area plays a major role in supporting the horse's weight and needs to remain correctly balanced.

## Interior Anatomy of the Hoof

The largest bone inside the horse's hoof is the **third phalanx bone**, also known as the pedal bone or the coffin bone. The shape of this bone provides a framework for the shape of the horse's hoof. The third phalanx bone provides strength and stability to the hoof and holds the other structures in place. This bone differs from other bones in that it does not have bone marrow and has an unusually high density of tiny blood vessels running through it.

Surrounding the third phalanx bone is the **laminae**, which hold the hoof wall to the bone and produce some of the intertubular horn of the hoof wall. The underneath of the bone is covered in solar corium, which produces the sole of the hoof. At the back, the bone attaches to cartilage, which forms a large portion of the back of the hoof. Tendons and ligaments attach to the third phalanx, and a dense network of blood vessels runs around and through it.

The **navicular**, or distal sesamoid, bone can be found just inside the back of the third phalanx bone, with the deep digital flexor tendon passing over it. The navicular bone prevents over-articulation of the third phalanx bone, maintains a constant angle of insertion for the deep digital flexor tendon and allows for additional tilt within the coffin joint when travelling over uneven surfaces.

The **digital cushion** sits just behind the third phalanx bone and above the sensitive frog. It is a mass of flexible material that contributes to the formation of the heels. This structure is one of the primary shock absorbers of the hoof. As weight is placed upon the hoof, pressure is transmitted down the phalanx bones to the wall of the hoof, the digital cushion and the frog. The frog also presses up on the digital cushion, compressing it and forcing it outward toward the lateral cartilages. When the weight is lifted off the hoof, the structures return to their original position.

When the hoof is placed on the ground, the blood in the hoof is forced from the foot to the leg by the increased pressure in, and the change in shape of, the frog and the digital cushion. Exercise increases the blood circulation in the hoof and favors good hoof growth. Lack of exercise, dryness of the hoof wall, and poor nutrition all inhibit hoof growth.

The **lateral cartilages** are located above and below the coronary band, extending around the front, the sides and the back of the hoof. Below the coronary band, they extend out over the digital cushion and attach to the back of the third phalanx bone. These cartilages provide resistance as the third phalanx bone descends during the weight-bearing portion of the stride, regulating the amount of pressure applied to the coriums. They assist in suspending the third phalanx bone in the correct position as well as acting as springs, storing and releasing energy during locomotion.

The **coriums** are vascular structures which manufacture hoof horn. The solar corium produces the sole, the frog corium produces the frog, the coronary corium produces the tubules and intertubular horn of the hoof wall, and the periople corium produces the periople.

The **sensitive laminae** and the **insensitive laminae** (also known as the white line) intermesh together, in a fashion similar to velcro, to hold the hoof wall to the third phalanx bone. In a healthy hoof, the hoof wall is tightly attached to the third phalanx bone by the laminae attached to each structure. In a live horse, it is virtually impossible to physically separate the laminae from the hoof wall unless it becomes stretched due to metabolic insult (see the section on laminitis). The sensitive laminae are filled with nerves and blood vessels that help support the horse's lower leg and hoof.

## Hoof Care

One of the most important aspect of horse care involves proper care of the feet. Horses living in the wild grow their hooves naturally and wear them down as they travel over diverse terrain. Domesticated horses do not have the ability to wear their hooves naturally, so correct farrier care is essential to maintaining hoof health.

Good stall and paddock sanitation is necessary for good hoof care. It is important to clean hooves before and after each ride, daily for a horse kept in a stall, and at least weekly for a horse living on pasture. Remove all debris from each hoof by using a hoof pick in a downward motion from heel to toe, being careful not to push any debris into the sensitive heel area.

The health of the hoof wall is related to the health of the inner structures of the foot. Regular exercise stimulates circulation, maintains health of the living tissue, and balances the internal moisture content. A well-balanced diet will help the hooves to grow properly.

Horses kept in wet environments may have hooves that are soft and crumbling. When the hoof wall is soft and crumbling, it tends to peel and separate and does not hold horseshoe nails well. Hooves also become prone to abscesses when they are too wet, as the hoof walls tend to spread and allow bacteria to enter the white line area. Horses kept in too dry an environment may have problems with hooves cracking or chipping. The hoof wall may contract and lose elasticity. Some hoof care treatment products can assist with maintaining the internal moisture by sealing the outer hoof wall. If you are unsure about what care your horse's feet need, speak with your veterinarian and farrier.

### The following factors determine a horse's hoof quality:

**Genetic predisposition:** Good bloodlines help to pass on good feet.

**Nutrition:** Proper nutrition leads to the correct balance of vitamins and minerals for hoof growth.

**Exercise:** Sufficient exercise increases the expansibility of the hoof, which reduces concussion. It also increases circulation, which promotes the health and elasticity of the hoof wall and stimulates new growth. The scrubbing action of soil contributes to hoof hygiene by removing dead pieces of sole and frog.

**Supplements:** These may play a small part in building a stronger foot. The horse's body normally produces the correct amount of the substances that are used to build strong feet. In some horses, supplementing with biotin and D-L methionine may help to stimulate hoof growth.

**Topical dressings:** Hoof moisture comes from internal sources; very little comes from the outer environment. Because of this, the hoof does not derive much benefit from hoof dressings. A better method is to rub the coronary bands with lanolin or a vegetable or mineral oil to stimulate growth.

### A horse's hoof quality can be damaged by:

Improper shoeing.

Excessive bathing, wet, or infectious conditions due to a lack of stable hygiene can weaken the feet so that they cannot tolerate a normal day-to-day amount of work and predisposes them to bacterial infection. Wet conditions can include wash racks, pastures that are wet from rain or dew, urine-soaked stalls, manure, mud and sand. Management is better than cure.

Excessive use of oily hoof dressings can soften and weaken the hoof wall, while excessive use of hoof treatments that produce a clear shine can have a drying effect. Use of either type of hoof dressing when applied to the entire hoof wall on a frequent basis can be harmful to the integrity of the feet.

**Medication:** Some medications, such as dexamethasone, may cause laminitis if used in large quantities. Medication should only be given under the supervision of a veterinarian.

**Footing:** Inconsistent or improper type, condition, depth and care of footing material can have a negative impact on hoof soundness.

**Longeing:** Inappropriate or incorrect longeing will cause feet to fatigue and fail due to the constant twisting of torque of the limb and the foot.

**Concussion:** Continued concussion breaks down the strength of a foot and increases inflammation, as well as loosens shoes. Jumping applies tremendous stress and force on the back section of the foot.

## Conformation Faults in Hooves

The feet of each horse have their own characteristics. In general:

The front hooves tend to be rounder than the hind hooves, but all hooves should be well-shaped and proportionate to the size of the horse. The sole of the front hoof should be almost round, while the sole of the hind hoof is more oval in shape.

The exterior hoof wall of the front foot should have an angle equal to that of the pastern and the shoulder.

Hooves should be wide at the heel so they give and spring farther apart when the foot hits the ground to help absorb concussion.

The foot should be fairly deep at the heel, making it less apt to bruise. A deeper heel also tends to have stronger bars.

The sole should be slightly concave and the frog should be centered in the sole, with the point of the frog aiming directly at the toe of the hoof.



Unfortunately, not all horses are born with perfect feet. Others have been victims of poor foot care and have developed problems. The following are conformation faults to note when looking at hooves:

**Flat:** Show a decreased angle of the foot with the ground. The heel is low, and the sole is flat and often thin. The frog compensates for the poor conformation of the rest of the foot and is usually large and well developed. Flat feet are likely to sustain sole bruises, collapsed heels, dropped soles and corns.

**Rings:** Rings may occur from fevers, laminitis, imbalanced trimming or shoeing, shoes that are too small, seasonal effects, or change in diet. Rings may not have an effect on soundness, but their cause should be investigated.

**Boxy or Upright:** Show an increased angle of the foot to the ground. The heel is high and narrow, the frog is small, and the horn texture is often very strong. Boxy or upright feet often have straight walls with little flexibility under loading.

**Club:** A more pronounced version of boxy feet. A club foot is usually characterized as having a hoof angle of greater than 61 degrees. The front face of the hoof may have a dished appearance caused by the shearing stresses within the sensitive laminae created by the steep hoof angle. Not all club-footed horses are, or will, become lame; however, the horse's high heel causes the hoof to land heel first in an exaggerated manner. This makes the third phalanx, navicular apparatus and structures of the sole more susceptible to bruising and strain. The third phalanx bone inside the hoof capsule rarely sits in a correct position in a club-footed horse. A club foot should not be trimmed to match the normal hoof angle, but rather to maintain the hoof structure. Club feet can develop in foals with flexural contractures.

**Long or fleshy:** Similar in aspects to flat feet. The toe is long and cannot be reduced to normal size without risk of injury to the internal, fleshy structures.

**Thin soles:** Thin soles may make a horse very sensitive to hard ground and susceptible to bruising. Horses with thin soles may benefit from having pads placed between the shoe and the sole.

**Dropped soles:** Horses with dropped soles have a convex sole and may, in acute cases, have the sole below the surface of the wall. Dropped soles are often a sign of chronic laminitis with rotation or sinking of the third phalanx bone. They are common on wide, flat feet that have a lot of angle to the side wall at the quarter. Special shoeing is usually necessary to keep horses with dropped soles comfortable.

**Pronounced ridges or rings:** A sign of an alteration of the growth rate. May be caused by a past or present disease such as laminitis, or by incorrect hoof trimming. Pronounced rings are widely spaced at the heel and converge at the toe. Those rings associated with a change in diet are smooth and run parallel to the coronary band.

**Brittle and shelly:** Brittle and shelly feet may be partly inherited, result from an incorrect diet, or stem from improper shoeing techniques. Careless rasping of the hoof wall can result in a loss of moisture in the hoof, leading to dry and brittle feet. Environmental conditions do not affect normal hoof tissues, but brittle feet may be affected by dry weather. Careful balancing of the diet, regular exercise, and skilled farrier care may improve brittle feet. The typical characteristics of shelly feet include chipped, crumbly walls that are usually flared at the toe or the sides. A shelly foot is often quite long relative to the third phalanx bone, causing the hoof wall to bear more weight. It is difficult to affix a shoe to shelly, thin walls. Horses with short and chronically shelly hooves are prone to lameness due to a possible circulatory disturbance, such as compression from imbalance. Pain, abscesses and white line disease can result. Taking radiographs prior to shoeing may assist the farrier in choosing an appropriate shoeing plan.

## Lameness Issues in the Hoof

When evaluating lameness in a horse, begin at the foot, as many problems develop in the complex structure of the hoof.

Some problems that may develop in the hooves include:

**Thrush:** Thrush, or pododermatitis, is a painful bacterial infection involving the central sulcus and the collateral grooves of the frog. It is characterized by a putrid black discharge along with poor growth and degeneration of the frog. When the frog is cleaned with a hoof pick, a soft, putty-like material will come from the central sulcus, and the sulcus will be much deeper than normal. If left untreated, the infection may extend into the sensitive laminae and infect the digital cushion.

Treatment involves paring away the clefts of the frog to allow for cleaning and air to reach the central sulcus. Keeping the hoof as dry as possible will allow the frog to heal. In severe cases, the horse may need a bar shoe to promote frog regeneration.

**Canker:** A chronic infection of the horn tissues of the frog and the sole of the hoof. It usually occurs in wet climates. The appearance is quite similar to thrush, but can be distinguished by the characteristics of the discharge, the severity of the infection, and the involvement of the sole as well as the frog. Treatment is similar to that of thrush; however, antibiotics may be necessary to kill the infection.

**Quittor:** A chronic, deep-seated infection of the lateral cartilage of the third phalanx bone. Destruction of the inflamed part of the lateral cartilage results in the discharge of infected material at or above the coronary band. During an acute attack of quittor, the horse will often be lame with swelling and heat over the involved lateral cartilage. The most effective treatment is to remove the damaged cartilage.

**Hoof Cracks:** Vertical splits between the hoof horn tubules. Cracks in the hoof wall can be a minor blemish or a more drastic unsoundness. They can be hard to get rid of once they occur, as the hoof tends to keep splitting as it grows out. Cracks are usually the result of long, bare and brittle feet. Quarter cracks are most common, as that is the thinnest and most delicate



part of the foot. A shoe can help relieve the stress on an area that has a crack. A farrier can trim the area around a crack so it doesn't bear weight, allowing for the hoof wall to grow out.

**Contracted Heels:** Contracted heels occur when the foot is abnormally narrow or actually contracted. One or more hooves may be involved. The condition is often caused by too little pressure on the frog. This can happen when a horse with a painful foot stands for long periods without the heel on the ground. An excessively long, unbalanced foot from improper trimming may also cause contracted heels. Corrective trimming and shoeing can help to return the hoof conformation to normal.

**Sheared Heels:** The heel of the horse's foot has two bulbs, both of which hit the ground simultaneously in a balanced hoof. If the hoof is unbalanced, one heel will hit the ground first, causing the horse to bear weight on the inside or outside of its heel. This causes an upward displacement of that heel bulb in relation to the other, often leading to soreness on the side that bears the brunt of the weight. It is often possible to manipulate the heel bulbs back and forth when a horse has sheared heels. The most common cause of sheared heels is improper hoof trimming. Bringing the hoof back into balance through corrective shoeing will relieve the pressure on the affected heel.

**Abscess:** An infection under the sole; one of the most common ailments of a horse's foot. The pain of an abscess can be moderate to severe. Some horses may display as much pain as they would with a broken leg. The horse may have an elevated digital pulse or swelling in the area of the abscess. A veterinarian should be called. To resolve an abscess, the veterinarian will remove the shoe, open the abscess so it can drain, and apply a poultice over the hoof to draw out the residual infection.

**Stone Bruises:** Trauma to the inner tissues of the hoof below the sole can rupture small blood vessels, creating bruises. A horse may step on a sharp rock, crushing the blood vessels between the sole and the third phalanx bone and causing bleeding beneath the sole. With a severe bruise, the horse may be reluctant to bear any weight on that foot. A mild bruise may just produce tenderness in the area. A heel bruise causes the horse to put more weight on the toe, resting the foot with the knee forward to relieve pressure on the bruised area. A toe bruise causes the horse to land heel first and shorten stride to avoid putting weight on the toe area. Any sole bruise is subject to infection and abscess if there is a crack in the sole, allowing bacteria to enter the area. If an abscess develops, it needs to be opened and drained.

**Corns:** Bruises where the hoof wall and the bars come together at the horse's heel. Corns are often caused by improper shoeing (especially if the shoes are too narrow) or the shoes being left on too long. Occasionally a farrier will bend the inside branch of a shoe toward the heel to keep the horse from stepping on the front shoe with a hind foot. This can put pressure on the bars of the hoof and create a corn from the repeated trauma to that area. Corrective shoeing can alleviate pressure in the heel area.

**Puncture Wounds:** As with all puncture wounds, a puncture in the hoof should be taken seriously and involve consultation with your veterinarian. If the object that caused the wound is still in the hoof, DO NOT remove it. Pack the area with gauze and contact your veterinarian immediately. The veterinarian will want to take radiographs to determine the depth of the wound and what, if any, structures of the hoof are involved. Follow your veterinarian's advice on follow up care.

**White Line Disease:** A progressive separation of the hoof wall from the foot, starting at the bottom of the foot and moving upward. It involves the insensitive laminae. This disease creates soft or chalk-like horn tissue. It often starts at the toe and is sometimes referred to as "seedy toe;" however, it can begin anywhere along the bottom of the foot. It may create a bulge in the hoof wall, a gray or black area of debris at the edge of the hoof wall, or a shelly, crumbly consistency that is easily pulled off or picked away from the hoof.

The separation may start if the hoof wall is too long, as weight placed on the foot pries the hoof wall away from the sole with each step. The separation collects debris, which is forced higher into the hoof with each step. White line disease does not cause lameness unless the case is extremely pronounced and the hoof wall has become completely detached, allowing the third phalanx bone to drop.

White line disease can be treated by removing all the diseased hoof horn and treating the underlying tissues with a good fungicide. Reconstructive shoeing is usually necessary to support that part of the hoof and protect it from further infection.

## NAVICULAR SYNDROME

Navicular syndrome is one of the most common causes of intermittent front leg lameness. Domesticated horses of all breeds, competing in all disciplines, are prone to lameness stemming from this area of the anatomy. Interestingly, navicular syndrome is rarely seen in horses in the wild, so is sometimes called a man-made disease.

A number of factors may contribute to a diagnosis of navicular syndrome including: poor hoof conformation (upright pasterns and hooves), infrequent or inadequate hoof trimming that leaves the toe long, low or sheared heels, contracted heels, and improper shoeing.

The navicular bone is located at the heel of the foot, beneath the back third of the frog. It is suspended by three ligaments, articulates with the coffin joint and serves as a support to the second and third phalanx bones. The deep digital flexor tendon runs behind the navicular bone and attaches to the bottom of the third phalanx bone. The navicular bursa, a small fluid-filled structure, is located between the navicular bone and the deep digital flexor tendon, acting as a cushion for the tendon to pass over the bone. The bursa is lined with membranes that produce synovial fluid.

Pain in the heel area can be caused by any of the anatomical structures in that area, often making it difficult to pinpoint the exact cause of lameness. Usually the lameness is mild to begin with, making it hard to determine what is happening. Later, the

lameness will become more frequent and present as definite heel pain. The horse's stride will become shorter as it lands toe first to avoid putting weight on the heel area. A stiff, shuffling gait with a short, choppy stride is characteristic of navicular syndrome.

A standard diagnostic test for navicular syndrome is to apply hoof testers over the center of the frog. Because the navicular bone is located beneath this area, a horse with pain in the navicular area will test positive. The veterinarian may perform a nerve block of the heel area to pinpoint the lameness and will often take radiographs to study the underlying structures. Because navicular syndrome can involve so many soft tissues, radiographs are not always diagnostic, and further evaluation may be needed to determine the exact source of pain. An MRI can identify soft tissue issues, but is costly.

There are many different treatments available if a horse is diagnosed with navicular syndrome. It is important to consult your veterinarian in all aspects of care relating to any lameness. Correct hoof angles are of vital importance in the care of the horse, so a competent farrier with skill in dealing with therapeutic shoeing may be needed. Once the hoof is properly balanced, a bar shoe may be used to support the area. Medical treatment involves the use of NSAIDs to relieve pain and reduce any inflammation in the area. Other medications may be used at the discretion of your veterinarian.

## LAMINITIS (FOUNDER)

Laminitis is a metabolic and vascular disease involving the sensitive structures of the hoof. The disease begins when bacterial endotoxins and lactic acid are released into the bloodstream. These dilate the large digital arteries to the feet, increasing the blood flow while also constricting the small capillaries that nourish the laminae. The result is a large volume of blood going to the foot, but not being granted entrance to the laminae. Deprived of blood and oxygen, the laminae swell, which causes compression because the hoof wall cannot accommodate the swelling. The laminae tissue is then compromised and, unless remedied, the tissue will die.

When the laminae tissue dies, it weakens the attachment of the third phalanx bone within the hoof, compressing arteries and veins, and, in severe cases, rotating the bone towards the sole of the hoof.

Laminitis can be acute or chronic. The most common cause of acute laminitis is the rapid consumption of excess carbohydrates. The carbohydrate load in the intestinal tract alters the bacterial balance within the cecum, indirectly leading to the release of endotoxins and lactic acid. Most commonly, the front feet are involved, but laminitis can affect the hind feet as well.

Acute laminitis begins suddenly with a high fever, chills, sweating, diarrhea, a fast pulse (especially the digital pulse) and rapid breathing. The horse's hooves are hot and quite painful. The horse may stand with its weight shifted to the rear, alternate standing with one front foot on the ground, or lie down to avoid putting weight on the front feet.

Laminitis becomes chronic when pain and lameness persist for more than two days, or when permanent damage to the foot occurs. Rotation of the third phalanx bone can happen as early as 48 hours after the onset of an attack, or can occur much later. Rotation occurs when the third phalanx bone becomes detached from the hoof wall and the toe drops downward from the pull of the deep digital flexor tendon. All degrees of rotation are possible, from minor to the bone actually penetrating through the sole of the foot.

Laminitis is a veterinary emergency, and the horse should be seen as soon as possible. Do not wait to see what other signs may develop. Keep the horse in a stall, and remove all feed from the area. Icing the horse's feet until the veterinarian can arrive may help make the horse more comfortable. The veterinarian will administer medications designed to reduce the severity of the attack and keep the horse comfortable. Continuing treatment will be necessary, as will correct farrier care to ensure the third phalanx bone remains properly aligned with the hoof wall.

Laminitis can stem from:

- Overfeeding
- Obesity
- Dehydration
- Hormonal imbalance
- Electrolyte imbalance
- Colic
- Concussion
- Infection
- Exhaustion
- Exposure to toxic plants such as black walnut shavings or ingesting hoary alyssum hay
- Overuse of corticosteroids or other medications
- Placenta retained in broodmares

## Shoeing

Horses are shod to increase support, improve hoof durability, correct problems and add traction. In making the decision to shoe a horse, consider that the added weight of a horse's shoes increases stress on muscles and limbs, leading to earlier fatigue. Shoeing causes the hock, knee and fetlock to flex more with each stride. It also causes a horse to have a higher arc of the hoof during each stride, resulting in added concussion with each landing. Shoeing affects the hoof wall flexibility and the nails weaken the hoof wall.

Not all horses require shoes, but whether the horse wears shoes or not, its feet should be maintained by a competent farrier every five to eight weeks. On average, a horse's foot grows  $\frac{1}{4}$  inch per month. The rate of growth changes with the time of year and the horse's health.

The two basic types of shoeing are hot and cold. In hot shoeing, the shoe is heated in a forge, shaped, and then applied to the foot or burned on to check for proper fit and contact. The final adjustments are made and the shoe is then cooled in a bucket of water. The farrier is able to fine-tune the shoe to the horse's foot. When a forge is not available, or a horse will not tolerate hot shoeing, a farrier can cold shoe. Cold shoeing does not allow for as many adjustments to the shoe.

### **Pros for hot shoeing:**

- Makes it easier to fit the shoe to the exact shape of the foot
- Makes fitting clips easier and more precise
- Seals the tubules
- Kills bacteria
- Toughens the hoof tissue that has been sealed
- Perfect union between the shoe and the hoof

### **Cons for hot shoeing:**

- Cost
- Time
- Farrier must be skilled

### **Pros for cold shoeing:**

- Faster than hot shoeing

### **Cons for cold shoeing:**

- Harder to make the ideal shape in the shoe
- Modifications like clips and square toes are less likely to be used
- Difficult to fit clips

When observing a freshly-shod hoof, the hoof angle and the pastern angle should match. The clinches should be in line. A clinch, or clench, is where the nail comes through the hoof wall and is secured by being bent down and in toward the hoof. The wall should be lightly rasped up to, but not over, the clinch line. The foot should sit level on the ground. When the foot is picked up, the shoe should fit the foot with the heels receiving proper support. A properly-fitted shoe prevents the hoof wall from growing down over the shoe.

Hoof rings or cracks are characteristic of a small shoe. A horse is considered to be "short shod" if the shoe branches (the back of the shoe) do not extend far enough back to support the heels. The shoe branches should extend back to the buttress, or widest part of the frog. Short branches do not give enough weight-bearing support and can cause stress cracks and lameness. The branches should also be wide enough for heel support.

Branches that are not wide enough can cause contracted heels, corns, heel bruises, abscesses, or inflammation of the coffin bone due to excessive concussion.

There should be no daylight between the foot and the shoe. The frog should be close to the ground, healthy and resilient. The sole should be concave, with a fairly wide heel. When the horse moves, each foot should land in good alignment and balance without twisting, rocking or uneven weight distribution. The foot should be trimmed so concussive shock is distributed evenly.

The breakover is the phase of the stride that occurs between the heel leaving the ground and the toe leaving the ground. Foot conformation that makes it difficult for the horse to lift the heel increases the tension on the flexor tendon and the navicular structures. Breakover can be improved by backing up the toe (rasping or squaring it back) and applying a shoe that is set back from the toe. Another method is a rolled toe or rocker-bar shoe.

The moment when the hoof hits the ground (called the hoof strike) is determined by the placement of the third phalanx bone within the hoof capsule. The hoof angle describes the relationship of the front face of the hoof to the ground. Ideally, the hoof angle and the pastern angle, known as the hoof-pastern axis, should match.

### **Ways a low (acute) hoof angle can affect foot health:**

Causing the toe to strike first, placing more tension on the deep digital flexor tendon and causing greater compression on the navicular structures.

Causing circulatory congestion, which reduces blood flow to the heels and raises the pressure in the marrow of the navicular bone.

Over-weighting and overloading the heels leading to caudal (rear of the hoof) heel pain. This also slows the rate of hoof growth.

Common problems with hoof angles include:

**Broken-back hoof pastern axis:** The pastern angle appears steeper (or more upright) than the face of the hoof. The horse lands toe first. This is caused by a low hoof angle.

**Long-toe, low-heel syndrome:** When viewed from the side, a line drawn through the center of the cannon bone should terminate at the bulb of the heel. Heels that are ahead of that line or have a slope greater than the hoof face are considered underrun. A horse with underrun heels generally has a long toe. This causes long-toe, low-heel syndrome in which the pastern assumes a steep angle. Stress is placed on the coffin joint, navicular structures and the deep digital flexor tendon. Over time, the horse's hoof loses shock absorption. The horse has problems breaking over normally, which causes muscular strain and can make a horse forge.

## TYPES OF SHOES

Shoes can be made of a number of substances. The most common are:

- Steel
- Aluminum: Lighter than steel. May give less support to a heavy horse. The steel nails that attach the shoe to the horse's foot can expand the aluminum, causing the shoe to loosen and move on the foot. This movement can cause the wall to break up around the nail holes. The aluminum of the shoe does not directly cause the walls to break up.
- Titanium
- Synthetics

Common specialty shoes include:

**Bar shoes:** Constructed to strategically alter pressure on a particular part of the foot. A solid bar connects the branches to each other. Egg bars are oval shoes that may be used to help with heel soreness and for navicular syndrome.

**Trailers:** An extra-long branch on one side artificially extends the horse's heel and helps an unbalanced hoof to land squarely.

**Wide Web shoes:** Increases the protection to the bottom of the foot without using a pad. The wide web should be in contact with the wall but not the sole. Incorrectly applied, these shoes can cause sole bruising(197).

**Glue-on shoes:** Used for horses who cannot tolerate nails and for certain types of lameness. Also used if a horse's hoof wall has been compromised in a way that makes using nails impossible.

## Traction

Some riding and working situations, such as performing on concrete or in snow, require horses' shoes to have more traction. Common options for more traction include:

**Tapped shoes:** Shoes that have holes drilled into them for screw-in studs. Studs come in a variety of heights and shapes for different footing surfaces.

**Borium:** A metal that is welded to the shoe to provide added traction on asphalt, ice, pavement and other hard surfaces.

**Rim shoes:** These shoes have a groove or wedge that runs down the center of the shoe. They offer significantly more traction than flat or keg shoes.

**Ice, mud or frost nails:** Large-headed nails that give traction until they wear down.

**Heels, caulks or grabs:** Small projections welded to the toes or the heels of shoes. They help to provide traction on grass.

## Traction devices should be used with care, as the following problems can occur:

Mud can cling to caulks and studs, creating excessive drag and contributing to injuries.

Studs, caulks and other traction devices can significantly increase the horse's risk of injury. Bell boots are recommended when traction devices are used.

If a horse is worked on a surface with sufficient traction while wearing shoes with traction devices, the resulting grabbing of the hoof can result in serious damage to the foot and lower leg.

Horses should never be turned out with studs in, as the risk of injury is too great. Shoes with borium also pose significant risks, both in increased concussion and in blunt trauma force from kicking.

Be careful that horses do not step on your foot when wearing traction devices. Serious injury may result.

## Pads

Some horses may benefit from wearing a pad underneath the shoe. Full pads are usually used in conjunction with a packing material such as polyurethane, silicone, oakum, pine tar or foam. This keeps foreign material from accumulating under the pad. A horse may become dependent on a pad and the pad may also contribute to shoe loss.

Pads may be used to reduce concussion or to protect a foot that has a sole abscess, nail puncture, bruising, corns, flat feet, laminitis or other lameness.

## Different types of pads include:

**Full:** Used for sole protection.

**Wedge or degree:** Used to elevate heels and correct hoof angles.

**Heel or cut out:** To add protection to the heel and frog without covering the entire sole.

**Rim:** Placed between the shoe and the hoof wall. Used for horses who are easily bruised by shoes against the soles of their feet.

## Shoeing Terms and Tools

The parts of the shoe are:

**Web:** The width of the material from which the shoe is made.

**Branch:** The length of the shoe from the toe to the heel.

**Heel:** content needed here

**Toe:** The front portion of the shoe.

**Bearing surface:** The part of the shoe in contact with the foot.

**Clips:** The farrier draws these at either the toe or the quarter by heating and shaping the shoe.

**Fullering or full swedge:** The groove made in the ground-bearing surface of the shoe.

## Shoe making tools:

**Anvil:** A large, shaped iron block used in the shaping of horseshoes.

**Anvil stand:** Holds the anvil steady.

**Butcher block brush:** For brushing fire scale off of hot steel. Fire scale is a layer of oxides that form on the surface of the metal during heating.

**Clipping or turning hammer:** For drawing clips when hot shoeing.

**Creaser or fuller:** Used to make the cut in a horseshoe where the nails are placed.

**Fire tongs:** For turning the shoes in the fire.

**Fore punch:** Makes the nail head shaped holes in handmade shoes. These come in E-head (European) and city head.

**Forge:** A coal, coke or propane fueled furnace where shoes are shaped.

**Hot fitter:** Takes the hot shoe from the forge to the foot to burn the shoe on the foot.

**Pritchel:** Used to remove the tiny piece of steel left at the bottom of a nail hole after the fore punch has been driven into the shoe. It can also be used to hold a hot shoe against the foot.

**Rounding hammer:** Used to shape shoes.

**Shoe tongs:** Holds a hot shoe on the anvil.

## Shoeing tools:

**Clinch block:** For clinching and setting nails.

**Clinch cutter or buffer:** Has a blade that is used to cut or raise clinches by placing it under the clinch and striking it with the driving hammer. Also has a point for punching nails and broken studs out of the hoof. It can be used to raise the head of a nail from the creases of a shoe sufficiently to enable the shoe pullers to grasp the nail head for removal. The pointed end can also double as a hoof pick.

**Clinch gouge:** Used to remove a small piece of hoof wall under the nail where it comes out of the foot, which gives the clinches a good seat.

**Clinchers:** Bends over the piece of nail that comes out of the foot. This holds the shoe on more tightly.

**Driving hammer:** Drives nails into the horse's foot.

**Hoof knife:** Made in right and left handed models, this knife is used to cut or pare the outer layer of the sole.

**Hoof nipper:** Used to cut the hoof wall.

**Hoof stand:** Holds the foot while the farrier is finishing the outside.

**Hoof tester:** Squeezes the hoof to test for tenderness.

**Loop knife:** For paring the frog.

**Nail pullers or pincers:** Removes nails from shoes once they have been driven into the foot.

**Rasp:** A file featuring a rough (rasp) side and a smooth (file) side, used to remove hoof tissue. Finish rasps are designed to take off a minimal amount of foot.

**Shoe puller:** Used to pull shoes, widen shoes and cut nails when necessary.

**Shoe spreaders:** For widening the heels of shoes.

**Shoeing apron:** Heavy suede chaps that protect the farrier's legs.

**Shoeing box:** Generally an open tool box on wheels.

**Wire brush:** Cleans the foot before shoeing.

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# HORSE HANDLING

## Behavior

Horses are prey animals, and therefore are wary of predators sneaking up on them. They use their ears, nose and eyes to detect potential danger. Instinct makes flight the horse's first option, but they will fight with teeth and hooves if unable to flee.

To correctly approach a horse, speak to it in a low, soothing voice and place your hand on its body to give reassurance that you mean no harm. Much is communicated by voice and touch. You should be as confident as you are gentle to help the horse understand that you are the dominant being, or "herd leader," in the relationship. A nervous or timid approach makes horses suspicious and potentially more dangerous and unpredictable. Be sure to approach from the shoulder rather than from directly in front or behind, as the horse has blind spots in these areas.

Be aware of your surroundings when you are handling horses. Inexperienced people, children and pets should be asked to step into a non-horse area when a horse is being handled. This is especially true when the horse is disobedient, injured, nervous or has been confined for a prolonged period of time. Horses can injure their handlers, bystanders, pets and objects around them without much effort. Take extra precautions, such as putting a chain across a horse's nose for extra control.

## Stable Vices

Vices have been linked to boredom, nervousness, lack of exercise, neglect or inattention. Horses can learn stable vices from other horses. If left unchecked, a stable vice may become a permanent habit.

Some stable vices are addictive and may border on compulsive behavior. The horse may choose to engage in the vice instead of eating or drinking. Stable vices may negatively influence the horse's performance, soundness or ability to maintain weight.

It is not always possible to identify the causes of vices such as weaving, cribbing and stall walking. Many horses show these stereotypical behaviors due to boredom, stress, confinement and unhappiness with their neighbors or location. When possible, remove the horse from the situation that is bringing on the behavior. Try moving the horse to a different location, as it may enjoy either more or less privacy in its stall. If that is not possible, you can try to modify the behavior by using a cribbing strap or muzzle to minimize cribbing, or by turning the horse out for a longer period of time to minimize stall walking. Some horses benefit from an object in their stall, such as a ball or a pacifier, while others enjoy the companionship of a goat or other small animal.

Stable vices include:

### Cribbing (also known as crib biting)

Cribbers grab onto the edge of a stall, fence or other hard object with their teeth, then arch or contract their neck, pull back, and occasionally grunt. Some horses rock rhythmically while cribbing or crib biting.

It is speculated that cribbing activates narcotic receptors within the central nervous system, causing an addiction. All aspects of cribbing are addictive behaviors that may cause significant damage or wear to the teeth. In some cases, wood splinters may cause damage to the cribber's mouth, throat, or intestines. Both cribbers and windsuckers (see below) may be hard keepers. They also tend to be prone to gastric ulcers.

Mineral imbalance, boredom, excessive stall confinement, ulcers, and proximity to others with the vice have all been linked to cribbing and windsucking. Round-the-clock turnout with electric fencing limits a cribber's opportunity to indulge this vice. Surgical intervention that involves cutting the nerve supply to the muscles under the neck that enable a horse to crib has a minimal (less than 60 percent) success rate.

### Windsucking

Windsucking can occur without the horse grabbing onto anything with its teeth. The horse holds its neck and moves its mouth in a particular manner that allows it to suck air. Windsucking is often accompanied by an audible grunt.

### Pawing

Chronic pawing may stem from excitement, frustration, boredom, illness or pain. Horses can paw holes of significant size and depth in dirt-floored stalls.

Stall mats or rigid flooring may eliminate pawing damage to a facility, but they do not stop a horse from the behavior.

Pawing from nervous excitement or boredom can often be curtailed through consistent re-training. Longeing the horse every time it begins pawing, for instance, may teach it to associate pawing with going to work and be very effective in eliminating the habit. Consult your veterinarian for possible causes of pawing in case it stems from illness or pain.

### Stall Kicking

Kicking the sides of a stall can inflict damage upon both the structure and the horse. A horse could catch a leg in the gap between stall bars, weaken and kick through wood walls, or punch through sheet metal siding. Stall kickers can sustain injuries including lacerations, fractures, sprains, pulled or bowed tendons, capped hocks, hygromas, hoof damage, and bruised muscles.

Horses may become stall kickers for a variety of reasons including stress, claustrophobia, introduction of new stable mates, anticipation of feeding time and territorial "posturing."

Often, changing the circumstances that instigated the unwanted behavior will eliminate it. Some advise hanging a rubber stall mat or otherwise padding the area where the horse routinely kicks in an effort to minimize noise, structure damage and injury. Kicking chains correctly affixed to the kicking legs are often effective in limiting or eliminating stall kicking behavior, but they do not address the underlying cause of the behavior. A horse that is forced to stop stall kicking may respond by developing another stable vice.

### Weaving

A weaving horse stands in one spot, but sways rhythmically and swings its head from side to side. Weaving is a boredom-related behavior.

### Pacing

A pacer, or stall walker, moves restlessly within the confines of the stall. The horse walks the stall perimeter or walks endlessly back and forth along a single stall wall.

Pacing may stem from illness or pain. A horse that is confined for long periods of time may exhibit less weaving or pacing if the stall includes a U-shaped opening that allows the horse to put its head out of the stall, but restricts its motion from side to side. Similar to weaving, pacing is generally boredom-related and is seldom seen in horses that enjoy lengthy, daily turnout that includes the ability to graze.

### Wood Chewing

This differs from cribbing because the horse does not suck in air when it indulges in the habit.

A wood chewer can cause significant structural damage to stalls, sheds, barns and fences, as well as excessive wear to its teeth. Splinters from the wood can damage the mouth, throat and intestine. Wood chewing may stem from a salt, fiber or mineral deficiency, boredom, or extensive confinement.

### Blind Spots

The horse has blind spots directly in front of and behind the body that are roughly the width of the whole body. Horses cannot see directly below their noses or distinguish an object that is less than four feet ahead. For that reason, they are less likely to spook when allowed to view objects from farther away.

When working on the bit, the closer the plane of the face is to the vertical, the less vision the horse has directly in front of it. To resolve this, it is likely to raise the head high in order to see objects that are very close. This may not bother a horse in a ring situation, but it may impair its ability to handle uneven terrain outside the ring.

### Bridle Tying

A horse should never be tied using the bridle, as it can easily injure its mouth if it pulls against the tie rope or rein.

In addition, any time a horse feels trapped and unable to get free, it has a tendency to panic and, in all probability, the horse will destroy the bridle.

If you need to tie or cross tie a bridled horse, take the time to put a halter on over the bridle, making sure that the noseband of the halter is large enough to fit over the cheeks of the bit. The reins can be looped through the throatlatch of the bridle or tied in a knot on the neck. It is important to note that a horse should not be able to get the reins under its feet when it is tied or cross tied. Additionally, a horse with or without a bridle should not be left unsupervised on the cross ties.

### Haltering and Leading

Most horses are accustomed to having the halter put on from the left side and are consequently most comfortable with that as part of the haltering routine.

To halter a horse:

1. Place the lead rope around the horse's neck to prevent it from walking away as you put the halter on, especially when catching the horse in the pasture.
2. Stand next to the left shoulder, facing forward, and slip the halter over the ears before buckling the crownpiece.

You should practice leading the horse from either side, while always leading with a lead rope or shank, as it gives you leverage. Without a lead rope, you have little or no control if the horse pulls away from you.

Never wrap the lead rope around your hand. If a horse panics and tries to run away, you can be dragged, or, at the very least, receive a painful rope burn. Cotton and leather are more appropriate lead rope materials than nylon. Nylon burns the handler's hands if the horse pulls back sharply and can get into a knot that cannot easily be undone.

### Learning and Ground Manners

Ground manners are an important piece of a horse's training. Good ground manners make a horse easier to handle and set the foundation for a good working relationship between horse and handler. This relationship carries over from ground work to mounted work.

Good ground manners include:

- Turning to face you when you enter the stall
- Walking quietly through gates and stall doors

- Standing still even on a loose lead shank
- Staying next to you without crowding or bumping while being led
- Picking up the feet easily when asked
- Allowing the body to be lightly touched with a whip without fear or resentment

Correct and consistent handling teaches a horse to respect the handler. Inconsistent handling develops bad habits for which the horse often receives harsh discipline. This is the fault of the handler.

Horses learn differently than we do. They learn by association, meaning that they associate a signal with the action that immediately follows the signal. This is the basis for all training. To teach a horse a new skill or behavior, use rewards and corrections for reinforcement.

Rewards include:

- Food
- Release of pressure
- Patting
- Cessation of work
- Kind words

Corrections include:

- Words such as “quit” or “no”
- Sharp voice tones
- Making the horse repeat the correct behavior
- Making the horse stop and wait

For the horse to learn, it must connect the reward or punishment with the action within one to three seconds. Whether you are rewarding or correcting, you must be consistent in the behaviors that you correct and the cues that you give to correct the behaviors. Following these procedures makes it easy for your horse to learn appropriate behaviors and new skills.

## Pasturing and Turning out Horses

Unless they are sick or injured, horses derive great benefit from daily turnout. The horse is a grazing animal by nature, and in natural conditions, would graze 60 percent of the time. Grazing satisfies a physiological need for roughage and a psychological need to chew fiber. Horses are meant to graze and wander for long periods of time. Due to lack of land and human convenience, we have made them into animals that live in confinement.

It is extremely important to follow turn-out safety precautions, because horses can act out in many ways when turned out. When turning a horse out, make sure to lead it all of the way through the gate and turn it to face you before removing the halter or unclipping the lead shank. The horse should stand quietly before you let it go. Never chase a horse away from the gate, as it may kick at you. Chasing a horse also encourages bolting at the gate.

If you leave the halter on in the pasture, make sure that it is leather or, at the very least, has a leather crownpiece. This allows the halter to break if the horse gets caught on anything. Horses are able to catch their halters on fencing, protruding objects, other horses' jaws and even on their own feet and shoes.

When leaving the paddock, make sure the gate is firmly closed and latched.

To catch a horse that has been turned out, enter the field and close and latch the gate behind you. Carry the halter (if your horse is not wearing it) and a lead rope over your shoulder but close to your body so the horse does not see it easily. Some horses do not like to be caught, and seeing the halter or lead rope is enough to send them galloping in the other direction. If your horse is hard to catch and is turned out alone, take a treat or small bucket of grain to entice it to come near enough for you to catch. Move slowly and put the lead rope around the horse's neck while it eats the treat.

Do not chase the horse if it runs. Instead, call to it after it stops and try the feed again. Many horses connect being caught with working. If you practice catching your horse and rewarding it with a treat rather than immediately bringing it in, the horse may become more accustomed to being caught.

If there are multiple horses in a field, do not bring treats or grain to catch them, as they may invade your personal space for the food or become dominantly aggressive toward other horses in your vicinity. To avoid injuries, do not walk between them in any circumstances. If the horses are unruly, it may be necessary for another person to hold one horse while you catch the other. If two horses in a field become anxious when separated, it may be necessary to bring them both in to avoid panic between one or both of them.

When leading the horse through the paddock gate, make sure that the gate is open wide enough to avoid banging the horse's hips. Close and latch the gate when you leave to prevent it from sagging on its hinges.

## Stall Safety

When entering a stall, make sure the door is open to its fullest extent. Walk together into the stall and turn the horse to face the door. Do not turn the horse loose as it walks through the door because it may do one or more of the following:

- Kick you
- Bolt into the stall
- Hit its hips on the door frame
- Learn to drag people through the stall doorway

Once the horse is standing quietly, remove the halter and close and latch the door securely.

Occasionally a horse lies down in the stall and rolls into the wall, becoming cast or trapped against the wall or fence. Some horses lie quietly and wait for help, while others are a danger to themselves and any person around them. The signs of a horse being cast overnight are very disturbed bedding in the stall and scratch marks on the wall. If you see these signs, monitor the horse for injuries.

To help a cast horse, loop a soft rope or longe line around the fore and hind legs nearest the wall and pull the horse over onto its other side. This is generally a two-person task. If there is not a second person available, remove any ridges of bedding behind the horse's back and shoulder and then take the horse by the tail and drag the quarters away from the wall. Great care should be taken that the horse does not kick or strike the handlers if it is panicking.

Piling the bedding up on the walls or banking can help prevent a horse from becoming cast. A horse who repeatedly casts itself may benefit from wearing an anti-cast roller or having anti-cast ridges or grooves in the stall. An anti-cast roller is usually made of leather and has a large leather-covered steel piece above the withers that stops the horse from rolling over. Anti-cast ridges are affixed to the wall to give the horse a foothold. The hooves catch on the ridges and help the horse right itself.

## Pasture Safety

Pastures need to be inspected at least once a week for safety. When conducting a safety check, watch for:

- Broken or loose fencing
- Protruding nails
- Proper function of electric fence, if applicable
- Holes
- Animal burrows
- Trash
- Machinery
- Poisonous plants
- Erosion

In addition to regular safety checks, make sure the paddock does not have any place where one horse can trap another. Water troughs must not have any sharp edges. Any telephone or utility wires should be fenced off.

## Restraining Horses

Restraining a horse is often necessary for clipping, shoeing or veterinary care. The objectives of restraint are:

- Avoid injury to the handler
- Prevent injury to the horse
- Allow a procedure to be handled safely and effectively

Every horse responds differently to restraining procedures. An experienced handler can read the body language of a horse and be guided by the horse's subtle cues.

If possible, work in a familiar area where the horse is comfortable. Speaking in a low, soothing and monotonous voice exerts a relaxing effect on a horse, while touching and stroking gains its confidence. Unless it is impractical, work from the horse's left side, as this is where it is probably most used to seeing a handler.

Do not tie or cross tie a horse for a procedure, as it may panic if it reacts to the procedure and finds itself confined. The possibility of injury to both horse and handler outweighs any possible benefit from tying.

It is often the best practice to start with a minimal amount of restraint and move to the next level as necessary. Some horses become much more difficult to handle when certain types of restraint are used.

Use common sense and caution when performing a procedure on a horse that is reacting negatively. Anticipate what the horse will do, and try to stay one step ahead at all times. Remember that the horse should respect you as the leader of the herd.

Use cooperation rather than domination to get your point across to the horse. Do not allow yourself to display temper. A human will have trouble winning a physical battle with a large animal.

Make sure that your working environment is safe and there is nothing that the horse can knock over or catch a leg on. The halter, lead shank and restraining devices should be in good repair. Ask anyone who is in the area to leave and confine any pets. Keep your fingers and hands safe from being trapped in the lead rope, chain or twitch. Above all, be ready to hang on and not let go if things get rough unless physical injury to the handler is imminent.

As the handler, you are responsible to know which type of restraint works the best for each horse. Some veterinarians are very specific and will ask for a certain type of restraint for a procedure.

Restraint comes in two forms: physical and chemical. Physical restraints include:

- Halter and lead rope
- Confinement in an enclosed area
- Distracting noises
- Skin, rope, chain and “humane” twitches
- Lip chain
- Stud chain
- Stocks

The most basic level of restraint is a halter and lead rope in an enclosed area. Back the horse into a corner to give it an impression of control. Although standing on the left side of the horse is often the most comforting position to the horse, standing on the same side as the person performing the procedure is much safer for both participants. If the horse attempts to kick, the handler can turn the horse's head toward both people, which causes the horse's hind end to spin in the opposite direction.

It is generally safer to stand close to the horse rather than far away to reduce the force of a kick or strike.

If a stronger restraining method is necessary, a rope halter is a step above a regular halter. The narrow rope of the halter is sharper than its leather or nylon counterparts, increasing the degree of contact on the horse's head.

Some horses respond well to jiggling the halter or rapping on the horse's head in a rhythm-less pattern. This can be used in connection with other restraint systems such as a lip or stud chain. It works well with a horse that needs distraction rather than restraint.

A lip chain can be applied across a horse's upper gums. The lip chain is both self-punishing and self-rewarding in that it tightens or loosens based on the horse's behavior. The handler should never yank on the chain.

It is important to assess the length of a stud chain, which is put over the horse's nose. Some chain lead shanks are long enough to go across the muzzle and up the cheek to the throatlatch ring of the halter. Care must be taken that the halter does not slip across into the horse's eye.

Chemical restraints include tranquilizers and sedatives, which should be administered by your veterinarian. A tranquilizer such as acepromazine is a generalized central nervous system depressant. It relieves anxiety while having little effect on the horse's motor skills. Xylazine and detomidine are central nervous system, musculoskeletal and cardiopulmonary depressants. Horses lose their coordination and stability due to the muscle relaxation caused by these drugs.

## Twitches

A twitch comes in two forms and is applied to the horse's upper lip.

The first is a long wooden handle with either a rope or chain loop at the end. The handler grasps the lip and pulls it through the loop, which is then twisted toward the holder. Care must be taken not to push the twitch in toward your abdomen due to the potential for injury.

The second form of twitch is a nutcracker-like device called a “humane” twitch or one-man twitch. The horse's lip is pinched in the end of the twitch, and the device is closed with an attached rope and snap that connects to the horse's halter. Although this twitch is very convenient, it can also become a dangerous weapon for the horse if it hits the handler in the face.

Both types of twitches work on the principle of pressure on the sensory nerves of the lip and acupressure over the calming points.

The action of twitching a horse releases endorphins and enkephalins from the central nervous system, which help to sedate and relax the horse. At no point should a twitch be applied to an ear.

Skin pinching or “neck twitching” requires a fair amount of hand strength. Grab and hold a large fold of the horse's skin on the neck just ahead of the shoulder while the procedure is being performed. The horse's head should be turned toward you to loosen the skin so you can grasp it. Neck twitches serve as a distracting device.

## General Barn Safety

Common sense, awareness of your surroundings, planning, responsibility and knowledge are critical when it comes to barn safety. It is easy to become very casual when working around horses. Even the most experienced personnel should take sensible precautions, such as always wearing appropriate footwear.

Although most of us go to the barn to have a good time, we must be mindful of our equine companions. Loud music and playful yelling and running are all very disturbing to horses. A foolish or over-confident person may mistakenly appear aggressively dominant to a horse, triggering the horse's fight or flight instinct. On the other hand, a horse's detection of fear in

the handler can create an equally negative energy in the relationship. Your best tool is an air of quiet confidence when approaching and handling horses.

Use caution when performing even simple tasks. Before entering a stall, speak to the horse and make sure it knows you are there. Make sure that the horse turns to face you before you step into the stall. Never put yourself in a position where the horse is between you and the door. Even the calm, seasoned horses can become startled and pose a danger to the handler.

## Tying Safety

Many horses are unwilling to be cross tied, especially if they are expected to stand in an aisle with no wall behind them. Cross tie the horse in a wash stall or other similar area that has a back wall. Some cross ties come with a “panic snap” or quick release device built in. This is generally a metal collar that releases when sufficient pressure is brought to bear on the tie.

Horses that do not cross tie can be tied in their stalls using a slip knot and a safety string which breaks when the horse resists to a certain amount of pressure. Safety string can be made out of baling twine or multiple loops of yarn. A panic snap can be used in place of a safety string.

A horse should be tied in the following manner:

- At the level of the withers to avoid injuring the horse’s neck if it pulls back
- With approximately 18” of slack: enough slack to turn the head but not enough that the horse can get a leg over the rope
- With a quick release knot
- To a secure object such as a fence post never tie to a fence board

Horses should never be tied with the following:

- Leather shanks, because they break too easily
- Chain shanks placed across the horse’s nose, because they cause injury and may not be able to be unknotted
- Nylon halters, because they do not break
- Any knot other than a quick-release knot

Never leave a tied horse unsupervised.

Some horses have not been taught to tie. When tying a horse for the first time, make sure it is in an enclosed space in case it breaks free. Do not leave a horse loose while working with it. Horses can easily trap you in the back of their stall or step on you in panic.

Walking a horse, especially a saddled horse, under another horse’s cross ties is dangerous. If you must walk a horse past a cross tied horse, undo the cross tie to avoid catching it on the saddle and panicking the two horses. A second person should stand beside the cross tied horse to prevent it from reaching out at the passing horse.

## Working with Young Horses

Training young horses is a process that should be accomplished by slowly building a solid foundation, with each lesson building on previously learned skills. A good maxim is: the less experienced the horse, the more experienced the handler. A young or unskilled rider should not be asked to work with a young or green horse.

The trainer should be the horse’s teacher and leader, not conqueror or tyrant. Be patient and prepared to explain a skill to a horse in different ways until it understands what you expect. Take frequent breaks and never underestimate the value of praise to a young horse.

Have a system but not necessarily a schedule. Each horse is an individual and, as such, will learn at their own rate.

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# HORSE HEALTH

Keeping horses healthy requires daily attention. It is important to notice things about each individual horse, such as its eating and drinking habits, normal amounts of manure, and whether or not it lies down on a regular basis. A good horseperson can walk past a stall and immediately tell if a horse is not well.

## General Horse Health

A healthy horse has a bright, interested look with a shiny coat and loose, supple skin. Its gums are a light pink. It may lie down periodically during the day or night, but will get up easily. Some horses may rest a hind leg, but it is not normal for a horse to stand with one front leg out ahead of it. This behavior is called pointing and may indicate pain in the horse's foot.

A normal horse enjoys eating and drinks about 12 gallons of water per day. It produces 35 to 50 pounds of manure per day and generally passes it about eight times per day in the form of soft balls. The urine is slightly cloudy and light yellow or straw colored. This cloudy appearance is due to mucous and calcium oxalate crystals which are normal components of urine.

A horse should be an appropriate weight. Horses that are too thin do not have enough fat between the muscles and skin. The ribs show and there are hollows in the flanks and hindquarters. A thin horse may appear depressed and dull.

A fat horse has fat up over the back. The ribs are covered with fat and the belly is large. Hindquarters appear to be round instead of muscled. A horse that is too fat may be in danger of laminitis.

A horse should have a health exam at least once every 12 months. Keep records of your horse's health including vaccinations, shoeing, de-worming and the date each procedure was performed. In addition, test annually for Equine Infectious Anemia (EIA) using a Coggins test, which detects the antibodies formed when a horse is infected with EIA.

## VITAL SIGNS

Know what your horse's normal vital signs (temperature, pulse and respiration) are in order to better understand equine health. You should take a horse's vital signs when it is at rest, prior to being ridden.

A horse's normal resting temperature is between 99.5 and 101.5 degrees Fahrenheit. Temperature is taken by the use of a rectal thermometer. A digital thermometer is easiest, but a glass veterinary thermometer can also be used. Make sure to shake the glass thermometer down below 97 degrees before inserting it into the rectum.

A horse's normal resting pulse is between 30 and 45 beats per minute. To take a horse's pulse, put your finger on the facial artery (which crosses under the jawbone) for 10 seconds and multiply the result by six.

A horse's normal resting respiration rate should be between 12 and 25 breaths per minute. To take a horse's respiration rate, watch its sides while at rest in the stall and count the rise and fall of the rib cage as the lungs inflate and deflate.

## Signs of an Unhealthy Horse

An unhealthy horse may exhibit any of the following signs:

**Colic (belly pain):** The horse may paw, kick at its belly, stretch out as if to urinate, stop eating, break out into a sweat, lie down, roll, or sit on its hindquarters like a dog. Call your veterinarian immediately.

**Coughing:** A wet cough may include discharge from the nose or eyes. Mucous should not be white, yellow or green.

Diarrhea or dry, hard manure balls.

**Depression:** Horse may refuse to eat, drink, move, or may stand hunched up in its stall.

**Fever:** A fever of 102 degrees or higher is serious. Check the horse's feet to make sure they are not warm, especially if it is standing with the hind legs drawn up under the body and the front feet pushed out ahead. (See Laminitis in the Lameness section of this guide for symptoms of laminitis.) Call your veterinarian immediately.

Some precautions to take to help keep your horse healthy are:

- Isolate new horses for two weeks to help prevent an outbreak of communicable diseases.
- Minimize nose-to-nose touching with strange horses.
- Do not share equipment, especially water and feed buckets.
- Keep vaccinations up to date.

## Isolation or Quarantine Procedures

Exposure to strange horses is one of the major sources of contagious equine diseases and should be limited as much as possible. Maintaining a closed herd (no horses going in or out) greatly reduces the chances of an infectious disease entering the herd.

When new horses are brought into the stable, they should be isolated for two weeks to reduce the risk of exposure. Isolation requires housing exposed or affected horses away from other horses. Do not allow turnout in adjacent paddocks. If affected horses must be near others, a solid barrier with no gaps should be erected between them.

If horses need to be quarantined or isolated, the following bio-security protocols should be followed:

Post restricted access signs in the isolation area.

Place footbaths and hand sanitizers at access points to the isolation area. Ensure that footwear is clean when leaving the area.

Assign specific individuals to care for the affected horses. Ideally, a caretaker should not be responsible for both healthy and affected horses. If it is not practical to have only one person caring for a quarantined horse, that horse should be handled last.

Horse handlers must undergo rigorous hygiene procedures such as:

Wearing disposable gloves and foot covering booties. Gloves and booties should be disposed of in a lidded trash receptacle after caring for an affected horse.

Thoroughly washing hands using a pump soap, then washing for a minimum of 15 seconds. If water is not available, hands may be cleaned with a 62 percent ethyl alcohol gel or foam disinfectant and allowed to dry for 10 to 15 seconds.

Washing and disinfecting footwear.

Wearing specific clothes when contacting an affected horses that are removed when care is complete and washed or disposed of in a lidded hamper.

Use different equipment to feed, clean and work with the affected horses. Buckets, feed tubs, lead shanks and halters should be clearly labeled as belonging to a specific horse.

Instruct caregivers not to submerge water hoses when filling buckets.

Dispose of bedding from affected horses in a separate dumpster.

Disinfect wheelbarrow and tractor tires because manure on these tires is a potential source of the infection agent and can be tracked everywhere else on the facility.

Take all horses' temperatures twice a day. An elevated temperature may be an early sign that a horse is getting sick and needs to be isolated.

After an outbreak of an infectious disease is controlled, all equipment used on the affected horses must be disinfected. Take the following steps:

- Scrub thoroughly and clean with a detergent and water
- Rinse
- Apply disinfectant
- Final rinse

Cleaning personnel must wear rubber boots, coveralls, goggles and gloves.

Disinfection should be done in an area with minimal foot and traffic flow that can be cleaned and disinfected afterward. It is preferable to use a solid surface close to a drain. A grazing area should never be used to disinfect equipment. Cloth items should be laundered and thoroughly dried between each use. Disinfectant may be added to the rinse water, but an additional rinse cycle must then be used to remove disinfectant residue. Equipment that cannot be effectively disinfected, such as sponges and brushes, should be discarded.

When cleaning the facility, note that non-porous stall surfaces (e.g. varnished wood, metal, painted concrete, asphalt, poured textured floors and stall mats) should be cleaned with a detergent, rinsed and either allowed to dry or squeegeed of excess water. Select a disinfectant that has a documented effectiveness in the presence of 10 percent organic matter, works in the local water type (hard or soft water), and is safe to use around horses and humans.

Thoroughly clean before using bleach because bleach is inactivated by organic matter. Bleach is the only practical commercially available disinfectant that kills clostridial spores. Viruses such as influenza, herpesvirus and equine viral arteritis are readily killed with detergents and disinfectants.

Completely strip stalls of all bedding material and equipment. Brush down all walls of cobwebs and other residual material. Begin by wetting down all non-porous surfaces including walls, ceilings, and ledges (tops of walls) with detergent and water. Powdered laundry detergent can be used. Some veterinary disinfectants also have a detergent incorporated into the mix.

Allow five to 10 minutes for the liquid to soften caked-on organic matter, and then scrub surfaces with a stiff-bristled broom to loosen all of the material. Rinse the walls, beginning at the top and moving down toward the drain. Repeat this step until all of the surfaces are clean, including corners, ledges and drains.

Do not use power washers set at greater than 120 psi as this can aerosolize pathogens. A garden hose with a regular nozzle can be used. Squeegee excess water off surfaces or allow them to dry. Spray properly diluted disinfectant on surfaces, starting at the top of the stall and working from the far end of the stall to the exit. Allow to dry and repeat. Completely clean and disinfect aisles, wash racks and common areas, following similar procedures.

Porous surfaces, such as wood construction and dirt or clay flooring, are extremely difficult to clean and disinfect. It is critical to remove as much organic matter as possible. Thorough cleaning with large quantities of water can turn dirt or sand floors to a slurry and should be avoided. Remove all bedding and organic matter and thoroughly dry scrub all surfaces. Follow up with scrubbing stall walls with a detergent solution. Disinfectants can be sprayed on surfaces, but may have inadequate result if the surfaces are not also scrubbed.

## Infectious Diseases

Preventative health care emphasizes the deterrence of infectious diseases through proactive care including vaccines and good management practices.

Infectious diseases are caused by bacteria, viruses, protozoans, fungi and rickettsia (parasitic bacterium) which invade the horse's body and cause an illness. Most infectious diseases are transmitted from horse to horse through contact with contaminated equipment, urine, feces, or other bodily secretions. Many of these diseases have vaccines available to help prevent infection.

Some of the most common bacterial diseases that affect horses are:

**Anthrax:** A highly contagious and rapidly fatal disease caused by *Bacillus anthracis*. This spore-forming bacteria can remain dormant in the soil for up to 50 years. Horses contract the disease by grazing on infected pastures.

**Botulism:** A paralytic disease caused by the bacteria *Clostridium botulinum*. Spores of the disease can be found in improperly-processed hay or feed containing animal matter.

**Lyme disease:** Also known as Borreliosis and caused by the bacteria *Borrelia burgdorferi*. The bacteria are spread by tick's saliva entering a tick bite. This is a slow-moving disease with symptoms often not appearing for weeks or months after the tick bite. It is characterized by intermittent lameness and joint pain, often with swelling involving tendon and ligaments. Preventing ticks from becoming attached to your horse by using an insecticide or repellent labeled as effective for ticks is the first defense against Lyme disease.

**Salmonellosis:** The most common cause of infectious diarrhea in adult horses and a major cause of septicemia in foals. Many species of salmonella are infectious to horses. They are very resistant to environmental factors and remain alive in soil and manure for months or years, which can cause outbreaks of infection. Stressed horses are most susceptible to salmonellosis.

**Strangles:** A severe acute upper respiratory and throat infection caused by the bacteria *Streptococcus equi*. The bacteria invade the respiratory tract and cause swelling of the lymph nodes around the head and neck. Inflammation surrounding the pharynx may cause the horse to feel as if it is strangling. As the disease progresses, the lymph nodes break open to drain a thick, creamy pus. This condition is seen most often in very young and very old horses. Strangles is highly contagious and can remain in the soil for several years. Once a horse is suspected of having strangles, it must be quarantined for approximately six weeks. Nursing care and quarantine protocols are very important with this disease.

**Tetanus:** Caused by *Clostridium tetani*, tetanus is a non-contagious disease. It occurs in wounds where the oxygen content is low, such as a healed-over puncture wound. Bacteria in the wound produce a potent neurotoxin that is transmitted along nerves and ascends to the spinal cord, or is absorbed locally and carried by the bloodstream to the brain. Tetanus is commonly known as "lockjaw," due to the jaw muscles contracting so the horse is unable to open its mouth or to swallow. Without treatment, tetanus is always fatal.

Some of the most common viral diseases are:

**Equine infectious anemia (swamp fever):** A retrovirus infection that is transmitted by all body secretions. EIA-positive horses remain infected for life if they survive the initial onset of the disease, and present a continuous hazard to other horses. This disease has been greatly reduced through the use of the Coggins test which detects antibodies to the disease. Horses that test positive for EIA are required to be reported to federal authorities, after which the owner is given the option of humane euthanasia or branding and quarantining the horse for life.

**Equine viral arteritis (EVA):** EVA attacks the walls of small arteries. Petechial hemorrhages appear on the mucous membranes inside the nostrils and on the conjunctiva that covers the whites of the eyes. EVA is spread by respiratory secretions.

**Equine viral encephalomyelitis (sleeping sickness):** There are three different strains of encephalomyelitis: Eastern, Western, and Venezuelan. All three are transmitted by the bite of a mosquito that has fed on an infected bird or rodent. The disease causes a high fever followed by acute encephalitis, or swelling of the brain.

**Influenza:** This is a contagious disease that can quickly spread through herds of horses. Influenza is a relatively mild infection, but secondary complications may create breathing difficulties. Horses that travel are more susceptible to influenza, due to the large number of horses to which they may be exposed.

**Rabies:** A fatal disease that occurs in nearly all warm-blooded animals. The usual source of infection for a horse is a bite from an infected wild animal such as a fox, bat, raccoon or skunk. The virus travels to the brain along nerve networks. Rabies is 100 percent fatal.

**Rhinopneumonitis (herpesvirus 1 and 4):** EHV-1 is the most common respiratory illness in young horses. It is highly contagious and is easily spread through coughs and sneezes. EHV-1 can cause abortion in pregnant mares. A neurological form of EHV-1 can occur in mature horses and in mares who have aborted.

**Vesicular stomatitis:** A contagious disease transmitted by the blood-sucking black fly. This disease is characterized by blister-like ulcers on the mucous membranes of the mouth and tongue, in the nose, and on the coronary bands of the feet.

## Vaccinations

Active immunity to a disease can be induced artificially through vaccinations.

Horses should be vaccinated on a regular schedule, according to what infectious diseases are seen in that particular area of the country. Vaccines work by stimulating the horse's immune system to produce antibodies for a particular disease. When that disease comes in contact with the horse in the future, the immune system creates a defense against the disease based on its past contact with the vaccine. Vaccines do not give a horse 100 percent immunity, but a horse that is immunized will have a milder case of the disease if it becomes sick.

Almost all vaccines require one or two initial doses given three to four weeks apart, followed by annual boosters. You should always consult with your vet about which vaccines are necessary for your horse in the area in which you live.

The most common vaccines given in the United States are:

**Anthrax:** Given once a year in areas that are prone to outbreaks.

**Botulism:** Given once a year.

**Encephalomyelitis (sleeping sickness):** In the north, the vaccine is given annually in the spring. In the south, the vaccine may be necessary every three to six months because mosquitos remain active all year.

**Equine viral arteritis:** Given once a year or as needed in areas where EVA occurs.

**Influenza:** Protection lasts for about three months. Boosters should be given at least every six months. This is an important vaccination to give horses that travel and encounter strange horses.

**Leptospirosis:** Given once a year.

**Potomac horse fever:** Given once a year in areas that are prone to outbreaks.

**Rabies:** Given once a year.

**Rhinopneumonitis:** Protection lasts for three to six months. Boosters should be given at least every six months.

**Strangles:** Intranasal vaccine given once a year.

**Tetanus:** Given once a year unless the horse gets a deep cut and requires a booster.

**West Nile virus:** Given twice a year in areas that are prone to outbreaks.

## Parasites

Horses are constantly exposed to a barrage of parasites. Parasites are an organism that lives in or on another organism (called the host) which benefits by deriving nutrients at the expense of the host.

Parasites can be both external and internal. Internal parasites live in the stomach, intestines and other internal organs, damaging the horse by sucking blood and nutrients, causing tissue damage, obstructing the digestive tract and producing toxins. Colic is often caused by damage from parasites.

A de-worming parasite prevention program should be designed by your veterinarian. Different regions of the country have different de-worming needs. These can range from daily treatments to as needed after a fecal exam. Pasture rotation, manure clean-up and removal, and avoiding overcrowded conditions help in minimizing parasite problems. Avoid haphazard de-worming and reliance on a single product. Long-term warm and humid conditions are ideal for parasite growth. Climates with harsh, cold winters kill larval stages and cause parasite eggs to go dormant.

Semi-annual fecal exams are important to determine if your horse has internal parasites, and how best to eliminate them if the exam is positive. Your veterinarian can take a fecal sample while at your stable for spring or fall shots and examine it under a microscope to determine if you need to de-worm your horse. If de-worming is warranted, the vet can advise you on what product will make the most impact on the parasites. Using unnecessary or incorrect de-worming products can increase parasite resistance to the medications that are designed to kill them.

Some outward signs of parasite infestation include weight loss, lethargy, rough coat, poor appetite, diarrhea or constipation and tail rubbing. Larger parasites may be visible in the manure of a horse that is infested.

Types of parasites include:

**Ascarids (Roundworms):** Horses with an ascarid infestation may have a poor coat, distended abdomen, coughing, diarrhea, lethargy and general unthriftiness. Ascarids in the lungs can lead to chronic coughing, bronchitis and pneumonia. Adult colonies of ascarids in the small intestines may cause an intestinal obstruction or rupture.

**Bots:** Bots are not worms, but the larvae of the bot fly. The cycle begins when the bot fly lays eggs on the horse's hair and the horse licks them, transferring them to the mouth, where the larvae are eventually swallowed and end up in the horse's stomach, attaching to the stomach lining. In the stomach lining, bot larvae can contribute to ulcers, impaction, colic and peritonitis.

**Flies and Gnats:** Flies and gnats can destroy a horse's coat, health and well-being. Cleanliness is the first line of defense against these winged parasites. Clean your barn and paddocks on a regular basis and do not allow water to stand. Biological predators can be released on a set schedule to eat the fly larvae. "Feed through" fly control can be used, but has been linked to toxicity to the insecticide. Check with your veterinarian before starting a "feed through" program. Be wary of large-scale

insecticide use, as insecticides are poisons and can lead to toxicity. Flies and gnats can be lured to fly traps or onto sticky paper. Although both of these are unsightly, they are more environmentally friendly than insecticides. Horses can also wear fly masks and fly sheets when they are outside.

**Large Strongyles (Bloodworms):** Large strongyles are the most damaging of all of the parasites. In the arteries, strongyles may cause inflammation, blockage, anemia and aneurysm. If left unchecked, some strongyles migrate to key organs including the heart, lungs and liver. Strongyle infestations are the number one cause of colic and may result in irreparable bowel damage, severe colic, lameness or paralysis from blockages in the iliac artery, obstruction of blood vessels and even death.

**Lungworms:** Donkeys are lungworms' natural hosts. The eggs pass in manure and mature into larvae, which are swallowed with grass. The larvae migrate to the horse's lungs, where they cause a persistent cough that gets worse with exercise.

**Pinworms:** These worms lay their eggs, which may be visible to the naked eye, under and around the horse's tail. Pinworms live in the large intestines. Their eggs quickly deteriorate outside. Severe pinworm infestation is only seen in stabled horses. Horses affected by pinworms rub their tails, often to the point of hair loss.

**Small Strongyles (Cyathostominae):** Their larvae burrow into the lining of the intestinal tract until mature, when they emerge and lay their eggs in the intestines. The larvae may also encyst within the intestinal wall and go dormant for up to two years. While encysted, small strongyles are impervious to de-wormers and are unaffected by cold and dry environments. Significant numbers of mature strongyles emerging at once can severely impair the intestinal lining. Fever, un-thriftiness, failure to shed out, severe diarrhea, colic and death may result.

**Tapeworms (Flatworms/Cestodes):** Adult tapeworms attach themselves to the horse's intestinal wall. The adult worms' bodies segment as they mature. Eggs are passed from the horse along with the body segments. Tapeworms cause anemia, colic and unthriftiness. Inflammation from the parasites can cause a number of intestinal problems. Most de-worming products are ineffective against tapeworms. Removing other parasites with routine de-worming may eliminate competition for horses and cause tapeworms to proliferate. An estimated 60 percent of horses in the United States are infected with tapeworms.

**Ticks:** Ticks do not cause many problems for horses unless they are carrying a disease. To remove a tick, grasp its body as close to the mouthparts as possible and use gentle, steady pressure to pull it from the horse's skin. Immediately wash both the tick bite and your hands. Lyme disease (see infectious diseases) and anaplasma phagocytophilia are diseases associated with ticks. Anaplasma phagocytophilia was formerly called equine granulocytic ehrlichiosis. Some symptoms of tick-borne diseases include fever, depression, weakness, poor motor coordination and limb edema. They are treated with antibiotics such as tetracycline.

## Inflammation

The body responds to injury or infection with inflammation. When inflammation is present, circulation is increased at the site as the body delivers leukocytes and antibodies, or defense cells, and takes away cellular debris. The cellular defense cells attempt to fight off the irritants. In the process, exudates leak out of the capillaries into the surrounding tissue.

Inflammation leads to healing, but sometimes inflammation needs to be controlled. Left unchecked, it can cause proud flesh, excessive scar tissue and loss of function.

Treatments include cold therapy and antibiotics, but check with your veterinarian for the most appropriate treatment for your horse.

The five signs of inflammation are:

- Heat
- Swelling
- Redness
- Pain on pressure
- Reduced use of the affected area

## Edema

Edema, or swelling, refers to a localized buildup of fluid. Heat may also be present. This condition is known as "stocking up" when it occurs in the legs.

Edema may be caused by bug bites, strain, injury, illness, poor circulation, lack of exercise, feed changes or other environmental issues.

## Dehydration

Dehydration occurs when the horse's body tissues lose too much water. Horses can become dehydrated through excessive sweating or by the under-consumption of water. Water is necessary for almost every bodily function. A thousand-pound horse's body contains about eighty gallons of water. Even small changes in total body water can have a negative impact on the horse's well-being.

A thousand-pound horse usually drinks 10 to 12 gallons of water per day, depending on its work and the weather. Horses that work or lactate in hot weather can consume more than 100 gallons of water a day.



Dehydration may lead to colic. A quick check for dehydration is to pinch the skin of the shoulder. If the skin stays up in a tented fashion or does not snap back into place quickly, the horse may be dehydrated. Encourage it to drink water and contact your veterinarian immediately if the condition persists or is severe.

## Shock

Shock is the collapse of the circulatory system due to traumatic injury. The body directs blood flow away from the extremities, such as the legs and the head, as it attempts to deal with a serious injury. This is an emergency that requires immediate veterinary attention.

Signs of shock include:

- Sweating, trembling, cool skin
- Apathetic attitude, depression
- Cold ears and legs and subnormal temperature
- Rapid, weak pulse and low or falling blood pressure
- Pale or bluish mucous membranes
- Weakness and collapse
- Shock can be caused by:
  - Severe trauma
  - Burns
  - Major infections
  - Massive bleeding
  - Dehydration
  - Intestinal obstructions
  - Heart failure
  - An allergic reaction to an irritant (anaphylactic shock)

## Skin Problems

The horse's skin is subject to many problems. In all skin issues, hygiene is of the utmost importance. Keep your barn clean, and if you suspect any fungal infections, do not share equipment between horses.

Common skin conditions are included in the First Aid section.

**Hives:** Also known as urticaria, hives are areas of edema that start small and grow into large, elevated, flat-topped bumps with steep sides. They generally develop on the neck, shoulders, and sides of the thorax. They are caused by an allergic reaction to a plant, food, drug, pollen, mold, topical product or insect bite. They can also be the result of an autoimmune disease. Treatment may vary, depending on the cause of the hives.

**Rain rot/rain scald:** Common names for infection caused by the *dermatophilus congolensis* organism. The spores, which are activated by moisture, are present in the soil and in the scabs of infected horses. Raised tufts of hair form along the back and rump of the infected horse. The lesions are generally painful.

To help avoid rain rot, a horse that lives turned out in rainy conditions should have access to a run-in shed or stall.

To treat rain rot, clip the hair away from the affected area and remove the scabs. Lather a medicated shampoo such as povidone iodine into the coat and allow to stand for 10 minutes. Oral or injectable antibiotics may be necessary to eradicate the infection. Consult with your veterinarian.

**Ringworm:** A fungal infection known as dermatophytosis. Fungi are present in dark, damp barns especially during the autumn and winter months. They are highly contagious and are spread by shared tack and other equipment. Humans can catch ringworm from an infected horse. A skin culture should be taken to diagnose ringworm. If ringworm is suspected, take action immediately:

- Isolate the horse
- Remove all bedding and disinfect the stall
- Disinfect all equipment including brushes
- Do not share tack or equipment between horses

**Sarcoid:** A benign tumor that is unique to equine skin. Sarcoids are localized and do not include the underlying structures. They are an external, cosmetic blemish that can be irritated and become ulcerated or infected. A horse can spread sarcoids on its body by biting, rubbing or through contaminated tack.

Sarcoids generally appear on the limbs, head and neck, but can also appear on the chest, trunk, abdomen, flanks and prepuce.



Sarcoids do not generally pose a health risk to horses. Unless they interfere with tack or grow and change, they should be left alone. They are either sessile (broad-based) or pedunculated (with a stalk) and exist in the following forms:

**Verrucous:** Wart-like, dry, horny masses resembling a cauliflower. They are difficult to distinguish from warts, but generally do not have any hair around them. Verrucous sarcoids do not regress.

**Fibroblastic:** Develop from a wound or a verrucous sarcoid that has been traumatized. They have the appearance of normal granulation tissue. They may stay small for years and suddenly develop into a sore greater than 10 inches in diameter. A wound that does not heal may be a fibroblastic tumor.

**Mixed:** A mixture of verrucous and fibroblastic.

**Occult:** Tumors with a flat or slightly raised and thickened aspect. If they are disturbed they may convert to the fibroblastic form.

**Sunburn:** Horses are subject to sunburn. Sun block, Desitin® or other zinc oxide creams may be applied to the muzzle. Some horses show sensitivity to PABA-containing products. The horse's body can be shielded from the sun by the use of fly sheets and fly masks or bonnets.

**Warts:** Also known as papillomas, warts generally appear on horses under three years of age and those with compromised immune systems. The most common locations are on the muzzle, lips, prepuce, vulva, eyelids and ears.

Warts may be transmitted by a virus and should be considered communicable. Do not share tack between horses when warts are present. Most cases of warts are self-limiting and will gradually disappear.

**Scratches:** Scratches is the common name for dermatitis. The condition is also known as mud fever, greasy heels, cracked heels, white pastern disease and dew poisoning. It is generally present on the lower legs. White leg marking are predisposed to getting scratches. The skin swells and chaps, followed by weeping red skin at the back of the pasterns.

Another form of scratches known as photo-activated vasculitis can be brought on by photosensitivity. This form can be present on other areas of the body, most often on the muzzle.

Scratches may be caused by:

- Caked-on manure or mud
- Sandy or abrasive soil
- Grit of training surfaces
- Rough stubble in fields
- Urine soaked and filthy bedding, causing chemical and bacterial irritation
- Sand and dirt caught between boots or leg wraps and the horse's legs
- Long feathers on the pasterns
- Failing to thoroughly dry the horse's legs after bathing
- Alfalfa or legume hay (causes photosensitivity)
- Clover or legume pasture (causes photosensitivity)
- Pasture that contains ragwort, buckwheat, vetch, St. Johnswort or horsebrush (such plants cause photosensitivity and potential liver damage)
- Wet, marshy land

The best treatment for scratches is early identification of both the condition and the underlying cause. After removing the horse from the causative agent, clip the hair away from the affected area. Scrub the affected area with an antiseptic soap and then towel dry. Treat the area with corticosteroid ointment, triple antibiotic ointment, aloe vera gel, Desitin®, or Vitamin A & D® ointment. Bandage the leg with a light pressure wrap. Change the bandage in accordance with your veterinarian's instructions.

## Medications

All medications should only be given under the supervision of a veterinarian. Some medications may be controlled or prohibited by USEF rules. Make sure to do your due diligence to stay within the drug and medication rules.

Medications are often prescribed by a veterinarian to assist in treating an injury or illness. Medications should be given exactly as prescribed, and for as long as the veterinarian tells you to continue treatment. Stopping some medications early may create more problems than you were initially treating.

Some common medications are:

## ANTIBIOTICS

Antibiotics are used to kill bacteria and control bacterial infections. Bacteria are classified by whether they take up blue-black "gram" stain, and are called "gram positive" or "gram negative." Antibiotics are classified by whether they kill "gram positive" or "gram negative" bacteria. Some are called "broad spectrum" because they act against both types of bacteria.

Some common types of antibiotics are trimethoprim, sulfas, penicillin, and gentamicin.

## CORTICOSTEROIDS

Corticosteroids are powerful anti-inflammatory hormones. The horse's body naturally produces corticosteroids when adrenocorticotrophic hormone (ACTH) stimulates the adrenal glands.

Synthetic corticosteroids can have up to 100 times the anti-inflammatory properties of natural corticosteroids, which can cause severe side effects, including laminitis, occasionally from only one dose. They should never be used without the knowledge of your veterinarian. Corticosteroids can be used to treat a variety of conditions, from arthritis to skin conditions to inflammation.

Some common types of corticosteroids are dexamethasone and prednisone.

## NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS)

NSAIDs are used to reduce inflammation and to help pain associated with arthritis, sprains, strains and fevers. They work by reducing the local inflammatory reaction to an injury which controls the pain. Controlling the inflammation to an injury allows healing to occur faster.

Most NSAIDs inhibit both COX-1 and COX-2 enzymes. Equioxx is currently the only NSAID that targets only the COX-2 enzyme inhibitors.

Use of NSAIDs inhibiting both COX-1 and COX-2 enzymes has been linked to a number of side-effects including gastrointestinal ulcers, lesions of the mouth and tongue, and kidney damage. If NSAIDs are injected improperly, clostridial myositis can develop in the muscle, causing serious tissue damage.

Some common NSAIDs are phenylbutazone, flunixin meglumine (Banamine), ketoprofen, and equioxx.

## TRANQUILIZERS AND SEDATIVES

Tranquilizers and sedatives work through the horse's central nervous system to circumvent a horse's reaction to pain or other stimuli.

While all horses respond differently to tranquilizers, the effect of tranquilizers is cumulative throughout the horse's life. This may cause an issue in drug testing with horses that have been maintained on tranquilizers long-term to manage behavior while on stall rest or recovery from an injury. Horses that have been maintained on tranquilizers can test positive for weeks after the drug is withdrawn, which is a much longer period than for horses that have received a single dose.

Some common tranquilizers are detomidine (dormosedan), acepromazine, and xylazine (rompun).

## ULCER MEDICATIONS

Some estimates indicate that more than 60 percent of horses suffer from gastric ulcers. Equine ulcers can cause discomfort, poor performance and an increase in likelihood of colic.

Ulcer medications are designed to suppress gastric acidity and maintain a proper pH balance in the stomach. Horses are usually treated on a daily basis for a minimum of one month.

Omeprazole is the only medication currently approved to treat or prevent gastric ulcers in horses. Some people use cimetidine (Tagamet) or ranitidine (Zantac) to help block the histamine-mediated secretion of acid in the stomach, but neither of these drugs are approved for equine use.

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# HORSE IDENTIFICATION

When describing a horse, it is important to be able to make another person “see” the animal. Color (including shade), facial and leg markings, brands or other distinguishing markings (such as whorls), breed characteristics, and gender all play a part in the description of the horse. Learn to be as descriptive as possible.

## Colors

Horses come in many different colors. Some breed groups and color breeds have their own color standards. The hunter/jumper discipline does not have specific rules or definitions of colors. The most common colors include:



COURTESY OF SHINE BRIGHT STUDIO

Bay



Dark Bay



COURTESY OF SHINE BRIGHT STUDIO

Black



COURTESY OF SHINE BRIGHT STUDIO

Brown



COURTESY OF SHINE BRIGHT STUDIO

Chestnut



COURTESY OF WINDFIRE QUARTER HORSES

Liver Chestnut

**Bay:** Reddish brown with black points. Points are defined as the tips of the ears, muzzle, mane, tail and legs.

**Black:** Black with no brown highlights.

**Brown:** Similar to bay without black points.

**Chestnut:** Reddish-tinger or copper with the same color or lighter mane, tail and legs. A liver chestnut has a dark purplish hue.

**Grey:** White or grey coat with dark skin, eyes and muzzle. A grey horse is born as a darker grey and lightens with age, until it is nearly white. Iron is a mixture of dark grey, black and white hairs; dappled has circles of darker colors generally on the hindquarters; flea-bitten has grey or chestnut specks throughout the body.



Grey



Steel Grey



COURTESY OF AMBER ASLIN, THE EXCHANGE

Flea-bitten Grey



Steel Dappled Grey



**Roan:** A dark coat with white hairs mixed in. Roans can be bay (bay and white), blue (black and white), strawberry (light chestnut and white) or red (chestnut and white).

**Dun:** A tan or mouse color with dark legs, dorsal stripe, mane and tail.

**Buckskin:** Dun with no dorsal stripe. May have zebra stripes on the legs.

**Palomino:** Golden coat with a cream or silver mane and tail.



Bay Roan



Blue Roan

COURTESY OF JULIE HERSHEY



Palomino

COURTESY OF SUNNYLUCK FARMS



Strawberry Roan



Red Roan

COURTESY OF JESSICA BAKER, ROXANNA



Palomino

COURTESY OF SUNNYLUCK FARMS



Dun

COURTESY OF SUNNYLUCK FARMS



Buckskin

COURTESY OF SUNNYLUCK FARMS

**Appaloosa:** Roan with patches of spots, dark with light spots, white with dark spots or dark with a white blanket containing spots. Appaloosa is considered both a breed and a color.



Bay Blanket Appaloosa

COURTESY OF APPALOOSA JOURNAL



Chestnut Blanket

COURTESY OF APPALOOSA JOURNAL



Snowflake Appaloosa

COURTESY OF APPALOOSA JOURNAL



Leopard Appaloosa

**Pinto:** Large colored patches of any color and white. Paint is the name of the color breed, while a pinto horse is not necessarily a Paint. Black and white pintos are known as piebalds. Any other color and white is a skewbald.



Bay and White Pinto



Bay and White Pinto



Brown and White Pinto



COURTESY OF SUNNYLUCK FARMS

Chestnut and White Pinto



COURTESY OF JULIE MOSES

Black and White Pinto



Palomino Pinto



Bay Roan Pinto

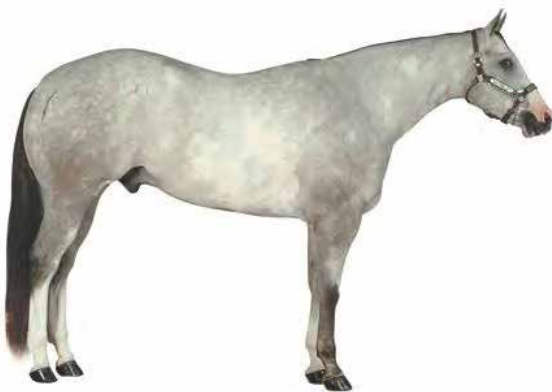


Blue Roan Pinto



COURTESY OF AMERICAN PAINT HORSE ASSOCIATION

Buckskin Pinto



Grey Pinto



## Face And Leg Markings

A horse may have one or several markings on its face.

**Star:** White mark between the eyes.

**Snip:** White or flesh colored mark on the muzzle that may be connected to a stripe.

**Stripe:** Also known as a strip or race. A narrow facial marking that runs down the center of the horse's face and may be connected to a star or a snip.

**Blaze:** Wide white marking that runs the length of the horse's face.

**Bald face:** Wide facial marking that extends to or past the inside corner of one or both eyes.

Markings can be further described as:

**Faint:** A marking consisting of only a few white hairs.

**Interrupted:** A stripe or blaze that is broken (not solid) for the entire length of the face.

**Connected:** A star and stripe; a stripe and snip; or a star, stripe and snip that are attached.

**Irregular or crooked:** Refers to stripes and blazes.



Irregular blaze



Interrupted star, stripe and snip



Elongated star



Snip and faint star



Irregular star, stripe and snip



Irregular star, stripe and snip



Bald face



Irregular star and stripe





Pastern



Half stocking (sock) with ermine mark



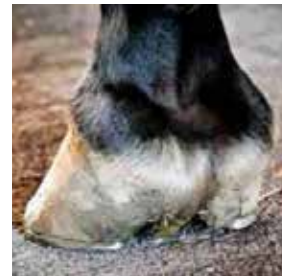
Stocking



Irregular ermine coronet band extending to pastern



Back of irregular coronet band extending to pastern



White heel

Leg markings include:

**Heel:** White marking on one or both bulbs of the horse's heel.

**Coronet:** White marking that encircles the coronet band.

**Pastern:** White marking starting at the coronet band and ending lower than a sock.

**Sock or half stocking:** White marking that extends higher than the fetlock but not as high as the knee or hock.

**Stocking:** White marking that extends to, or above, the knee or hock.

**Ermine:** Black dots within a white leg marking.

## Breeds

There are many breeds throughout the world. A horse of unknown or mixed breeding is called a grade horse. Common breeds include:

**Arabian:** The oldest pure breed of horse. They are small, high spirited and intelligent. Breed characteristics include a deeply dished head, large eyes, fine skin and coat, arched neck, high tail carriage, flaring nostrils, and delicate muzzle. Arabians are commonly used for endurance riding.

**Thoroughbred:** First bred as race horses in England. Thoroughbreds are the descendants of the Darley Arabian, the Byerly Turk and the Godolphin Arabian. Breed characteristics include a refined head with wide-set intelligent eyes, long light neck, well-muscled sloping shoulders and muscular hind end. They are tall, rangy, fast, sensitive and powerful with good endurance and long, low strides. (See below for information on reading Thoroughbred tattoos.)

**Quarter Horse:** Of American origin. Bred to race a quarter mile and to work cattle. Breed characteristics include compact and well-muscled body with strong hindquarters. They are usually calm and intelligent. Quarter Horses are used for almost all disciplines.

**Appaloosa:** Originally bred as Native American ponies in the Northwestern part of the United States. Known for their spotted coloring and striped hooves, sparse mane and tail, spotted genitals and muzzle and sclera (white ring) around the eye. They are used for many different disciplines, such as Western, English, jumping, trail and pleasure riding.

**Warmblood:** Not a single breed, but a group of breeds created in Europe by breeding hot-blooded horses such as Thoroughbreds and Arabians with cold-blooded draft horses. They are tall, strong and athletic and bred for jumping, dressage and driving.



Hanoverian



Oldenburg



Holsteiner



Dutch Warmblood

Warmbloods are sometimes branded by their registry of record to show they have met a specific set of parameters and have certain characteristics that are considered desirable for that registry. Often, warmbloods may be able to be registered with more than one registry. For instance, a stallion could be “approved” as a Dutch warmblood stallion, but may be branded as an Oldenburg. His progeny may be eligible to be registered as either a KPWN-Dutch or Oldenburg (or another warmblood registry), and may or may not be branded. In Europe, branding is becoming less common as more regulations regarding horse welfare come into play.

Some examples of warmbloods, and their associated brands, are:

Some registries have different brands for horses born in North America as opposed to those born in Europe.

**Welsh pony:** Originated in the mountains of Wales. Medium sized with beautiful heads, compact bodies and a floating trot, they are used for jumping and driving. Welsh ponies are divided into four sections by size and type. Section A and B Welsh ponies are the most common in the hunter/jumper segment of our sport.

- Section A: Welsh Mountain Pony (does not exceed 12.2 hands)
- Section B: Welsh Mountain Pony (does not exceed 14.2 hands)
- Section C: Welsh Pony of Cob Type (does not exceed 13.2 hands)
- Section D: Welsh Cob (exceeds 13.2 hands)

Other pony breeds: Exmoor, Pony of the Americas, Connemara, Shetland, German Riding pony, New Forest and Dartmoor are all examples of pony breeds.

## READING THOROUGHBRED TATTOOS

All Thoroughbred horses who participate in racing are required by most state racing commissions to be lip tattooed. The tattoo serves as a means of identification for the Thoroughbred while racing. To assist with compliance, The Thoroughbred Racing Protective Bureau provides the lip tattooing service to all Thoroughbreds stabled at member racetracks (as well as non-member tracks and farms) throughout the United States and Canada.

The Thoroughbred's tattoo consists of a letter corresponding to the horse's year of birth and four or five numbers. Services available through the Jockey Club can assist owners and agents in identifying Thoroughbreds based upon what information has previously been filed.

Other breeds also tattoo racehorses on their upper lips. A Quarter Horse tattoo consists of four or five numbers followed by a letter, and a Standardbred tattoo consists of one letter followed by four numbers.

These charts show which letter corresponds to each year.

Year	Letter	Year	Letter	Year	Letter	Year	Letter	Year	Letter
1971	A	1978	H	1985	O	1992	V	1999	C
1971	B	1979	I	1986	P	1993	W	2000	D
1973	C	1980	J	1987	Q	1994	X	2001	E
1974	D	1981	K	1988	R	1995	Y	2002	F
1975	E	1982	L	1989	S	1996	Z	2003	G
1976	F	1983	M	1990	T	1997	A	2004	H
1977	G	1984	N	1991	U	1998	B	2005	I
Year	Letter	Year	Letter	Year	Letter	Year	Letter	Year	Letter
2006	J	2013	Q	2020	X	2027	E	2034	L
2007	K	2014	R	2021	Y	2028	F	2035	M
2008	L	2015	S	2022	Z	2029	G	2036	N
2009	M	2016	T	2023	A	2030	H	2037	O
2010	N	2017	U	2024	B	2031	I	2038	P
2011	O	2018	V	2025	C	2032	J	2039	Q
2012	P	2019	W	2026	D	2033	K	2040	R

Source: The Jockey Club

**Microchipping**

Beginning December 1, 2018, all horses who show at USEF licensed Hunter/Jumper shows must be microchipped.

Microchipping provides a reliable way to verify a horse's identity, which can contribute to the well-being of a horse and support consumer confidence during horse sales. Microchipping is a standard of the FEI, the international equestrian sport governing body.

Microchips are about the size of a grain of rice and can hold electronic data, such as identifying information about a horse, including gender, age, breed and height.

The microchip rules can be found in the USEF rulebook, under the following numbers: HU101, JP100, EQ103.

# LAMENESS

Lameness is the clinical sign or signs by which a horse communicates pain in a given leg.

The forelegs of the horse carry approximately 55 to 60 percent of the horse's weight and tend to have a higher incidence of lameness, with the majority of lameness issues occurring from the knee down. In the front leg, the foot is the most common site of lameness problems. In the hind leg, the majority of lameness occurs in the hock and stifle joints.

Horses exhibit two types of lameness. Supporting-leg lameness is made worse when the horse shifts its weight onto the sore limb. The horse will attempt to rest the affected limb by removing weight from that leg. Laminitis and foot abscesses are examples of supporting-leg lameness. Swinging-leg lameness is made worse when the horse "swings" or moves the limb. The horse will try to protect the affected area by shortening the reach of the leg as it moves. A pulled muscle is an example of a swinging-leg lameness.

When trying to identify the source of lameness, you should first observe the horse standing still. Normally a horse stands with its weight evenly distributed on all four legs. If the horse is standing with one leg flexed, pointing a toe out in front of the other toe, or shifting the weight off a leg, begin your investigation with that leg.

Next, observe the horse walking and trotting directly away from you and back toward you. Watch the horse's head to see if it bobs up and down with each step. In a horse with a front leg lameness, the head will bob downward as the horse's weight comes down on the sound leg. In a hind leg lameness, the head bob will be reversed, with the head bobbing downward as the injured leg hits the ground.

Once you have identified the injured leg, conduct a systematic examination starting at the foot and working the way up the leg. Pick up the foot and examine the sole for any wound or bruising. Hoof testers can assist with examining the foot by pinpointing a sore area within the hoof.

Working your way up the limb, run your thumb and fingers along the superficial digital flexor tendons at the back of the fetlock, feeling for heat or inflammation. Be careful, as the horse may react if there is pain in the area. Continue up the limb by palpating the fetlock joint, followed by the cannon bone and tendon, then the hock or knee joint. Heat, inflammation or pain in any area should be noted for follow up.

A veterinarian can use diagnostic tests to assist in finding the cause of lameness and to monitor the course of treatment. Some typical diagnostic tests include:

**Arthroscopy:** A fiber optic scope is passed through the skin via a small incision, allowing for direct visual inspection of the interior of a joint. Surgery to repair a joint can be done at the same time. This is primarily performed at equine medical centers.

**Bone scans:** Also known as nuclear scintigraphy, this method of imaging uses intravenous radioactive isotopes and scintigraphy equipment to create pictures of the bones and surrounding tissues. These are primarily performed at equine medical centers.

**Magnetic resonance imaging:** MRI scanners use strong magnetic fields and radio waves to generate images of the structures in the limb. These are primarily performed at equine medical centers.

**Nerve blocks:** Local anesthetics are injected around specific nerves to localize pain and lameness. Nerve blocks do not deliver a diagnosis, but assist in localizing the source of the pain.

**Radiographs:** Also known as X-rays, these images show the bones of the area in detail and allow a veterinarian to look for fractures or other bone issues.

**Synovial fluid analysis:** Normal synovial fluid is clear and pale yellow. The presence of blood in synovial fluid indicates that bleeding has occurred into the synovial space due to an injury. Often, laboratory analysis of the fluid helps in providing further information.

**Ultrasound:** Ultrasound waves create pictures of soft tissues that cannot be seen on radiographs.

## Unsoundness

A horse is considered unsound when, by virtue of an old injury or conformation defect, it is unable to perform at the level for which it was intended. Some injuries may produce lameness and then become blemishes, while others create unsoundness for life.

Some common unsoundnesses include:

**Bone spavin:** Osteoarthritis of the tarsal bones involving the lower hock joint. Can be caused by cartilage compression, uneven loading, conformation, or any activity which requires a lot of joint flexion.

**Carpitis:** Degenerative joint disease of the carpus. Usually caused by chronic repetitive trauma to the joint resulting in a decreased ability to flex the joint.

**Osselets:** Traumatic arthritis of the metacarpophalangeal joint. Visible swelling on the front of the fetlock joint usually points to arthritis developing on the lower end of the third metacarpal bone and the high end of the first phalanx bone.

**Pedal osteitis:** Inflammatory reaction localized along the solar margin of the third phalanx bone. Usually associated with horses working on hard surfaces who are subject to constant concussive trauma.

**Radial nerve paralysis:** Trauma to the radial nerve will affect all the muscles along the humerus. Severe trauma almost always leaves permanent damage.

**Ringbone:** Also known as phalangeal exostosis. New bone growth that originates and forms on the dorsal, dorsolateral, or dorsomedial surfaces of the first and second phalanx bones, and the extensor process of the third phalanx bone. The most common cause is trauma causing strain on the collateral ligaments, strain on the joint capsule, or a direct blow to the area. Conformational defects can also lead to ringbone.

**Sesamoiditis:** Periostitis of the digital sesamoid bones following sprains of the distal sesamoid ligaments. Periostitis and new bone formation occur where the suspensory ligament attaches to the sesamoid bones.

**Sidebone:** Ossification of the collateral cartilages of the third phalanx bone. Common in the front feet of horses working on hard surfaces or when subjected to long term unbalanced shoeing.

## Developmental Orthopedic Diseases (DOD)

Cartilage converts to bone through endochondral ossification, a complex process. This occurs at three sites in the bone: the diaphysis, or shaft of the bone; the physis, or growth plate located at the junction of the shaft with the head of the bone; and the epiphysis, the surface of the head of the bone that articulates with the joint. Any mistakes in how the cartilage converts to bone can either delay the ossification process or leave damaged cartilage which fails to mature into healthy bone. Abnormal cartilage is prone to fracture, fissure and breaking into small pieces which enter the joint. This can even result in angular limb deformities.

Some horses appear to have a genetic predisposition for developing DOD, but there are external factors that can contribute to the diseases. Too much or too little energy in the grain ration, a deficiency of calcium, phosphorus, or microminerals in the diet, heavy exercise or hard training during bone growth periods, and hormone diseases may all influence the development of bones.

Specific developmental orthopedic diseases include:

**Angular limb deformities:** Congenital limb deformities are caused by abnormal limb placement in the uterus, nutritional imbalances in the mare, neonatal hypothyroidism and unequal growth between the two sides of a long bone. Deformities that appear days to months after birth are known as developmental deformities. The most common angular limb deformities are knock-knees and bowlegs.

**Arthritis:** This describes a number of joint ailments including inflammation, degeneration, and new bone formation in and around joints. Most arthritis causes stiffness and diminished range of motion of the joint.

**Degenerative joint disease:** Arthritis resulting from an injury to the joint or to the ligaments supporting a joint. The most common arthritic problem in adult horses.

**Infectious or septic arthritis:** Occurs when bacteria from the bloodstream enters the joint and destroys cartilage.

**Acute serious arthritis:** Characterized by swollen, tender, fluid-filled joints, along with lameness. The result of joint stress or injury.

**Flexural limb deformities in foals:** Also known as contracted digital flexor tendons, these are most commonly seen in the fetlock joint, coffin joint and knee joint. Either the deep or superficial (or both) digital flexor tendons in the forelegs are contracted, producing a raised heel and a club foot. In mild cases, the foal appears to walk on its toes. In severe cases, the foal bears weight on the front of the fetlock.

**Osteochondrosis and Osteochondritis Dissecans (OCD or OD):** An extremely common disease in growing horses resulting from a primary defect in the process by which cartilage is converted to bone. Thickened cartilage within the joint fragments and breaks into loose pieces of cartilage. Most often found in stifles, hocks, shoulders and fetlocks. These can usually be removed through arthroscopic surgery.

**Physeal dysplasia:** A generalized bone disease that causes lameness in young horses due to the enlargement of the growth plates located at the juncture of the shaft with the head of the bone causing a flaring at the end of the bone. This occurs in rapidly growing foals up to two years of age. Previously known as epiphysitis.

## Laminitis

Laminitis is a metabolic and vascular disease involving the sensitive structures of the hoof. See “Laminitis” in the Hooves and Shoeing section of this manual for more detailed information on this disease.

## Navicular Syndrome

Navicular syndrome is one of the most common causes of intermittent front leg lameness. See “Navicular Syndrome” in the Hooves and Shoeing section of this manual for more detailed information on this syndrome.

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# LONGEING

Longeing can be a wonderful training tool for horse and rider when it is handled in an appropriate manner. Longe the horse using the correct equipment and in a safe and secure location.

The longeur should be well versed in proper longeing techniques, especially when longeing an untrained horse or teaching a rider on the longe line. Inexperienced longeurs should learn to longe by working with a very experienced horse.

Longeing can be used:

- To train a horse to voice commands
- To teach stabilization
- To exercise a horse when it cannot be ridden
- To develop rhythm, balance and suppleness
- To improve the rider's position
- To diagnose lameness
- As advanced schooling for the horse

Longeing should not be used to work a horse down. Longeing is physically demanding on a horse and care should be exercised to not overwork the horse on the longe line.

Longeing is harder than ordinary riding because working on a circle puts more stress on the horse's legs, muscles, joints and tendons. The humane treatment of the horse when longeing is the trainer's responsibility, as is being sure the longeur has enough experience to longe the horse appropriately.

Longeing is very similar to riding a horse. The hand provides contact through the longe line in much the same fashion that the rein does. The whip simulates the rider's leg. The longeur's body position and voice help the horse to understand the longeing aids.

The following equipment is necessary to longe a horse, either with or without a rider:

**Longe line:** 30-foot minimum length with a swivel snap. Typically made of cotton, cotton webbing, spun nylon or Dacron, 1 to 1½ inches wide and ½ inch round. Stops may be sewn into the line for extra control in case the horse should pull against the longeur. Narrow nylon lines and those with chain ends should be avoided. The end of the longe line should not be used as a whip.



**Surcingle**



**PHOTO 1**



**PHOTO 2**

**Saddle**



**PHOTO 3**



**PHOTO 4**

**Saddle**



**PHOTO 5**



**Longe whip:** A long whip (approximately five feet) with a lash and a short popper on the end.

**Longeing cavesson:** A leather and metal device that resembles a halter with an extra low-slung throatlatch called the jowl strap. The noseband is padded and has three longe line attachment rings. The longeing cavesson may be used alone, but it is usually used over top of a snaffle bridle. The noseband, which should be adjusted to fit approximately four fingers' widths above the nostril, should be placed under the bridle's cheek pieces, with the throatlatch and jowl straps worn over the cheek pieces. The noseband and jowl strap must be adjusted snugly so the cavesson does not slip over the horse's eye. The longeing cavesson gives the longeur better control than a halter and is more humane than a bridle.

**Snaffle bridle:** Due to the potential for mouth injury, longeing with the line attached directly to the bit should only be done by longeurs who have educated hands. Only experienced horses should be longed in a bridle. The longe line is placed through the bit on the inside of the bit ring, over the poll and attaches to the outside bit ring, producing a gag effect. When used with the longeing cavesson, the regular cavesson should be removed from the bridle. The reins can be either twisted through the throatlatch or removed from the bridle. The longe line should not be attached to only one side of the bit, attached under the horse's chin, or used with a chain (which spoils the contact because of its weight).

**Side reins:** Generally made out of leather and either strong elastic, a rubber "donut" or elastic tubing. They attach to the snaffle bit below the reins at one end and to the girth of the saddle or surcingle at the other. A horse should be allowed to warm up before the side reins are attached to the bit. During warm up, attach one end to the girth or surcingle, cross them over the horse's withers and attach them to the D-ring of the surcingle so they are not dangling. Once the horse has warmed up, attach the side reins to the bit so there is a slight amount of slack when the horse's face is slightly ahead of the vertical. They should only be used by experienced longeurs or under the direct supervision of a trainer. Side reins should always be detached before the rider mounts or dismounts. This safety measure allows the horse freedom of the head and neck and prevents the rider from getting caught in the side reins while mounting and dismounting.

**Surcingle:** A canvas and leather band worn in place of a saddle when a horse is being longed without a rider. It has multiple D-rings for the attachment of the side reins. A saddle pad or other form of protection should be placed under the surcingle.

**Saddle:** A saddle may be used in place of a surcingle. Care must be taken to either remove or secure the stirrups so they do not hang free and bang the horse in the sides. To secure the stirrups, run them as normal (photos 1, 2 and 3). Bring the lower end of the stirrup leather and put it up over the bottom of the stirrup and back under the anterior branch of the stirrup (photo 4). Place the looped end of the stirrup leather above the keeper or slot on the saddle, slip the end of the stirrup leather through the loop and then through the keeper (photo 5). The stirrup is held in place against the saddle and the saddle is protected from the stirrup leather swinging and consequently scratching the saddle or frightening the horse.

**Boots:** Longeing causes centrifugal force and may make the horse interfere or overreach. Four boots or polos, along with bell boots, help to protect the horse.

The longeur should wear gloves, hard-soled shoes and a helmet for safety and protection. Spurs should be removed to eliminate the risk of catching them on one another and tripping or falling.

The longeing area should have good level footing that is neither slippery nor deep. The footing should be firm with a soft, springy feel. Great care must be exercised when longeing a horse on grass, as the horse could easily slip on the slick surface. Slippery, wet, deep or overly hard surfaces should be avoided altogether when longeing. Riding areas with different types of safe footing, such as sand and grass, give horses and riders valuable, varied experience. Since the longeing horse travels in circles, the longeing area should be free from clutter, holes or divots or anything else that could place excessive and additional stress on the horse's legs. The longeing area should be well-lit and well ventilated, and large enough for the horse to make a comfortable circle. The safest longeing areas are enclosed on all sides, although two sides of a fence or a corner area may be substituted. For safety reasons, riders should not ride in the same area where a horse is being longed.

## Longeing Technique

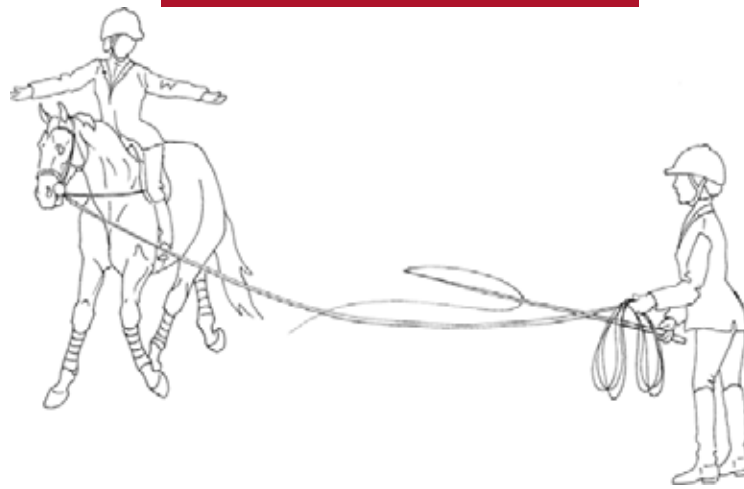
The horse should be worked on a round, consistent circle of approximately 60 feet in diameter. Due to the potential for injury to the horse, the longe circle should never be small or tight.

The longeur may either stand in one spot and pivot, or walk a small circle. The horse is controlled by the rein aids through the longe line, the body position and gestures of the longeur, the use of the longe whip and the longeur's voice.

The longe line is held in the left hand when the horse is tracking left and held in the right hand when the horse is tracking right. The longe line should be folded rather than wrapped around the hand and may be held in the rein position or the driving position. While tracking left, the whip is held in the right hand toward the horse's hocks with the lash pointing down at the ground. The horse and longeur form a triangle. The longeur stands at the point of the triangle, and the longe line, longe whip and the horse's body form the sides.

A longe whip should be of good quality and properly balanced. Handling the longe whip requires practice. The longeur should learn to hold and use the longe whip in either hand.

A horse should respect the longe whip but not fear it. It should learn to accept seeing and being touched with the whip. To teach the horse, start with a stiff dressage whip or driving whip. Allow the horse to sniff and touch it. When it is comfortable, touch it gently while speaking in a calm and kind voice. Move to the longe whip with the lash wrapped up when the horse is comfortable being touched with the shorter whip. End by touching the horse gently with the lash. Make sure to work on both sides of the



horse's body. This procedure may take some time and should not be rushed.

The longe whip may be used in the following ways:

Close to the ground with a forward rotating motion to ask the horse to move forward.

Flicked at the hocks from back to front. This is a stronger way to ask for forward motion.

Flicked forward and upward toward the belly so that it lands where the rider's leg rests. This asks for forward and outward motion.

Pointing at the shoulder to ask the horse to move out to a larger circle or to stop cutting in.

Under the longe line and toward the horse's head asks the horse to slow down or stop. This is an advanced aid that takes practice and tact.

Touching the horse is a strong driving aid in which the lash can be lightly tossed upward, run out to lightly flick the horse or applied with a stinging snap. The latter should be used only for serious disobediences.

The longe whip can be cracked, but this aid should only be used as a last resort when the horse is not listening. Cracking the whip on a regular basis makes the horse ignore the noise.

Running out the lash may be done along the ground toward a specific part of the horse.

When the horse is too fresh, the longe whip may be held pointing at the ground behind the longeour's body.

When approaching a horse, the longe whip should be held backwards with the lash in the longeour's hand.

The longe whip should not be used in anger, to strike the horse (except for stinging snaps), to make the horse buck and play or with a plastic bag or other device attached to the end.

The horse can be started on the longe at approximately five years of age. This limitation is due to the lateral stress that longeing puts on a horse's legs. Young, immature horses are at risk to injuries from longeing that is done incorrectly or for too long. Longeing a young horse increases the risk of an accident caused by the horse's immaturity.

## Beginning Longeing

To teach a horse to longe, begin with the concepts of parallel leading and parallel longeing.

Parallel leading teaches a horse to move forward, stop and obey voice commands when it is several feet away from the longeour. This develops into parallel longeing, with the horse located six to 10 feet away from the longeour.

To begin parallel leading, lead the horse as usual. Carry the longe whip in the hand opposite the longe line, with the whip pointing backwards and down and the lash wrapped up. Gradually move away until you are three to four feet from the horse. Practice transitions, turning and voice commands on both sides of the horse. Make sure to use proper rein and whip aids. When the horse is obedient, gradually move farther away and progress to parallel longeing.

During both parallel leading and parallel longeing you will walk with your horse. You may start to longe the horse on a 60-foot circle when it is obedient to voice commands, rein and whip aids.

The horse should be taught to stay on a consistent-sized, round circle. The initial job of the longeour (and assistant if necessary) is to teach the horse voice commands.

Upward inflections are used for upward transitions and downward inflections for downward transitions. The longeour's vocabulary should be small and consistent so the horse learns what it is being asked to do. It is better to only speak when necessary so as to not confuse the horse.

Good longeing is generally a matter of communication between rider and horse, using body language, gestures, timing, tone of voice and a consistent vocabulary of commands.

Whether young or old, a horse must learn to have respect and manners while on the longe line. Kicking out, bucking or pulling away are all disrespectful behaviors that should be corrected immediately.

A horse should learn at the earliest opportunity to halt and stand on the longe line.

A longeur should never pull a horse in to the center of the circle. If it is necessary to adjust the horse's tack or change direction, the longeur should walk toward the horse, folding the excess longe line in their hand while walking forward.

As the horse advances in training, make sure that it tracks correctly while on the circle. Ideally, the horse's hind legs follow in the tracks of the front legs. A horse should be studied carefully to see where any crookedness lies.

Side reins may help the horse to look in to the center of the circle. Keep the circle large enough that the horse is comfortable and balanced. The longe whip can be used to encourage stronger use of the inside hind leg. Maintain a slow speed and a steady rhythm and tempo until the horse is comfortable tracking correctly.

The movements of the longeur's body, limbs and gestures with the whip can discourage a horse from cutting in to the center of the circle. Horses respond well to body posture or body language because it is similar to the way they communicate with each other.

The longeur's posture influences the horse's direction and impulsion. The longeur is responsible for giving clear and consistent commands to the horse.

Rein aids that can be used while longeing include:

**Opening or leading rein:** Used to lead the horse forward and encourage stretching out the neck.

**Direct rein:** Short squeezes on the rein used toward the longeur's elbow. This is used to make the circle smaller, increase bend or stop the horse from pulling away.

**Indirect rein:** The longe line is moved inward and sideways toward the longeur's opposite hip. This asks the horse to slow down or stop.

**Giving the longe:** The longe hand moves forward briefly, releasing the contact on the horse's mouth. It is used as a reward and also to make the circle bigger. The longe line should not have enough slack to sag toward the ground.

**Vibrating the longe:** Gentle vibrations to get the horse to listen to a light signal.

**Half-halts:** Used to prepare a horse for a transition. Raise the whip and ask the horse to engage the hind end. Follow with a short lift and squeeze on the longe line.

Horses can be schooled on the longe line. This takes an educated, advanced-level horseman with experience in riding on active contact. The horse should be schooled to intermediate or advanced level.

Advanced longeing techniques can help the horse to understand steady contact. Correctly adjusted side reins, coupled with impulsion, ask the horse to reach forward into a plain snaffle bit. The full engagement of the horse's hind legs moves the energy from the hind end to the neck and to the mouth.

A horse should not be asked to jump on the longe line because it tends to increase speed over the jump and wants to go straight afterward, as opposed to staying on the longeing circle. It is not easy to keep the horse on the circle without pulling on the longe line and in effect hurting the mouth. Longeing over rails or raised cavalletti are appropriate exercises.

## Longeing Lessons

Students can benefit from riding on the longe line. Lessons may be conducted with or without side reins. For safety, the horse must be used to being ridden in side reins, be dependable, honest, responsive and consistent.

Many exercises can be performed with and without reins and stirrups. Longe lessons can be used to allow a rider to concentrate on improving their riding without worrying about controlling the horse.

Benefits of longeing lessons:

- Build confidence.
- Improve suppleness, eliminate stiffness and help the rider follow the horse's movements more accurately.
- Improve a rider's balance, security and correct position.
- Develop a secure, correct, supple and independent seat, from which the rider can apply the aids correctly and easily.

## Long Lining

Another advanced technique is long lining. The horse is worked with long lines, a bridle and a surcingle. The long liner drives the horse. The horse may be worked from the ground on straight lines, bending lines and circles. This should not be attempted without supervision from an experienced long lining instructor.

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USHJA Trainer Certification Manual & Study Guide, 2010

# NUTRITION

## Feeding Practices

One of the most important aspects of keeping a horse healthy is making sure that it receives free-choice water and appropriate feed on a regular schedule. Horses require a balanced diet of water, roughage and salt to survive.

A horse should be fed approximately two to three pounds of feed per day per 100 pounds of body weight. At least 80 percent of that should come from good quality roughage.

A concentrate/roughage imbalance can lead to increased gut acidity and negative behaviors (with no apparent function), such as cribbing and wood chewing. Horses are trickle feeders and cannot cope digestively with large meals. Small portions in frequent feedings is the rule. For this reason, a horse's daily ration of concentrates and roughage should be broken down into three to four small meals per day to avoid overloading the digestive tract.

Because different grains weigh different amounts for the same volume, feed by grain weight instead of feed volume. If a change in diet needs to be made it should be done gradually over the course of 10 to 14 days.

Water is the most important nutrient that you can give your horse. Clean, fresh water should be available to horses at all times. Water is an essential part of every cell and of all vital fluids (including blood), which carry nutrients to all parts of the body, pick up waste products and help to eliminate them. Water acts as a cooling agent in the summer and helps warm the body in the winter. Horses that do not drink an appropriate amount of water can suffer from dehydration, which can lead to impaction colic.

Horses enjoy treats, but should not be fed refined sugar. Better choices for treats are horse cookies, carrots or apples. To avoid choking, carrots and apples should be cut into pieces. Hand feeding can bring on mouthy behaviors so it is generally best to give treats in the horse's feed tub.

Before dumping new grain into the horse's feed bucket, check to make sure that the earlier grain was eaten. Never put new food on top of old food. It is important to find out why a horse did not eat its earlier ration. Sometimes the presence of supplements or medications causes horses to pick through or not eat their grain, but leaving food may also point toward illness or a dental problem.

A horse's feed tub should be hung at about the height of its shoulder to minimize pawing at the tub and potentially catching a leg on it.

Some factors to take into account when determining how much to feed include:

**Body type:** Rangy vs. blocky. Rangy horses usually need more feed per 100 pounds of body weight than blocky, chunky horses.

**Current condition:** This determines if the horse needs to gain, lose or maintain weight.

**Temperament:** A "hot" horse may need to be fed less grain and more carbohydrates in the form of hay and grasses.

**Appetite level and feeding behavior**

**Health**

**Work load**

**Type of work:** A jumper may need to be fed a ration that results in high energy and a hunter may need a high fat, high fiber, low concentrate diet to stay quiet but in good flesh.

**Age:** Young horses have special nutritional needs for the growth and development of their bones. The calcium / phosphorus ratio should be from 1.1:1 to 3:1 to avoid skeletal and joint problems. Older horses may not be able to adequately digest and utilize feed, often due to the deterioration of their teeth. They may profit from additional fat in their diet.

**Lactating mares:** These mares need the most food of any horse to adequately satisfy their body's needs in addition to their foal's nutritional requirements.

Horses need the following essential nutrients:

**Water:** Most horses drink at least 12 gallons per day. Water needs may increase with work load.

**Carbohydrates:** Starches and sugar create energy, while cellulose is necessary for digestion. These are found in grass, hay and grain.

**Proteins:** The building blocks of cells, proteins are necessary for growth, repair and maintenance of the body. They are found in oilseed meals, oats, barley, corn and alfalfa.

**Fatty acids (lipids):** Produce extra energy, especially when carbohydrates are insufficient. Small amounts are used in digestion, particularly of vitamins. These are found in corn oil and wheat-germ oil.

**Vitamins:** Necessary for vital body functions. These are found in hay, grain, sunlight and vitamin supplements.

**Minerals:** Build and maintain tissue, especially bones, and act as triggers for body functions. These are found in hay, grain, salt and mineral supplements.

## Carbohydrates

High-energy food is important for the equine athlete. Horses are fueled by carbohydrates, fats and proteins. Carbohydrates are chains of sugars joined together. The most important fuel for working muscles is derived from both carbohydrates and fat.

Compared to carbohydrates and fats, protein is a less efficient fuel source because it costs more energy to metabolize while creating less energy.

A horse ingests carbohydrates and starches through grain and forage. The energy generated by the body metabolizing carbohydrates keeps a horse's body temperature up to normal. Carbohydrates also give the horse energy to perform its job.

Carbohydrates are used in the body as: starches and sugars, which are used for energy, and cellulose, which makes up the bulk of fiber in the equine diet.

Carbohydrates are broken down into:

**Nonstructural carbohydrates:** These short, simple chains of sugar, such as starch and sugar, are water soluble in water. Nonstructural carbohydrates are broken down in the horse's GI tract to simple sugars such as fructose or glucose and absorbed. The sugars then pass to the liver, which sorts them and converts most of them to the simple sugar glucose. Glucose is released from the liver and travels to all cells of the body. The hormone insulin withdraws the glucose from the bloodstream and uses it for energy. If more glucose than the cell needs comes in from the bloodstream, it is stored as the compound glycogen. If excess glucose continues to be supplied, then the adipocytes (special fat-producing cells) absorb it, convert it to fat and store it.

The digestion of non-structural carbohydrates supplies the horse's body with glucose. It is either used immediately by muscle tissue to produce energy or is stored in the muscle and liver as glycogen (a connected chain of glucose sugar molecules). When the body needs to use glycogen, it must be broken back down to sugar molecules.

**Structural carbohydrates:** Longer, complex chains of sugar that make up the cell walls of plants and contribute to the rigidity of wood. Examples are cellulose, hemicellulose and lignin. Cellulose has strong cellular bonds and needs help from bacteria to be broken down. Lignin is indigestible, even to bacteria.

Volatile fatty acids, or VFAs, are formed by the digestion of hay and other roughages. VFAs provide only a small part of the energy requirements of muscle. When more readily available energy is needed, it comes from glucose and fatty acids that are absorbed from the intestinal tract.

## Protein

Proteins are essential components of every cell in the body and are needed for growth, maintenance and repair of the body's tissues.

Proteins are composed of amino acids, which break down plant protein from feed into animal protein. The two most important amino acids are lysine and methionine. Amino acids must be present in the correct amount for the body to function properly.

There is a mistaken belief that the higher the protein percentage in feed, the more chance of the horse displaying bad behavior. The protein percentage noted on each bag of feed can be a misleading piece of information. The protein percentage measures crude protein level instead of energy or caloric density of the protein. Overfeeding calories can contribute to hyper activity and fractious behavior in horses. Also, sugar content of the feed may play an even bigger role in creating a misbehaving horse. Ingested sugars and starches cause changes in blood sugar concentrations and some individual horses appear to suffer sensitivity to the fluctuation while others are not bothered at all.

## Fats

Fats, also known as lipids, carry vitamins through the digestive system and are necessary in small amounts for metabolism.

Fatty acids add to the health of the skin and coat and assist in the growth rate of young horses. Fats are calorie dense, efficiently digestible and metabolized to fuel aerobic activities. During aerobic exercise a horse's body will burn fats and VFAs, saving glycogen reserves for anaerobic activities.

When ingested, fat from dietary sources (such as vegetable oils or rice bran) is digested and formed into triglycerides, which are the major form of fat stored by the body. VFAs that are not needed as immediate muscle fuel are stored in fat reserves or adipose tissues as triglycerides. When the horse needs fuel, triglycerides are released from adipose tissue into the bloodstream. Upon their release they are known as free fatty acids. Fats and fibers do not cause an increase in blood glucose when consumed.

The absence of carbohydrate content in fat minimizes the risk of colic or laminitis for the horse. In addition, a high-fat diet improves a horse's tolerance to exercise in hot weather. Exercise improves the ability of muscles to use stored fat reserves.

Oils contain more than twice the calories of grains, contain no starch and are easily absorbed from the small intestine. When high-fat products are fed, less feed needs to be consumed by the horse to achieve the same caloric density of a feed containing high amounts of starch.

## Metabolism

Metabolism is the process of energy production and consumption. There are two basic types of metabolism, aerobic and an-aerobic. See the Conditioning section of this manual for more information on this topic.



## Energy

Energy is the term used to describe the caloric density of a ration. The digestible energy in grain produces glucose and aids with glycogen repletion and storage following maximal exertion. Grain or concentrates contain between 45 to 65 percent soluble carbohydrates, making them more energy dense than forage, which is composed of structural carbohydrates or fiber.

A horse's energy needs for every two hours of work (as calculated by the National Research Council) increase by:

**Slow walk:** 12 percent

**Fast walk:** 18 percent

**Slow trot:** 46 percent

**Fast trot or slow canter:** 97 percent

**Medium canter:** 138 percent

A horse's feed requirements vary due to many factors, including body condition. Horses are scored on a scale of 1 to 9, with 1 being emaciated and 9 being obese. The ideal body condition is 5, in which the horse has a level back with ribs that can be felt but not seen. There is a slight amount of fat at the tail head and the withers are rounded over the spinous processes, with the neck and shoulder blending smoothly into the body. A horse with a body condition of 1 is terribly thin and appears to be starving. A horse with a body condition of 9 is in danger of foundering and urgently needs to lose weight before it can do even the smallest amount of work.

## Concentrates

Grain or concentrates are high in digestible energy and, if managed correctly, should be incorporated in reasonable amounts in the performance horse's diet.

Grain, which is not a natural feedstuff for a horse, can lead to a starch overload in the hindgut. If a horse requires a higher digestible energy content and starch overload is a concern, beet pulp, soybean hulls and rice bran can be blended into the ration. These products do not contain a high level of starch.

## OATS

Oats are high in fiber and low in digestible energy due to the fibrous hull surrounding each kernel. Oats have nine to 12 percent protein and four to five percent fat.

They should be plump, have heavy kernels and weigh at least 32 pounds per bushel. Oats shouldn't have small black kernels, which may indicate a toxic fungus known as ergot.

They should be stored for three to four months after harvest to let their nitrogen level subside. Oats can be fed whole, crimped or rolled.

## CORN

Weighing approximately 56 pounds per bushel, corn has the most energy (calories) per pound of any grain. It is approximately nine percent protein and three to four percent fat. To put this into perspective, one-half scoop of corn provides as much energy as one scoop of oats.

It may be fed whole, cracked, rolled or on the cob. Whole ear corn includes the ground up cobs, which contain more fiber but reduce the available energy per pound.

Improperly stored corn is subject to mycotoxins or the by-products of mold growth. Moldy corn can cause:

Leukoencephalomalacia, which causes neurological signs, ataxia, depression and sudden death.

Aflatoxicosis, which causes gastrointestinal disturbances, anorexia, diarrhea, hemorrhage, anemia and weight loss.

## BARLEY

Similar to oats but has more energy and less fiber. Rolled barley weighs approximately 40 pounds per bushel. Barley can be fed rolled or flaked.

## BEET PULP

Sugar beet pulp or beet pulp is the dried, fibrous byproduct of the sugar beet. It provides horses with a food that is high in fiber (18 percent), low in sugar and low in protein.

Beet pulp comes in two forms: one that requires soaking before it is fed and one that does not. It contains more roughage than grain and more energy than hay. It is also more easily digestible than hay. Beet pulp is digested easily in the large intestine without concerns related to carbohydrate overload that arise from grain.

It can be fed as a substitute for roughage in horses with allergies.

## BRAN

Bran is the ground up hulls of wheat. Bran is approximately 15 percent protein and three to four percent fat. It has more fiber than corn, about the same amount as oats and less than hay.



Bran contains a high amount of phosphorous, of which approximately 90 percent is in the form of phytate. Phytate interferes with calcium absorption and reduces the absorption of copper, zinc and manganese. This excess phosphorus, coupled with a low amount of calcium may bring on bone problems.

Bran should not contain dust, clumps or cobweb-like strands, which are evidence of weevils.

## RICE BRAN

An energy dense food that is useful as a fat supplement, rice bran is 20 percent highly digestible fat.

A horse can eat one cup, which weighs one pound, twice a day.

Rice bran is high in phosphorus, so care must be taken in balancing the calcium to phosphorus ratio. It contains an anabolic plant sterol called gamma oryzanol, which is thought to increase lean muscle mass.

## PELLETS OR EXTRUDED

Some feeds are ground, mixed together and then heated and formed into small nuggets or pellets. Heating alters the starch molecule, making it more digestible and easier for the horse to absorb.

Pelleted and extruded products contain little or no molasses and their shelf life is longer due to processing.

Not all pelleted feeds are complete. Some must be combined with roughage for the horse to receive adequate fiber and nutrition. Due to the chance of dehydration with pelleted feeds, make sure water is readily accessible to the horse.

## Roughage

Horses are herbivores that are designed to graze on a continual basis. Their bodies efficiently process dietary fiber in the form of roughage, which includes pasture and hay. A horse should eat approximately one pound of roughage for every 100 pounds of body weight per day.

When a horse receives an appropriate amount of roughage, it decreases aberrant behaviors such as licking the ground or eating dirt, which is also known as pica.

A fiber deficiency will cause a horse to eat fence boards, dirt or weeds. Fiber deficiencies limit normal stimulation of the large colon that may allow sand to precipitate out into the intestine. They also predispose a horse to gastric ulcers<sup>91</sup>.

Hay and other roughage, such as grass, alfalfa cubes and beet pulp, should account for approximately 80 percent of a horse's diet. High in fiber and low in energy, roughage is the most natural form of horse feed and takes a long time to consume and digest. The plant fiber that roughage provides is essential for equine intestinal health.

## HAY

Varieties of hay include:

**Grass:** Timothy, brome, orchard grass, ryegrass, prairie hay and coastal Bermuda. Grass hay contains more fiber and lower levels of protein than legume hay, making it less likely that the hay will be overfed. Horses who are fed grass hay are more likely to require supplemental concentrates, especially if they are growing, lactating or in hard work.

**Legume:** Alfalfa, clover and Lucerne. Legume hay is 20 percent higher in energy, twice as high in protein, three times as high in calcium and five times higher in vitamin A than good quality grass hay. Legume hay is best fed as a supplement to grass hay.

Horses that eat a large amount of legume hay have a need to drink more water than normal to help their body excrete the high nitrogen level that comes from metabolizing the high protein content.

In effect, legume hay can cause dehydration and the buildup of ammonia fumes in the horse's stall, which are potentially dangerous to the airways and respiratory system.

Other problems that may develop from the overfeeding of legume hay are: development of gaseous colic, laminitis and myositis.

Make sure to use a good hay supplier who has a consistent source of high-quality hay. Hay should smell sweet and fresh like a fresh cut lawn and be both dust and mold free. It should be green in color and contain leafy, intact plants.

The moisture content of hay should be between 12 and 18 percent. Hay that is damp (more than 20 percent moisture) will mold and spoil. Damp hay may also overheat and spontaneously combust. First-, second- or third-cutting may not make much of a difference to the hay quality.

Aspects to consider when looking at hay:

- Level of fertilization of the field: Hay grown in poor soil (lacks minerals or is infertile) lacks nutrients and is not of good value
- Amount of water available during the growing season
- Species of plant being grown
- Region where the plant is being grown
- Maturity level at harvest: Hay should be cut and baled before it matures, which holds its nutritive value
- Proper curing: Weather damage, improper handling or baling when wet can result in moldy, dusty or less nutritious hay

- Proper storage: Hay exposed to weather during storage loses nutritional value (at least in the outer layers). Heat, over-exposure to sunlight and long periods of storage diminish vitamin levels (especially carotene and vitamins A and D).
- Insect infestation
- Weed control
- Sunlight

Prior to feeding hay, check for:

**Mold:** Can appear in white or grayish white patches. This can cause coughing and lead to more serious respiratory problems. When picking up a hay bale, note its weight. Extremely heavy bales tend to be wet and are most probably moldy. Moldy hay should not be fed to horses. If it cannot be returned to the hay dealer it may be sold or given to cattle farmers.

**Dead animals:** Occasionally found in hay bales, especially large round bales. Ingesting hay that has had a dead animal in it may lead to botulism.

**Blister beetles:** Found in alfalfa grown in the South, West and Southwest. Blister beetles are highly irritating and can cause death.

**Weeds:** Some weeds present no problem to the horse, but other weeds when present in significant quantity can be toxic or can reduce forage quality.

#### **Trash or other foreign objects**

Hay may be fed to horses on the ground, in a net, or from a manger or hay rack. Each method has its benefits and drawbacks. Feeding on the ground is the most natural position for a horse. However, when feeding hay outside, the horse may ingest sand and be at risk for a sand colic or parasite eggs and larvae. A hay rack is a better solution for outdoor hay feeding. A net helps to keep the horse's hay neat and minimizes waste. Nets must be secured with a quick-release knot and tied at a height so a horse cannot get its legs caught (especially as the net empties). Mangers (if they are hung high) can cause dust and debris to get into and irritate a horse's eyes.

## **PASTURE**

A horse's nutritional needs can be met by good quality pasture with free access to salt and water. Horses in moderate to hard work require supplementation with concentrates. A horse that lives "at grass," or turned out, requires prolonged grazing time so as to meet its nutritional needs. If the horse must be off the pasture for any significant amount of time, it requires supplementary feed to make up the difference. (For more information, see Pasture Management.)

## **Supplements**

A supplement is a needed substance that is not in the horse's normal ration.

A horse's daily ration usually contains an adequate amount of vitamins, minerals and protein. Feeding supplements can drastically increase the price of feeding the horse and, if not properly used, can create an imbalance in the horse's diet. If overfed, certain vitamins and minerals can reach toxic levels in the body.

Supplementation works well when feeding a low quality hay or pasture. There are numerous types of supplements. Always consult your veterinarian before starting a supplement regimen.

Some common supplements include:

**Ergogenic:** Performance-enhancing supplements that may or may not work. Much of the research has come from human studies and may not apply to equines. These supplements claim to increase speed, stamina and strength.

**Joint:** Designed to promote joint health. They should contain some combination of glucosamine, chondroitin sulfate, silicon, methylsulfonylmethane (MSM) and hyaluronic acid (HA).

**Vitamins:** Vitamin supplements typically have a short shelf life and may be negatively affected by exposure to air or light. Necessary vitamins include:

**A:** Fat soluble. Usually found in green hay and particularly in legume hay. Vitamin A deficiencies lead to eye, skin and reproductive problems. Excesses lead to bone or tendon disease. Vitamin A is stored in the liver and can be toxic if overfed.

**D:** Fat soluble. Usually found in quality hay and produced by the horse's body when exposed to the sun for a few hours of daylight each day. Vitamin D helps with calcium and phosphorus absorption and metabolism that is critical to bone, muscle and tendon health. Overfeeding vitamin D can lead to bone deposits in places such as the heart, blood vessels and kidneys. Bones and joints may develop calcium deposits.

**E:** Fat soluble. Usually found in good quality green roughage and summer pastures. Vitamin E is a useful antioxidant to stabilize cell membranes.

**B:** Water soluble. Usually found in good quality pasture and produced by the horse in the hindgut when fed adequate roughage. Helps with energy metabolism and contributes to performance.

**C:** Water soluble. Manufactured in the liver.

**Mineral:** Calcium, phosphorus and selenium are examples of minerals. Mineral imbalances and overdoses can cause serious problems.

**Protein:** Examples include soybean meal, oilseed meal, legume meal and milk protein. Excess protein is converted to fat or excreted, and can cause kidney problems.

**Fat:** Corn and wheatgerm oil are two examples of fats. Fat supplements help with weight gain, healthy skin and a shiny coat and are a source of concentrated energy. They tend to have a short shelf life and can quickly become rancid if exposed to heat, air or light.

## Electrolytes

The horse's body cannot function without the correct electrolyte balance. Electrolytes serve the body by:

Mediating electrical impulses to stimulate muscle contraction and movement and efficient interaction of nerves and muscles

Regulating the balance of body water within the various tissue compartments

Maintaining normal intestinal function, adequate blood circulation, normal heart rhythm and muscular strength and coordination.

Electrolytes are water-soluble body salts that include:

**Sodium and chloride:** Horses obtain sodium and chloride from salt blocks. A horse fed free-choice salt licks approximately one to two ounces per day. Horses should be allowed free-choice salt in the form of white salt bricks or blocks. Trace mineral (red) salt bricks have a high level of iron oxide. Iron overload may be a factor in the onset of insulin resistance in some horses.

**Potassium:** Contained in hay and grass.

**Calcium and magnesium:** Contained in hay, with alfalfa being the richest source.

As horses sweat, losing body water, they lose approximately one teaspoon of salt for each cup of sweat they produce. Electrolyte imbalances and dehydration can cause:

**Myositis:** Tying up syndrome

**Thumps:** Synchronous diaphragmatic flutter

**Colic**

**Diarrhea**

Electrolyte imbalances are more common in horses that are performing low to moderate intensity work, such as endurance riding. Most horses have enough electrolytes stored in their intestines to cover their needs for sports that have brief bursts of intense activities, such as show jumping.

Electrolytes that are not needed by the body are not stored but are processed by the kidneys and excreted as urine.

During times of athletic effort, it is as important to allow the horse access to good quality hay, which gives the horse a reservoir of electrolytes, energy and water to draw from. Electrolytes may be supplemented at the same time and should be taste-tested by the handler to ensure they are salty, not sweet. If the electrolytes are sweet they are most likely composed of more sugar than salt. In this case, choose a different brand.

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# PASTURE MANAGEMENT

A pasture or turn-out area is an important part of a horse's life. Pastures can be small or large and may contain grass or be a dry lot. Dry lots are generally composed of stone dust and are used for horses that should not be on grass. Sand is not advantageous because of the risk of a horse developing sand colic from an impaction.

Factors to consider when planning a paddock area include:

- Fencing
- Drainage
- Shelter
- Water
- Grasses and forage
- Concentrates, hay and salt
- Trees and toxic plants

Regardless of their size, all pastures require ongoing management to keep them safe and useful for horses.

Fence should be a minimum of 3'6" high and should not have sharp corners or places where horses can be trapped during rough play. Fences should be checked for loose or fallen boards or protruding nails on a daily basis. Do not use metal or T posts, due to the high chance of injury.

Fences can be composed of:

**Wood:** Can be three or four boards high and consist of nailed-in boards or slip rails. Slip rails should be nailed in to prevent horses escaping. Boards should be nailed on the inside of the fence to prevent horses pushing the boards off. Pressure-treated posts and oak boards are extremely durable.

**Wire:** Can be diamond mesh or box wire. Both types of wire are more secure with a top board to stop horses leaning on the fence and pushing it down. Some wire fences have a board on the bottom. Although wire fence may be less expensive initially, it can cause injuries that could have been avoided by using wood or a synthetic. Barbed wire is not appropriate for horse use, due to the potential for injury.

**Synthetics:** Synthetic fences, such as PVC or rubber, require much less maintenance than wood fences.

**Metal Pipe:** Welded pipe can be expensive to install, but it is safe, durable and non-chewable.

**Electric:** A good choice when used as a top wire for other types of fencing. It is sometimes referred to as "hot wire" fence. An electric fence by itself is hard for horses to see. Electric tape fencing is easier to see and more durable than electric wire. Electric fence chargers require grounding and come in the form of solar and plug-in.

Pastures should be checked on a daily basis for unsafe conditions, which include:

- Broken fencing
- Protruding nails
- Trash
- Horse shoes
- Holes
- Rocks
- Dead animals
- Grass clippings, which can be toxic

## Drainage

Horses do not benefit from pastures that are marshy or have standing water. Marshy pastures can pull a horse's shoe off, cause soft tissue injuries from the deep footing and act as breeding grounds for disease-carrying insects. In addition, wet ground predisposes a horse to scratches, rain rot and thrush. If the horse lives turned out, wet ground does not provide a comfortable place to lie down.

Signs of a poorly drained pasture include:

**Marshy grass**

**Standing water**

**Buttercups:** Certain species of buttercups, which are pasture weeds, grow in wet conditions. These may also be present in poorly managed pastures, which have been overgrazed or improperly mowed.

## Shelter

Occasionally, health reasons, lack of stall space or the horse's preference may cause a horse to live turned out in a pasture. This is the most natural place for a horse to be, although many horses do not tolerate this lifestyle.

Horses that live outside must have shelter from the elements. A three-sided shed or run-in shed works well for this purpose. The shed should be large enough to comfortably fit all the horses in the pasture and should be faced with its back to the prevailing wind.

The shed and pasture should be cleaned out on a regular basis to avoid parasite infestation. Hay should be provided if the grass is poor or sparse. It is safer and more economical to feed hay from a hayrack.

The horse should be looked at daily and checked for injuries, rain rot or changes in weight. Trees may be used as a shelter or windbreak in mild weather.

## Water

A clean, reliable, free-choice water source is of the utmost importance in a pasture. Water troughs should be sited in a well-drained area, away from fence corners and trees with leaves that may contaminate or poison the water. Some leaves produce tannic acid, which is toxic to horses. Troughs must be cleaned on a regular basis to keep the water fresh.

Ponds and streams are generally not safe sources of water. Ponds may be contaminated with certain species of blue-green algae that are toxic to horses. These types of algae are common in ponds that are contaminated by run-off from organic materials such as fertilizers. Pond water may also be stagnant. Ponds and streams may be polluted from upstream sources.

Closely monitor the water consumption of horses living on full-time turnout.

In the winter, some horses do not drink sufficient water. Under-consumption of water brings on dehydration and predisposes the horse to impaction colic. These horses should be brought inside or, if feasible, warmed water should be added to their trough. A horse cannot satisfy its water needs by eating snow. If a stock-tank heater is used, make sure the horse is not shocked by faulty wiring.

## Grasses And Forage

Pastures usually contain grasses, legumes and a certain percentage of weeds.

Each area of the country contains grasses that are compatible with the climate. Horses do the best on cool-season grasses, but these do not thrive in some parts of the country. Cool-season grasses are able to tolerate frost and grow well in locations where there is a cool spring and fall. They do not tolerate long periods of high temperatures or drought.

Cool-season grasses include:

- Timothy
- Ryegrass
- Orchard
- Fescue (subject to an endophyte fungus that can be toxic to horses)
- Kentucky bluegrass
- Brome

Warm-season grasses are able to withstand hot and humid weather. Many warm-season grasses contain toxins in their leaves and are not palatable. A pasture may become overrun with these grasses as horses eat around them. Careful pasture management can avoid this situation.

Additionally, horses that are not from the Southern regions may not be able to tolerate coastal Bermuda grass or coastal hay. This grass can bring on colic in horses that are not accustomed to eating it.

Warm-season grasses include:

- Coastal Bermuda
- Caucasian bluegrass
- Switch
- Tifton 44

Legumes are high in protein, amino acids and nitrates. Legumes obtain nitrogen from the air, and this helps to fertilize the soil for other plants. Clovers can form a toxic fungus, especially in hot and humid weather. This fungus leads to significant weight loss, drooling, oral lesions, colic, diarrhea and stomach edema. For that reason, clovers are not a good choice for pasture.

Legumes include:

- Alfalfa
- Bird's foot trefoil
- Lespedeza
- Clover: Red, white or alsike

## Concentrates, Hay and Salt

Horses do not require grain or salt in their paddock if they are turned out for a few hours a day.

Special provisions must be made when feeding concentrates to horses that are permanently pastured together. Every herd has its pecking order, and feeding time can be a dangerous experience for the underdog. It is not ideal to feed concentrates to horses in a group situation, but if it is necessary, the feed tubs should be spread over a large area with at least 30 feet between horses. A better strategy is to bring horses into the barn when they are being fed.

Hay can be fed in mobile hay racks. This prevents hay from being wasted and trampled underfoot (which creates muddy conditions) and also minimizes the ingestion of sand, parasite eggs and larvae.

Free-choice salt should be readily available for horses that live outside.

## Trees and Plants

Pastures must be monitored closely for natural hazards of toxic trees and plants. Most horses do not ingest toxic plants unless there is nothing else to eat.

Toxic plants vary from region to region. Refer to field guides or call your county extension agent to determine the toxic plants in your area.

Common poisonous plants in North America include:

- Arrowgrass
- Bracken Fern
- Buttercups
- Clover (sweet, red, alsike)
- Cocklebur
- Fescue (tall and chewings)
- Foxgloves
- Goldenrod
- Hydrangea
- Lantana
- Larkspur
- Lupine
- Milkweed
- Pigweed
- St. Johnswort (goatweed)
- Trees (apple, black locust, black walnut, cherry, oak, peach, red maple)
- Wild onions

## Herd Behavior

Many horses enjoy the companionship of others and develop good social skills, but care must be taken when introducing new horses to one another. If it is practical, allow the horses to meet in adjoining paddocks so they can become accustomed to one another. The first time they are turned out together, make sure to leave their halters on so you can catch them quickly in case of an emergency. Watch them until they settle down.

Some horses do not enjoy company and should be left in private turnout. Each horse is an individual and needs to be monitored closely for signs of unhappiness, which can manifest itself in behaviors as extreme as running and screaming.

Some horses become overly attached or needy. They do better in private turnout so they cannot become dependent on their pasture mates. Some horses become so buddy sour that they resist working unless their pasture mate is with them.

When turning horses out, consider the time of year and the amount of grass present. Spring grass contains high levels of proteins, minerals, vitamins, and sugars or fructans that can cause horses (and especially ponies) to have digestive upsets, diarrhea or attacks of laminitis. During this time any horse that is susceptible to these issues should have limited turn out time or wear an anti-grazing muzzle when turned out.

## Pasture Care

Maintenance of a safe and productive pasture takes planning and work.

The pasture should either be picked out or dragged with a chain harrow on a regular basis. Dragging the pasture on a hot, dry day breaks open manure balls and exposes any possible parasites to sunlight, which kills off the eggs and larvae(104). Horses tend to make one area of the paddock the “bathroom” and once they have dropped manure in an area they will not eat



the grass in that location. The grass in these areas becomes rough and rank if the manure is not removed. Regular harrowing or picking of the pasture helps keep these areas small and confined.

Pastures need to be rested to let the grass grow. Over grazing and overcrowding can lead to poor or sick (lacking in nutrients) soil and a lack of edible grass. Parasites can also take over a pasture that has not been rested.

One form of resting a pasture is rotation. Larger pastures can be divided into thirds, with one pasture resting, one pasture being fertilized or seeded and one pasture being used for grazing.

Test pasture soil periodically and apply the correct amount of fertilizer.

Mow pastures regularly, as horses prefer to eat the shorter grass. When mowing, be sure to cut to the correct height for the grass in the paddock. This helps strengthen the grass and helps to slow the production of weeds. Shorter grass species, such as bluegrass and rye grass, should be mowed at two to three inches; taller grass species should be mowed at four to five inches.

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# RIDING THEORY

## History of American Forward Riding

The theories and methods of American hunter/jumper riding (exemplified below by US Olympian Bill Steinkraus) are based on the idea that “forward riding” in motion with the horse is the safest, most humane, and most effective for disciplines that call for jumping over fences. This system developed in the early to mid-twentieth century, challenging three-hundred years of striving for collection and execution of precise “school movements” described in European equitation manuals dating from the sixteenth century.

Understanding the history of equitation in the Europe and the US will help you understand the origins and reasons behind the basic principles of position, control and schooling that guide modern day American hunter/jumper riding, training and judging.

### Developing a Partnership with the Horse

Although often used as pack animals and for pulling carts, horses for the past 2,000 years have made their greatest mark as riding partners in cultures around the world in warfare, as transportation and, in the modern world, in sport.

Xenophon, a Greek warrior who wrote a *Treatise of Horsemanship* in 360 B.C., is one of the earliest known writers to map out a theory of riding. Largely targeted at those training horses for battle, his methods and advice focused on developing a relationship based on mutual respect, rather than on domination by the rider over the horse. He wrote: “For what the horse does under compulsion . . . is done without understanding; and there is no beauty in it either, any more than if one should whip and spur a dancer. There would be a great deal more ungracefulness than beauty in either a horse or a man that was so treated. No, he should show off all his finest and most brilliant performances willingly and at a mere sign.”

Xenophon’s instructions were both humane and effective. For thousands of years, this belief has guided good horsemanship. Many of the instructions for riding, grooming and handling a horse on the ground included in this study guide were first described by Xenophon. Although there have been theories focused on brutal ways of teaching a horse submission, or “breaking” a horse to “obey,” these theories ultimately fail at producing good results—precisely because they are faulty.

Roman and medieval cultures tended to focus horses as transportation, even in battle. Knights heavily protected in massive armor were carried by horses also wearing armor. There was little expectation of agility and speed as battle lines charged ahead. Draft horses of today are descended from those medieval “chargers,” and jousting evolved into a courtly sport as hand-to-hand (or horse-to-horse) combat gave way to weapons using firepower. Then, mounted warriors needed to move quickly and strategically in both offensive and defensive maneuvers.

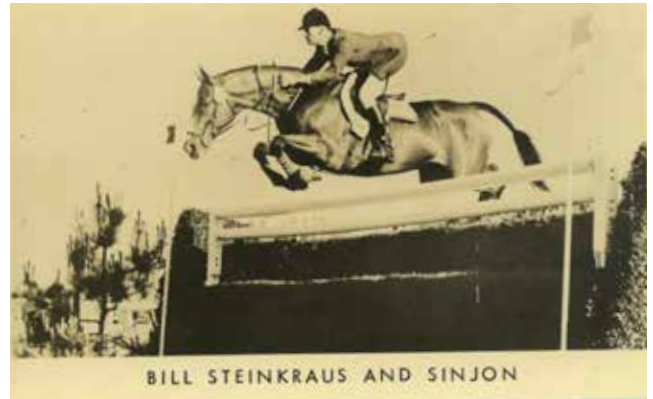
### Classical Equitation in Europe

By the sixteenth century, expanding empires called for diplomatic travels and cultural contests in addition to battle. In Europe, high-ranking military riders and courtiers were expected to provide entertainment, and the skills of horse and rider were on display as a sign of the magnificence of the royal house. The ability to show off well-trained horses gave rise to “school riding” in a small, closed arena (*a manège*).

While there were some national variations, school riding in Italy, France, and England developed along similar lines from roughly from the sixteenth through the nineteenth centuries. Horses were worked in the *manège* at all gaits in collection, requiring the horse to be in central balance and the rider to be in a deep seat with long stirrups, especially for movements such as passage, piaffe and other advanced “high school” (“haute école”) figures or “airs above the ground.” The focus on training for submission while exuding power gave rise to manuals of “equitation” that outlined what we know as classical dressage. Theories, methods and exercises from the most renowned manuals are in still use today.

In Italy, *L'Ecurie de Sieur Grison* (1550) by Frederic Grisoni stressed the importance of using specific leg aids to ask the horse for forward, lateral and turning movements. Following in his footsteps in France were Salomon de la Broue’s *Le Cavalerie François* (1593, 1646) and Antoine de Pluvinel’s *Manège Royale* (1623), which suggested the progressive move toward using a snaffle over the long-shank curb bits so often seen in illustrations of the time. Pluvinel taught King Louis XIII, and his ideas lead to the founding of the Equitation School of Versailles. He advanced Xenophon’s approach to training horses, encouraging his riders to “appeal to the intelligence of the horse rather than to the use of force,” and to understand that “the horse that resists does so, not out of malice, but because it does not understand the demands of his trainer.”

William Cavendish, Duke of Newcastle, is often credited with bringing school riding to England after spending time in exile in Belgium. He advocated Pluvinel’s humane training methods over some popular, but cruel, English works. He wrote and originally published in French in 1658 the influential book known in English as *A General System of Horsemanship*. Newcastle also published



*We must never forget, every time we sit on a horse, what an extraordinary privilege it is: to be able to unite one’s body with that of another sentient being, one that is stronger, faster and more agile by far than we are, and at the same time, brave, generous and uncommonly forgiving.*

*—Bill Steinkraus, Reflections on Riding and Jumping*



*Antoine de Pluvinet [left, without a hat] teaching King Louis XIII Manège Royale (1623)*



*The Duke of Newcastle training a horse to perform a Capriole A General System of Horsemanship (1658)*

a training manual titled *A New Method to Dress Horses* in 1667, giving an indication of the origins of the term dressage from the French word meaning “train” or “drill.”

François Robichon de la Guerinière's *Ecole de Cavalerie* (1733) is the most influential manual in tracing continuity between classical equitation and forward riding equitation. It describes clear and straightforward descriptions of the classical seat and explanation of practical exercises. It introduced the shoulder-in and work on two tracks, flying lead changes and the counter canter, movements that are considered fundamental in the training of today's hunters and jumpers.

De la Guerinière tied together theory and practice, stressing even further Xenophon and Pluvinet's insistence on the rider developing a humane partnership with the horse: “Without theory, the practice will always be uncertain. Theory teaches us to base our work on sound principles, and these principles, rather than being opposed to what is natural, must serve to perfect nature with the aid of art. Practice gives the ability to easily apply what we have learned in theory. In order to attain this facility, one must like horses, be energetic and bold, and have abundant patience. Herein are the principal qualities of the true horseman.”

### Challenges to Classical Equitation

Just as military needs and diplomatic life at court during the Renaissance had shaped classical dressage, cultural and political changes in Europe in the eighteenth and nineteenth century brought shifts in riding theory and practice. The rise of national standing armies in Europe and the need for horses' agility in battle with the development of gunfire brought increased need for principles of “outdoor” or “cross-country” riding.

In France, riding masters trained at the School of Versailles established a cavalry school at Saumur in 1815. By 1848, its director Le Comte d'Aure recognized that the high degree of collection in classical school riding was not suitable for forward-moving cross-country riding and set out to modify the classical seat and allow horses to move more “naturally.” He met with some resistance, particularly because in 1842 François A. Baucher had revived the military's attention to collected school riding in his *Methode d'Equitation*, emphasizing “flexion” as a means of control. Baucher's performances were popular in the many public demonstrations and circuses of the time. As a result, training at Saumur began to draw on new ideas while still holding on to old traditions.

Later in the nineteenth century James Fillis, born in London and living in France, similarly stressed classical riding, and like Baucher, rode in a circus. However, the horses Fillis preferred were more thoroughbred types than heavier dressage horses. In his *Principes de Dressage et d'Equitation* (1890), Fillis established as a basic principle that the horse must be correctly balanced in forward movement with impulsion, even though his system still called for a deep seat. Fillis later served as chief rider of the St. Petersburg Cavalry Riding School. Fillis also created the stirrup weighted heavier at the bottom that is popular in hunter/jumper riding today.

Changes in agricultural production led to the “Enclosure Acts” in England, which resulted in fences between neighboring estates. Foxhunters and travelers on horseback needed to navigate newly erected fences. Military riders now needed to jump fences, too. Riders and observers alike found the spectacle of jumping interesting, and soon agricultural fairs began featuring jumping demonstrations and competitions.



*Le Comte D'Aure's “natural riding,” c. 1848*



*Francois Baucher's flexion & collection, c. 1842*



*The classical deep seat for riding in central balance François Robichon de la Guerinière, Ecole de Cavalerie (1733)*

When foxhunting had expanded in eighteenth-century England, riders modified the classical dressage seat but often still sat quite vertical and central, which grew tiring after hours in the hunt field. Riders then pushed their legs forward and relaxed their back, which put them in a “chair seat” that became known as “the old English hunting seat.” As steeplechase and point-to-point racing developed, some jockeys began leaning forward to keep up with horses at speed. There were a few English proponents of riding with shorter stirrups in a lighter seat that would help the foxhunter, but even Fillis and most cavalry instructors recommended sitting vertical to “lift” the horse on take-off and leaning back over jumps in case the horse stumbled upon landing.





*James Fillis, Principes de Dressage et d'Equitation (1890). Chief Rider of the St. Petersburg Cavalry Riding School*



*"The old English hunting seat"*



*Nineteenth-century jumping technique*

### Caprilli's Forward Riding System

In 1897 Federico Caprilli, a rider in the Italian cavalry, began practicing a completely new system of riding off the stirrups, rather than off a deep, central seat. Shorter stirrups create angles in the rider's hips, knees and ankles that act as springs. Caprilli's system pioneered sitting lighter and more forward in the saddle, using shorter stirrups to rise out of saddle and softer arms to follow the forward motion of a horse's head and neck, especially over jumps.

Caprilli published only a few brief articles in 1901, which were later translated as "Principles of Cross-Country Riding"

when published in English in the 1930s by Caprilli's main proponent, Major Piero Santini. Caprilli's new principles were to help horses and riders "get across country with safety and dispatch," "withstand fatigue at the faster pace," and "respond to what is required of them quietly and smoothly and with the minimum possible wear and tear."

This revolutionary method was controversial at first, bucking "the old English hunting seat" and three hundred years of classical tradition, but Caprilli insisted the high degree of collection and drilling in dressage was unsuitable for cross-country riding, and unfair to the horse. He instead believed that practicing across changing terrain and at a faster pace

would train the horse: "We must strive to leave a horse as nature fashioned him, with his balance and attitude of head unaltered because, if there should be a necessity for modifying this same balance, we shall see that the horse, in the course of his schooling, is perfectly able to do so himself if allowed the necessary freedom."

Importantly, Caprilli aimed to train the rider in order to reduce the abuses of sitting backwards and pulling a horse's mouth while jumping that result in pain and "violent reactions, or at best, even when submitting, in a horse not employing his strength naturally, thereby wearing himself out in superfluous and harmful efforts" and at worst, in a horse refusing to jump or jumping "in a state of nervous tension."

Caprilli's system, then, can be summarized as focusing on position (rider and rider forward and coordinated in motion), control (clear aids for steering and guidance that result in a calm response, even at a gallop) and schooling (practice on terrain that develops and strengthens horse and rider to maintain balance). Caprilli taught his system when he became the director of the Italian cavalry school at Pinerolo until his untimely death in 1907. By that time, Caprilli's system had been become the foundation of the Italian cavalry schools at Pinerolo and Tor di Quinto, and officers from the United States, Russia, and Europe went to Italy to study the new system and bring it home.

### The Origins of Equestrian Sport

The dramatic shift in military equitation toward the forward riding system was typical of the larger social and economic developments at the turn of the twentieth century. Mechanization changed the ways in which horses were needed in battle, but military equitation skills were still important in demonstrations of a nation's strength. With the start of international competitions and the rebirth of the Olympics in 1896, the focus of military equitation began to shift from the battlefield to the sports arena.

Industrialization led to increased leisure time, and more people were drawn to pleasure and competitive riding. Jumping was all the rage for the military and civilians. As urbanization ate up more land, limiting the foxhunting countryside, horse shows



*Federico Caprilli demonstrating forward riding, c. 1905*



*Federico Caprilli working cross-country, c. 1905*

with hunter divisions appeared all over the country. The American Horse Shows Association (AHSA) was founded in 1917 to coordinate shows; many of its founders had roots in the military or the hunt field—or both. As equestrian competitions challenged how high, wide and fast horses could jump, Caprilli's followers began winning often, leading both to the rapid development of equestrian sports and predominance of the forward riding system.

The Olympics included only occasional equestrian demonstrations until 1912. The Olympia Horse Show in London and the National Horse Show in New York held the first international competitions in 1907, and the first Nations Cup jumping team event was held in London in 1909. With the best riding schools around the world being military schools, Olympic and international equestrian competitions were open only to military officers.

At the US Cavalry School founded at Fort Riley, Kansas, in 1905, a group of officers each year were chosen to specialize in advanced horsemanship. From 1912 through 1948, officers from this select group competed as the US teams in Olympic jumping, eventing and dressage, as well as in international horse shows hosting Nations Cup competitions. In some cases, the same officers, such as Guy V. Henry Jr. and his protégé, Harry D. Chamberlin, rode in all three disciplines, winning medals. Henry had been sent to the Saumur around 1905, and Chamberlin studied at Saumur and Tor di Quinto in 1923 and 1924. Henry and then Chamberlin integrated their European experiences into the instruction at Fort Riley of both enlisted cavalymen and officers training for the show team. After World War II, however, the US Cavalry became an armored division, and the last US military team competed in the 1948 Olympics.

As other nations began dissolving their military teams, international equestrian competitions opened to civilians. The United States Equestrian Team (USET) was founded in 1950 to recruit and train civilian riders. Some of the USET's founders and early team members had their equestrian roots in Fort Riley. Looking to be competitive internationally, the USET hired Bertalan de Némethy, a Hungarian cavalry officer who had arrived in the US in 1952, to serve as coach of the USET. De Némethy integrated Hungarian and German military training with the forward riding system, developing a program of dressage work, jumping grids, and longeing that he used with success in schooling horses and riders for the USET. He remained as coach until 1980, and all four riders on the US 1984 Olympic Gold Medal team had trained with him. He published *The de Némethy Method: Classic Show Jumping* in 1988.

### The Forward Riding System in the United States

In the United States, Caprilli's forward riding system gained hold quickly since there was no American history of centuries of classical dressage training and the US Cavalry developed in the nineteenth-century alongside steeplechase and flat racing, foxhunting, "hacking" in city parks and the countryside, and horse shows. Today's "hunter seat" was developed from the "forward seat" as described by followers of Caprilli's method, especially Harry Chamberlin.

As the head of the US Cavalry School at Fort Riley, Chamberlin rewrote the army's horsemanship manual, revolutionizing the training of riders and horses, refining the army's remount breeding program, and creating a show team to compete on the American fall horse show circuit in Washington, New York and Toronto. Chamberlin had learned from the cavalry how to teach sound riding principles in a short period (most cavalry officers had just a year of training), and he recognized the growing popularity of riding among civilians. His *Riding and Schooling Horses* (1934) and *Training Hunters, Jumpers and Hacks* (1937) became the foundation for American hunter and jumper riding.

Chamberlin went beyond focusing on "the forward seat" to stress that "position, control, and schooling" are three equally crucial components of the forward riding system:

- Developing a correct forward "position" allows the rider's seat, legs and hands to coordinate with the horse's movement at various gaits and when jumping. Staying in motion with the horse means using different yet correct seats. Today's full seat, light seat, half seat (galloping/jumping seat) and driving seat all have developed from Chamberlin's notion of staying with a horse's changing balance.
- Establishing "control" is based on using light, intermittent aids that progressively teach a horse about contact without forcefully disrupting a horse's natural head carriage.
- "Schooling" hunters and jumpers through thoughtful exercises gradually develops a horse's agility and athleticism. Influenced by his time at Saumur, Chamberlin includes basic dressage movements in his schooling exercises, bringing together classical equitation and forward riding.

Chamberlin's methods, like Caprilli's, were aimed to teach effective and nonabusive riding practices, especially to the "inexperienced amateur who desires to train his own horses." He said, "Nothing aside from the dearest human relationships can give



*Major (later Brigadier General) Harry D. Chamberlin, 1928 Olympics*



*Major (later Brigadier General) Harry D. Chamberlin  
Plate LIII, Riding and Schooling Horses (1934)*



the pleasure found in working and playing with a horse. That magnificent, powerful, yet dependent creature so willingly gives so much that surely it behooves his master to study thoroughly all things which may help in understanding his mute and faithful servant.”

Many Fort Riley-trained officers became instructors as riding academies sprung up between the 1930s and 1950s. The most influential among them was Gordon Wright, who actually began training riders for the show ring in the 1930s and then served time at Fort Riley when he enlisted in the army during World War II. Wright produced more Medal and Maclay champions from the 1940s through 1960s than any other trainer. Wright's *Learning to Ride, Hunt, Show* (1958), succinctly discusses forward riding theory and provides clear “how-to” guidelines for beginners through advanced riders.

Captain Vladimir S. Littauer, a former Russian cavalry officer who moved to the US in the 1930s, also shaped the American forward riding system. He directly set out to influence the quality of pleasure and competitive riding since there was no national system of instruction in the US as there was in European countries. His firsthand experience in World War I taught him that manège riding was not effective cross-country or in battle, and he had been taught the Caprilli method by Russians who had trained at Tor di Quinto.

Littauer and two fellow former Russian officers set up the Boots and Saddles Riding Academy in New York in the 1930s, experimenting with bringing exercises from classical dressage while refining Caprilli's method in their teaching. Littauer's own teaching was influenced by Chamberlin's ideas. In *Common Sense Horsemanship* (1951) and *Schooling Your Horse* (1956), Littauer lays out in clear terms and illustrations that the forward riding system's emphasis on position, control and schooling aims to produce unity, security and harmony between horse and rider. Littauer describes elementary, intermediate and advanced levels of riding, with exercises appropriate for each level. Littauer's methods and his students largely shaped hunter, jumper and equitation teaching and standards as these disciplines developed in the late twentieth century.

Jane Marshall Dillon followed Littauer's theory and practice at her Junior Riding School in Virginia, and published *School for Young Riders* (1958) and *Form over Fences* (1961). Dillon was influential in writing equitation guidelines for Virginia horse shows that were adapted for the AHSA (now USEF) hunt seat rules from the 1950s to the 1970s. Wright's, Littauer's and Dillon's books and the success of their students in the hunter and equitation rings as well as in international show jumping from the 1950s through today are a testament to the sound principles of the forward riding system. Paul D. Cronin, who studied under Littauer for thirty years and was the equestrian director at Sweet Briar College for decades, published *Schooling and Riding the Sport Horse* in 2004, bringing American forward riding system principles into the twenty-first century.

A number of the riders from the early decades of the USET—like those who had studied with Wright, Littauer and Dillon—went on to become influential trainers as horse shows expanded and hunter, jumper, and equitation divisions became more specialized from the 1980s through today. Many of those trainers and the next generation of riders trained by them have influenced the development of educational programs along the jumper athlete pathway, helping to create a legacy of an American riding system.

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Captain Vladimir S. Littauer  
 Pic. 64, *Common Sense Horsemanship* (1951)



*Joe Fargis and Touch of Class, 1984 Olympic Team and Individual Gold Medalists. Joe started riding with Jane Marshall Dillon and was a member of the USET under Bertalan de Némethy from 1970-1980. As a rider, trainer, and clinician with a lifetime of successful experience in the American forward riding system, Joe's main rule for riders of hunters, jumpers, and equitation is "Consider the horse first."*

## Safety

When working with horses, safety is of paramount importance. While riding, it is important to remember a few common sense rules:

Always wear a helmet with the chin strap securely fastened.

Boots or shoes should have a small heel to prevent the foot from slipping through the stirrup.

Candy and gum should not be eaten or chewed while riding. This is a choking hazard.

When riding in company, keep at least one horse's length between horses.

Dangling jewelry is unsafe. If earrings are worn, they should be small studs that will not catch on anything. Bracelets and necklaces should not be worn while mounted.

Scarves should be short so they cannot hook on anything to choke a rider.

Avoid wearing shorts with chaps.

Text messaging and cell phone calls should be handled in a non-horse part of the barn.

Never let your temper affect your working with any horse.

## Tacking

When tacking up a horse it is recommended to follow the same procedures each time:

### SADDLING

1. If using a martingale, put it over the horse's head so the neck strap buckle is on the left side of the horse's neck.
2. Place a clean saddle pad high on the horse's withers.
3. Gently set the saddle on top of the saddle pad and pull the saddle pad well up into the gullet. Doing this helps stop pressure sores on the horse's withers. Slide the saddle back until it falls into the natural hollow of the horse's back. If the saddle needs to be moved forward, pick it up and move it. Dragging the saddle against the direction of the hair has the potential to irritate a horse and cause saddle sores.
4. Attach the tabs of the saddle pad. Make sure they are above the buckle or billet guards.
5. Attach the girth to the right side of the saddle, making sure the girth is even on the billets.
6. If using a martingale, attach the martingale to the girth.
7. Attach the girth on the left side, again making sure the buckles are even.
8. Pull the billet guard down to cover the girth buckles. Doing this stops the girth buckles from abrading the saddle flaps.
9. Make sure the girth does not cause skin wrinkles that could potentially cause a girth sore or gall. Tighten the girth enough to keep the saddle in place, but do not tighten it fully until you are ready to mount.

### BRIDLING

Before bridling your horse, make sure the buckles of the noseband, throatlatch and curb chain (if any) are unfastened.

1. Place the reins over the horse's head so it is restrained at all times. Unbuckle the halter behind the left ear or un-snap the throatlatch and remove the halter. Hang the halter over your arm and proceed to put the bridle on the horse.
2. Hold the bridle in your right hand either just above the bit, with your hand across the front of the horse's face or at the crownpiece.
3. Place the fingers of your left hand on the mouthpiece of the bit and insert your left thumb into the horse's mouth in the interdental space, or bars, and squeeze gently. When the horse opens its mouth, guide the bit in so it is on top of the horse's tongue.
4. Bring the crownpiece to the ears and gently push the ears forward one at a time through the crownpiece.
5. Make sure that all of the bridle parts are straight before buckling the throatlatch and noseband.
6. If using a standing martingale, attach the martingale to the noseband.
7. Tighten the noseband so two fingers held perpendicular to the horse's face can fit in between the horse's jaw and the noseband. Tighten the throatlatch so four fingers or a fist can fit between the horse's cheek and the throatlatch.

## Mounting

When arriving in the ring, check and tighten the girth very gradually. The girth should be checked both before you mount and again after your horse has warmed up for a few minutes.

A properly adjusted girth should be on the same holes of each billet. A girth that is too tight causes discomfort, pain or full blown panic for some horses. Horses that are “girthy” or cold backed may react to an overly tight girth by rearing, sitting down or flipping over. Be aware that a sensitive horse with an overly tight girth might buck when you mount.

To tighten your girth while mounted, keep both feet in the stirrups and put your left leg ahead of the saddle flap. Reach down with the left hand and pull upward on the billet leaving the buckle attached. Use the forefinger of the left hand to guide the tongue of the buckle into the next billet hole.

If using an unfamiliar saddle, estimate the length of the stirrup leathers before mounting. Place your fingers on the stirrup bar and stretch the stirrup to your armpit.

Stand in front of the horse and make sure the stirrups are even before mounting. (The number stamped on the stirrup leathers holes is not necessarily an indication that the stirrups are even because leather can stretch unevenly or the horse may have an unlevel back.) Once mounted, a capable rider should not remove the feet from the stirrups while adjusting the length. The rider should be able to adjust the stirrups at the halt and walk unassisted.

The three mounting methods are:

- From the ground
- From a mounting block
- With a leg up

When mounting from the ground:

1. Place the reins over the horse's head, making sure they are not twisted. Stand on the horse's left, or near side, facing the rear.
2. Hold the reins in your left hand, on the crest of the neck. If using a stick, hold it in the left hand as well. The bight, or excess rein, and the stick should be on the near side. Take up the slack from the reins so the horse stands still.
3. Place your left foot in the stirrup, with the toe toward, but not touching, the girth.
4. Grasp the cantle with your right hand and push up off the ground with your right leg. As your body rises, push up with your arms to support your body and move your right hand to the pommel.
5. Bend your right leg at the knee and swing it over the seat of the saddle and the horse's croup, making sure you do not stab your horse with the toe of your boot.
6. Place your right foot into the stirrup and sink down lightly into the saddle. Put one rein in each hand and move the bight of the reins to the right side, or off side, of the horse's neck.

Mount the horse the same way from the mounting block. Stand the horse straight and square so it does not bang a leg when moving away from the mounting block.

To take a leg up:

1. Place the reins over the horse's head. Stand on the horse's left side, facing the saddle.
2. Hold the stick and reins in the left hand, on the crest of the horse's neck. The bight of the reins should be on the near side. Take up the slack from the reins so horse stands still.
3. Raise your left foot off the ground and bend your left knee at 90 degrees. Have helper person place their left hand on your left knee and their right hand on your left ankle.
4. On an agreed count, the helper lifts upward while you push yourself up with your hands on the pommel and cantle. Move the right hand from the cantle to the pommel.
5. Bend the right leg at the knee and swing it over the seat of the saddle and the horse's croup.
6. Place your right foot in the stirrup and sink down lightly into the saddle. Put one rein in each hand and move the bight of the reins to the off side of the horse's neck.

## Dismounting

Dismounting is the last action of riding the horse and is equally as important as any other component of the riding session.

Your actions during the dismount may have a positive or negative effect on the horse. Improper dismounting, such as swinging your leg over the pommel in front of you to slide down, can startle or scare the horse, putting both of you in danger.

To dismount properly:

1. Come to a complete halt. Put the stick and the bight of the reins on the near side.
2. Hold the stick and reins in the left hand and place your hand on the crest of the horse's neck, while taking up the slack so the horse stands still. Place the right hand on the pommel of the saddle.

3. Remove the right foot from the stirrup. Lift the right leg over the hindquarters without touching the horse. Bring your legs together while standing balanced in the left stirrup.
4. Remove the left foot from the stirrup and slide off, landing on both feet with a soft bend in your knees. Push your body away from the saddle as you dismount to avoid catching any clothing or equipment on the stirrups.
5. Once on the ground, bring the reins forward over the horse's head and immediately run up both stirrups and loosen the girth. Upon dismounting, run up the stirrups so they do not catch on anything. If a horse bites at its side, it can catch its teeth on a stirrup left down. Such an action will cause danger for both horse and rider.

## Untacking

As with tacking up a horse, when untacking it is recommended to follow the same procedures each time.

To untack:

1. Unfasten the throatlatch, noseband and curb chain, if the horse is wearing one. Place the reins over the horse's head and neck as if preparing to ride and gently slip the bridle off over the ears. Take great care not to bang the bit into the horse's teeth. Place the halter on the horse's head and remove the reins back over the head.
2. Tie or cross tie the horse. Hang the bridle neatly on a hook.
3. Unbuckle the girth on the left side of the horse and let go of it gently so it does not bang the horse in the ankles. Separate the girth from the martingale.
4. Detach the girth from the right side and place it over top of the saddle. Use both hands to lift the saddle and pad off the horse's back.

When finished unsaddling the horse, hang the saddle on a rack. If no rack is available, place the saddle pommel down, with the cantle leaning against a solid object. To avoid damaging the pommel or cantle, place the girth under the pommel and between the cantle and the object supporting the saddle. If using a martingale, take it off the horse and hang it with the bridle.

## Position

A rider who exhibits correct position is:

- Secure, workmanlike and efficient
- Capable, calm and confident
- Able to move in harmony and unity with the horse

A rider's proper position relies on four key angles: heel, knee, hip and elbow.

The principal body parts involved in forming proper position are the lower leg, base of support (hips to knees), upper body, hands, arms and seat.

## LOWER LEG

The *lower leg*, from the knees down, is used to communicate with the horse.

The rider's weight is distributed on the stirrup through the three angles of the hip, knee and ankle. The lower leg's position is dependent on the correct placement of the foot in the stirrup. The stirrup should rest on the ball of the foot with the outside branch slightly ahead of the inside branch. The stirrup remains perpendicular to the horse's side.

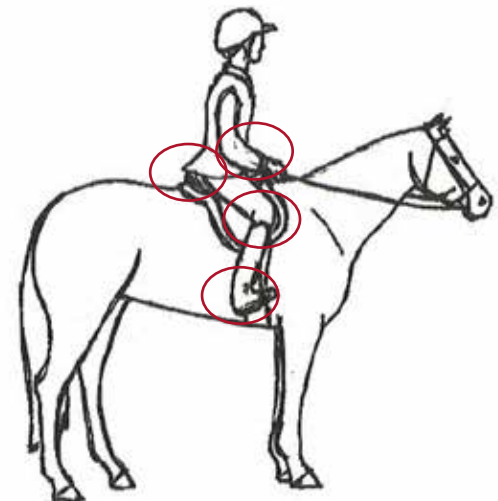
The length of the stirrup is essential to creating the rider's angles and weight distribution. The experienced rider has three lengths of stirrup:

**Normal:** The stirrup hits the rider's ankle bone when the feet are out of the irons with the leg relaxed. This length is used for ordinary riding and jumps up to four feet.

**Long:** One or two holes below the normal length. Used for advanced flatwork requiring more collection. This length creates a stronger leg but sacrifices spring and elasticity. If the stirrup is too long, the floor necessary for correctly distributing the rider's weight is lost.

**Short:** One or two holes above the normal length. Used for jumps over four feet and sometimes for flatwork. The shorter stirrup raises the iron's floor, distributing the weight to the heel. This increases the angles and, therefore, the spring in the ankle, knee and hip. Riding in short stirrups may sacrifice some security.

At the halt, the heels are down with the leg back under the rider. There is a straight line from the hip to the heel. The leg stretches both down toward the ground and curves around the horse making even contact with the horse's sides. The toe is slightly turned out. The knees and ankles act as shock absorbers.



Position faults include:

- Heels up
- Legs too far forward (chair seat)
- Legs too far behind the rider
- Pinching with the knee, heel or calf
- Turning the toes toward the horse
- Riding on the back of the calf
- Rolling the ankles over to the outside
- Extremely open or closed angles in the ankles and knees

## BASE OF SUPPORT

The base of support is from the hips to the knees and is used for the rider's security.

The leg is wrapped around the horse, securely balancing the rider in the middle of the saddle. The knee is relaxed, allowing the leg to stretch down.

The seat and position are independent of the rider's hands. The seat bones are in contact with the saddle. The rider's center of gravity drops down through the buttocks, weighting the angles of the hip, knee and ankle. The hips act as shock absorbers.

Position faults include:

- Pelvis tilted forward, throwing the rider onto their crotch, causing stiffness
- Pelvis tilted backward, which puts the rider on their buttocks with a round back and leg that sticks out ahead
- Gripping at the knee
- Loose thigh
- Raising the thigh and squeezing the saddle in an effort to stay on
- Unevenly distributed contact, with tension points pinching at the saddle
- Bringing the tailbone into contact with the saddle
- Sitting crookedly or off-center in the saddle
- Stiffness or tension in hips or knees

## UPPER BODY

The upper body, from the rider's head to their hips, is used to either follow or influence the horse's balance.

The position at the halt shows a slight arch in the back. Good posture includes the head up, shoulders back and chest lifted high.

A rider's head is heavy and controls balance. To help aim the horse, choose a target to steer for and look where you want to go, as opposed to looking down, which affects the horse's balance.

The rider sits slightly in front of the vertical, with softness and suppleness in the spine.

Position faults include:

- Collapsing in the small of the back
- Collapsing at the waist
- Slouching in the saddle
- Dropping a shoulder
- Looking down
- Riding too far forward or sitting too far back
- Roached or rounded back
- Stiffness or tension in the rider's body

## HANDS AND ARMS

To correctly hold single reins, pass the rein from the bit through the little finger and the ring finger, up across the rider's palms. The excess, or bight, comes out at the thumbs and hangs to one side of the horse's neck.

The hands are beside each other without touching. The thumbs are on top of the reins, with straight, supple wrists. The thumb on top of the rein helps the rider to keep the rein at one length. The hands move independently and have a soft feel of the horse's mouth.

A straight line runs from the rider's elbow through the arm and rein to the horse's bit. The elbows have a slight bend, are close to the torso and are carried slightly ahead of the body.

To shorten the reins, hold them correctly in both hands. Use the thumb and forefinger of the left hand to take the extra



portion of the right rein and pull the rein through the right hand to the desired location. Do the same thing with the right hand to shorten the left rein. Do not jump or crawl the hands up the reins.

Position faults include:

- Hands that are either too high or too low, creating a broken line to the horse's bit
- Straight, locked or rigid elbows
- Elbow "wings" flapping away from the body
- Using the hands for balance
- Open fingers on the reins
- Wrists bent in or out

## SEAT

When in motion, the rider's weight can influence the horse's balance at the walk, sitting trot and canter, or follow the horse's motion at the posting trot and hand gallop.

To influence the horse's balance, the rider sits just in front of the vertical, with the seat bones making contact with the saddle and an open hip angle.

To follow the horse's motion, the rider's upper body is angled about 30 degrees inside the vertical. The crotch makes saddle contact instead of the seat bones. The angles (except for the heels) are more closed.

The rider should strive to develop an independent seat that does not rely on the hands for balance. On the flat, sit on the vertical. When jumping, the angles are more closed.

The seats used in the American Forward Riding System are:

**Full:** The entire seat is in the saddle. This seat may be called three-point contact and refers to the seat and both legs being in contact with the horse. When riding in the full seat position, the rider is generally collecting for control. This seat allows the rider to shift the balance more toward the horse's rear, giving the rider more control and the horse less freedom. Practicing the full seat at different gaits, with and without irons, strengthens the seat.

**Half:** The seat bones are out of the saddle. This seat is also called jumping seat or jumping position. The rider makes contact with the horse at only two points: each leg. The half-seat is primarily used at the gallop and for jumping. In general, when riding in the half-seat position, the rider is encouraging an extension of the horse's action or motion. This position gives the horse more freedom and the rider less security. This is also the "up" phase of the rising trot. The half-seat can be used as an exercise called the two-point, which promotes better leg position, upper body control and improved security on the horse. Practicing the half-seat when schooling different movements strengthens the lower leg.

**Light:** The position between the half-seat and full-seat. The horse has less freedom and the rider has more security than in the half-seat. Practicing the light seat at different gaits, with and without irons, strengthens the thighs.

**Driving:** The rider deliberately rides behind the horse's motion to more effectively influence the horse's balance. The seat is used to drive a spooky or balky horse forward.

When jumping, a rider should ride with the motion. The horse's jump is the mechanism that closes a rider's angles.

It is occasionally necessary to ride behind the motion. Doing so strengthens the rider's driving or holding aids. A rider should not fling their body at a jump. It is never correct to ride ahead of the motion.

Position faults include:

**Leaning too far forward:** This pushes the rider's leg back and out of position.

**Jumping ahead:** Generally a fault of a rider that is behind the motion and throws their body forward to catch up.

**Ducking:** Dropping the head down below the crest while the horse is in the air.

**Dropping back in the air:** Weight shifts back at the top of the jumping arc. This fault occurs in riders with a poorly placed and insecure lower leg.

**Getting left behind:** Rider caught behind as the horse leaves the ground. This is an abusive habit.

**Overweighting one stirrup:** Uneven weight distribution.

**Perching:** The rider is above and ahead of the horse's motion. This fault leads to insecurity and a lack of control.

**Eyes down:** Looking at the jump or looking down at the horse. This fault interferes with the rider's balance and can inhibit the horse's ability to jump well.

**Bending at the waist:** Not supporting the upper body with the abdominal muscles. This fault causes the torso to collapse, making it difficult to keep the body in balance with the horse and keep the eye forward.

**Looking too early:** The rider's eyes and head turn before the horse has landed. This fault twists the rider's upper body and interferes with the horse's balance and performance.

## The Aids

Aids are the signals that riders use to communicate with a horse. For instance, the rider uses aids to ask the horse to make a transition between gaits.

The aids can be divided into natural and artificial and can generally be classified as either driving or restraining. They may be used laterally or diagonally.

Aids must be coordinated. When applying one aid, another must be relaxed for the horse to respond. For instance, a novice rider may relax both hands and add both legs to ask a horse to move forward.

When applying the aids, remember to use them in the following order of severity:

**Ask:** Give a clear cue, but use the most minimal form of the natural aid for the requested transition.

**Allow:** Give the horse time to respond.

**Tell:** Use a more emphatic version of the initial natural aid if the desired response is not forthcoming.

**Demand:** Follow the natural aid with an artificial aid, if needed, for an upward transition, or a heavier hand for a downward transition.

For instance, when making a transition from walk to trot, use the aids in the following order:

Close both legs lightly at the girth. (**Ask**)

Wait for the horse to respond. (**Allow**)

Close both legs harder at the girth if the horse does not begin trotting. (**Tell**)

Use a sharp aid such as a spur or a stick behind the leg. (**Demand**)

## NATURAL AIDS

### Legs

Used when the horse is being asked to move forward, to put the horse in front of the rider's leg, to correct backwards mistakes of the horse, to give support and provide direction on lateral maneuvers, and to soften the horse's mouth.

Leg aids can be used in the following manner:

**Urging:** Applied at the girth to encourage impulsion. Both legs may be applied simultaneously, urging the horse into an upward transition or to lengthen a gait.

**Holding:** Applied at the girth to keep a horse from falling in. May also be used to move a horse laterally. Applied with one leg at a time, generally on the inside of a turn. Helps keep a horse on a straight track and maintain a straight line.

**Displacing:** Applied slightly behind the girth. Used to move or displace the horse's haunch on turns and lateral maneuvers. May also be employed to hold the haunch in line, or prevent the haunches from falling out.

### Weight

Either follows the horse's motion or influences the horse's balance.

### Hands

Manage or control forward movement of the horse, provide directional guidance, and position the head and neck.

Use the reins in a gentle give and take, or as if squeezing water out of a sponge instead of yanking. Rein aids can be used in the following manner:

**Direct rein:** The most basic use of hands on the reins. The rider's hands move forward or backward but do not move laterally. For instance, to apply a left direct rein, the rider moves the left hand straight back toward their left hip. The line from the rider's elbow to the bit is straight at all times.

**Opening or leading rein:** Gives direction without taking away from the forward movement of the horse. The rider's hand opens away from the horse's body and leads the horse in the desired direction. This rein aid is used one hand at a time.

**Bearing or neck rein:** Both hands move in the direction of the desired turn. The outside hand crosses over the horse's withers and the outside rein presses against the horse's neck, which pushes the horse to turn away from the rein. This is effective for advanced control of the horse's shoulder especially on tight, timed turns.

**Pulley rein:** Firmly fixing the inside hand on the horse's withers or neck and strongly pulling up and back with the outside hand. It is a tool for correcting runaways or for an emergency stop.

**Lifting rein:** Used to correct horses that bear down heavily on the bit or overflex at the poll in avoidance. Both hands are raised higher than normal and the rider uses a series of bumps or nips that cease as soon as the horse corrects the behavior.

**Indirect rein:** Controls lateral movements including bending and turning. The rider's hand does not cross the mane line. There are two types of indirect rein aids:

**Indirect rein in front of the withers:** Displaces the horse's weight from one shoulder to the other. In a right indirect rein in front of the withers, the rider's right hand moves toward the rider's left hip.

**Indirect rein behind the withers:** Displaces the horse's weight from one shoulder to the opposite hind leg. In a right indirect rein behind the withers, the rider's right hand moves toward the horse's left hip .

### Voice

Should be low and gentle.

## ARTIFICIAL AIDS

### Stick

Also known as the bat, crop or whip.

A stick should only be used behind the leg.

When using a stick, make sure to hold both reins in the hand without the stick. This is called bridging the reins. To bridge the reins, place both reins in one hand, and hold them with one rein on top of the other. A rider should be able to carry and use the stick with either hand. (A dressage whip may be used without the rider taking their hands off the reins.)

### Spur

Used to reinforce the leg. The length of the shank depends on the need and skill of the rider. Only riders with a solid leg position should use spurs to avoid conflicting signals to the horse.

## THE GAITS

### Walk

A four-beat gait that has no moment of suspension.

The sequence of footfalls of the walk is: Left hind leg; left foreleg; right hind leg; right foreleg. The horse's head and neck move in an oscillating motion.

The speed of the walk:

**3 mph:** Shortened

**4 mph:** Ordinary

**5 to 6 mph:** Lengthened

### Trot

A two-beat gait with a moment of suspension.

The legs move in diagonal pairs. The sequence of footfalls is: Left hind leg and right foreleg as a pair; right hind leg and left foreleg as a pair.

The trot can be ridden by posting, which is also known as rising, or sitting. When posting to the trot, the rider is in the up phase of the rise when the horse's outside foreleg is forward. The horse's head and neck remain still.

The speed of the trot:

**5 to 6 mph:** Shortened

**8 mph:** Ordinary

**10 mph:** Lengthened

### Canter

A three-beat gait with a moment of suspension. The horse is on the correct lead when the inside foreleg is leading.

The sequence of footfalls at the right lead canter is: Left hind leg; right hind leg and left foreleg as a pair; right foreleg. The horse's head and neck move in an oscillating motion.

Faults in the canter include the four-beat canter and the cross canter, when the horse is on one lead with the front legs and the other lead with the hind legs. The speed of the canter:

**6 mph:** Shortened

**10 to 12 mph:** Ordinary

**14 mph:** Lengthened

### Gallop

A four-beat gait with a moment of suspension. The sequence of footfalls at the right lead gallop is: Left hind leg; right hind leg; left foreleg; right foreleg. The horse's head and neck move in a pronounced oscillating motion. The speed of the gallop is 14 to 18 mph.

## Contact

Contact is the feeling of the horse's impulse to move forward to the rein. The rider closes the leg, which urges the horse forward until the horse's forward motion meets the rider's hands. The rider does not pull back. The rein impedes the horse's forward

motion, creating the feeling of contact. Light contact is a steady feel of the horse's mouth. The reins are not loose or sagging and there is a straight line from the rider's hand to the mouth.

## Half-Halt

A half-halt is a signal made by the coordinated action of the rider's seat, legs and hands.

Half-halts are used to increase the horse's attention, decrease speed, renew impulse, and regulate rhythm and balance.

To apply a half-halt, the rider sits in the full seat and closes the legs to engage the horse's hindquarters. The hands and arms resist the mouth and then relax. As soon as the horse responds, the aids immediately release. The coordinated actions of driving forward, retarding the motion and then resuming the forward motion produce a half-halt. The half-halt never intends to bring the horse to a full halt.

## Flatwork

Once mounted, make sure to take adequate time to warm up the horse.

A horse benefits from a slow and consistent warm up. The heart rate accelerates rapidly in the first two to three minutes of exertion. Several minutes of brisk walking or slow trotting gets the circulatory system ready to meet the oxygen needs of the muscles. Ten minutes of walking enhances the blood delivery to the muscles. In addition, walking improves condition by slowly activating ligaments, tendons and muscles to take on a small increase in load.

Proper warm up minimizes the risk of musculoskeletal injuries and also prepares the horse and rider for focused work.

The purpose of flatwork is to make a horse rideable, forward, straight, supple and light. Flatwork is used to get the horse to move forward from the rider's legs at a desired gait and speed, back from the rider's hands with softness, and left and right with ease.

Flatwork teaches the rider the basics: position, balance, control of the horse, security in the saddle, confidence, and independent seat, hands and legs.

As riders and horses advance through their schooling work, the concepts of impulsion, flexion, self-carriage and collection are introduced:

**Impulsion:** Educated reserve energy or impulse, which is created by the rider's leg. The horse is energetic and alert but remains calm and cooperative with the rider. Natural impulsion is generally uneducated energy. Impulsion is taught in stages, which should include:

- Stabilization of gaits on passive contact.

- Consistent, soft or light contact with precise transitions and consistent reserve energy.

- Active contact with increased impulse.

**Flexion:** Softening and relaxing of the jaw and poll, which allows for softer, more precise control. The muscles of the lower jaw must be relaxed so that, in response to rein tension of stronger than normal contact, there is a softening or flexion of the jaw.

Direct flexion is a retraction of the lower jaw in the vertical plane and is used when slowing down, halting, in semi-collected and collected gaits, and sometimes in backing. Flexion at the jaw should be taught before flexion at the poll.

Lateral flexion is a retraction of the lower jaw combined with a soft turn of the head in the direction of travel. Lateral flexion teaches the horse to bend the neck slightly and yield promptly while turning and changing direction.

**Self-carriage:** As the horse becomes better balanced and more connected, the head and neck are raised and are carried a little higher as the horse develops more strength. Flexion, collection and shortening movements are used to be able to ride a horse in a connected forward balance to achieve the ultimate goal of self-carriage. Working on progressive transitions from slow to fast is one of the basic tenets of the American Forward Riding System.

**Collection:** The hindquarters are under the horse and the forehead is much freer than when in a connected forward balance. A collected horse can be extremely skillful turning, lateral movements and transitions at slow gaits. However, jumping requires a connected forward balance and thus, collection is used primarily for schooling gymnastics and flatwork. Collection requires both impulsion and flexion.

Flatwork can be either:

**Longitudinal:** Focuses on extending and shortening the length of the horse's stride and upward and downward transitions.

**Lateral:** Focuses on bending, turning and moving to the side off the rider's hands or legs.

Examples of lateral movements include:

**Leg Yielding:** The horse travels both forward and sideways, crossing its legs. The eye is slightly away from the direction of travel and the horse moves on four tracks. Ideally, the shoulder leads the hindquarters. The purpose of leg yielding is to improve lateral agility and responsiveness to the lateral aids, to help teach straightness and to accept contact. This movement uses lateral aids and is performed at the walk, trot and sometimes the canter.

**Turn on the forehand:** The hind legs move around the nearly stationary forehand on a circular track in a pivoting motion. This motion teaches a horse to move away from an active displacing leg and may be performed from the halt or walk. It can be performed with lateral aids (more basic) or diagonal aids (more advanced).

**Shoulder-in:** The head and neck are softly bent to the inside, with the horse looking away the direction of travel. The shoulder is brought to the inside track at a 30 degree angle. The horse is bent around the rider's inside leg and the haunches remain on the track.

The horse moves on three tracks. When viewed from the front, the horse's tracks are: Outside hind leg; inside hind and outside front leg; inside front leg.

The rider should use the outside rein to control the degree of bend in the neck.

The most common fault in the shoulder-in is falling out through the outside shoulder and bending the neck only, which is caused by rider error. The shoulder-in uses lateral aids and is performed at the walk, trot and rarely at the canter.

**Shoulder-fore:** Similar to shoulder-in but with less angle. The head and neck are softly positioned to the inside and the shoulder is displaced to the inside about 15 degrees. The horse moves on four tracks. This movement uses lateral aids and is performed at the walk, trot and sometimes the canter.

**Haunches-in or travers:** The head and neck are slightly positioned to the inside while the haunch is displaced 30 degrees to the inside. The horse is bent around the rider's inside leg and looks in toward the direction of travel. The outside hind leg steps over and in front of the inside leg.

The horse moves on three tracks. When viewed from the front, the horse's tracks are: The inside hind leg; the outside hind leg with the inside foreleg; the outside foreleg.

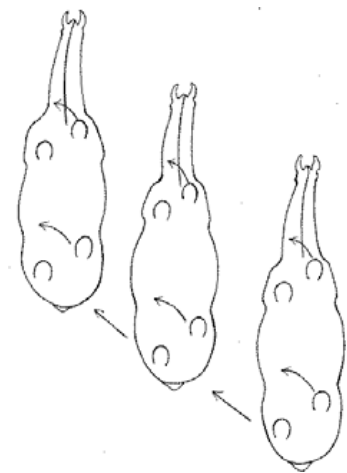
The haunches-in is performed with diagonal aids and this movement can be ridden at the walk, trot and canter.

**Haunches-out or renvers:** This is considered a counter movement and is, in essence, the opposite of haunches-in. When performing a counter movement, the inside leg, in a theoretical sense, is actually the outside leg. With the horse slightly off the track and the head and neck slightly positioned to the perimeter of the ring, the haunch is displaced 30 degrees toward the perimeter of the ring.

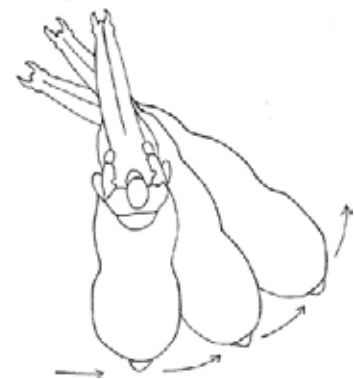
The horse moves on three tracks. When viewed from the front the horse's tracks are: The outside foreleg; the outside hind leg with the inside foreleg; the inside hind leg.

The haunches-out is performed with diagonal aids and this movement can be ridden at the walk, trot and canter.

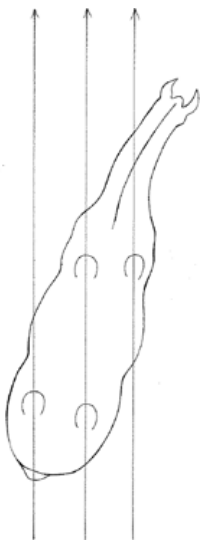
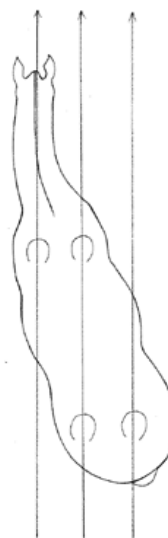
**Turn on the haunches:** The forehand of the horse turns around the inside hind leg, with the horse is bent in the direction of the movement.



Leg Yielding



Turn on the forehand away from the left leg

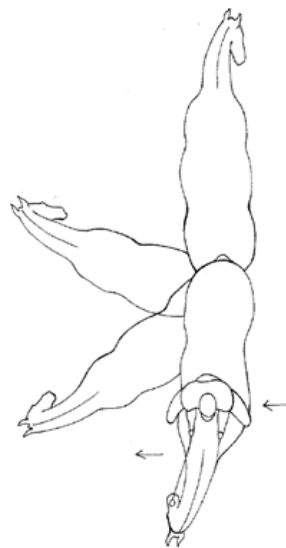
Shoulder-in,  
tracking rightwalk, trot and  
sometimes the canterHaunches-in,  
tracking rightHaunches out,  
tracking right



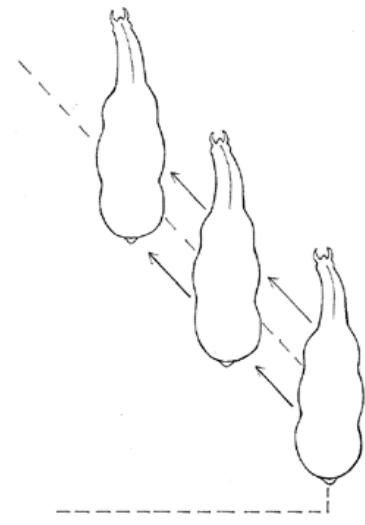
The turn on the haunches is performed with diagonal aids. It increases the engagement and carrying power of the hind leg. This is a forward movement and can be performed at the walk, trot and canter.

**Half-pass:** The horse is bent in the direction of travel, moving forward and sideways at the same time, with the front and back feet making two sets of tracks. The half-pass is performed with diagonal aids. This movement can be ridden at the walk, trot and canter.

**Counter canter:** Sometimes known as false canter. The horse canters on the incorrect lead for the direction of travel. Deliberately riding the counter canter is used to increase suppleness, teach straightness and is a precursor to teaching the flying change. The counter canter is performed with diagonal aids.



Turn on the haunches away from the left leg



Half-pass

## Jumping

Basic jumping terms include:

**Bascule:** The natural arc the horse's body makes as it jumps.

**Ground line:** A pole at the base of the obstacle that helps a horse to judge distance and the height of a jump. It is incorrect to jump an obstacle with the ground line on the landing side only.

**Trotting poles:** A line of poles or cavalletti that are set 4'0" to 4'9" apart for the horse to trot through. When placing a jump after the last trotting pole, the distance to the jump should be double that of the distance between the poles.

**Cavalletti:** A pole that is horizontally elevated by supports that can be changed to several different heights. Cavalletti are used for gymnastic exercises. The general striding for cavalletti are:

**Walk:** 2'8" to 3'3"

**Trot:** 4'0" to 4'9"

**Canter:** 9'0" to 12'0"

**Vertical:** An obstacle on a vertical plane that has height but no spread. Clearing it requires a short, high jump with balance and accuracy. A horse tends to have a steep arc over a vertical.

**Oxer:** A spread made with two sets of standards. The horse's arc is longer and less steep than that for a vertical. Spreads help horses to develop scope by jumping wide as well as high. Oxers may be ramped (with the back pole higher than the front) or square (all poles of even height).

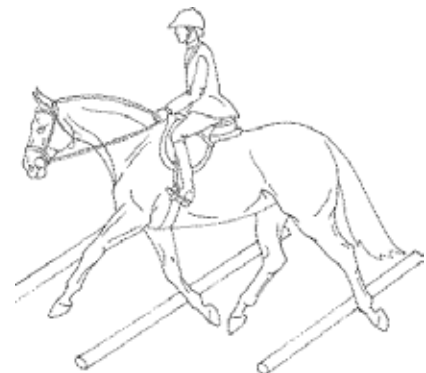
**Triple bar:** A spread obstacle made of three sets of standards. The front rail is low, the middle rail is higher and the back rail is the highest.

**Swedish oxer:** A spread obstacle where the front and back elements are angled in two different directions so the center of the obstacle is the lowest.

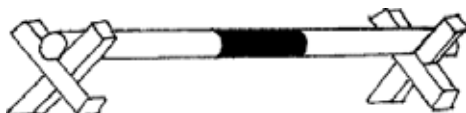
**Hogs back:** A spread obstacle made with three sets of standards where the front and back rails are lower than the middle rail.

**Fan:** A spread jump made with one standard on one side and multiple standards on the other.

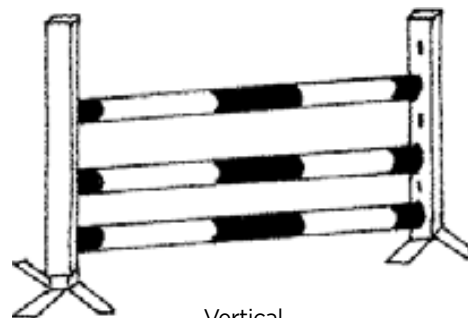
**Bending line:** A curved path between two obstacles. This is also called a *broken line*.



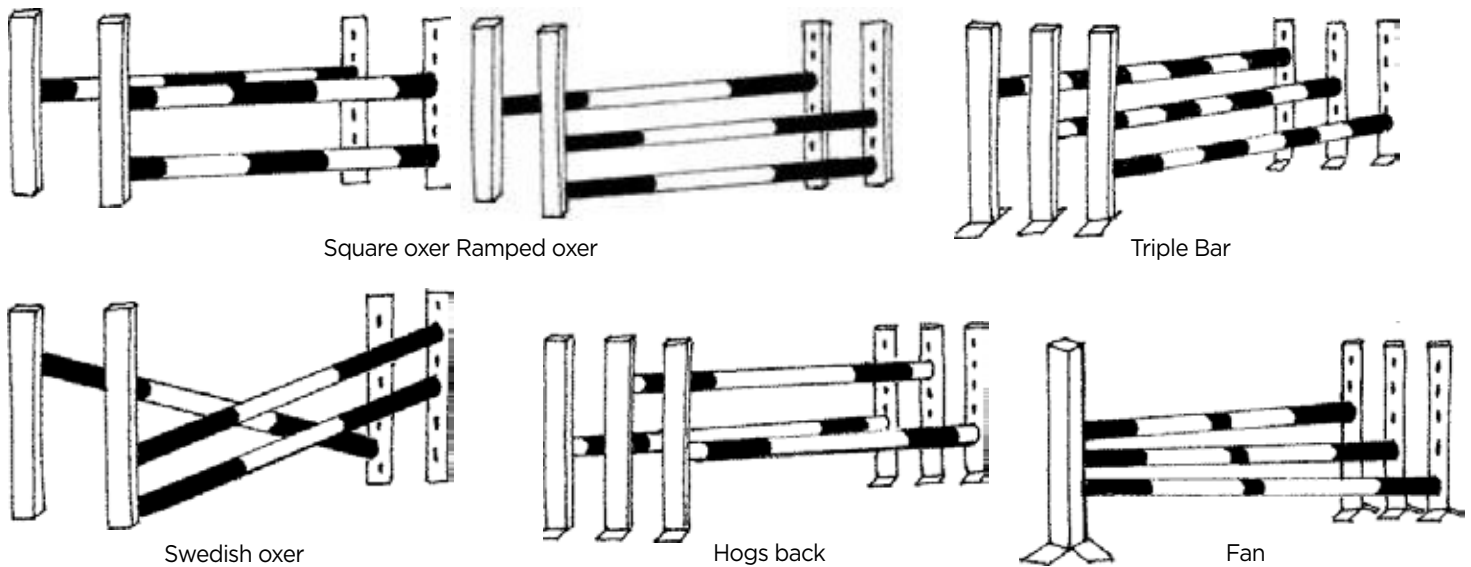
Cavalletti



Trot: 4'0" to 4'9" o Canter: 9'0" to 12'0"



Vertical



## STRIDES

The average horse's stride is 12 feet. When calculating jumping strides, allow 6 feet for takeoff and 6 feet for landing.

Small pony distances are usually based on a 9 to 10 foot stride, medium ponies are based on a 10 to 11 foot stride, and large ponies are based on an 11 to 11'6" stride.

Distances should be adjusted for poor footing, type of fence, size of jump, size of arena and slope. In general, when walking a course, take four steps for each 12 foot stride.

## JUMPING BASICS

The stages of the jump are:

**Approach:** Maintain a consistent and even pace. The approach ends when the horse "forks" and the mechanics of the gait are interrupted. In the fork, the horse's hind end comes up in the air, the head and neck drop lower and all of the horse's weight is borne on the front legs.

**Takeoff:** Begins with the "fork." The hind legs then push against the ground, providing the thrust that propels the horse's body through the air over the obstacle. The horse's legs should fold evenly at the top of the arc. The head and neck stretch forward over the obstacle. The takeoff ends when the horse's hind legs leave the ground.

**Flight:** Occurs when the horse is airborne. During this phase, the horse continues to reach forward with the head and neck. The front legs bend at the knees, with the forearms at or above the horizontal over the fence. The front legs begin to unfold for landing as the horse's shoulders drop lower than the hindquarters. The hind legs fold the tightest as they clear the highest point of the jump.

**Landing:** One front foot lands first, followed by the other front foot. The hind legs land one at a time and impel the horse forward.

**Departure:** The horse resumes the gait.

The five key factors of riding a course of fences are:

- Speed
- Distance
- Track
- Impulsion
- Control

Different types of jumps have different impacts on the way a horse jumps, lands or deals with the next obstacle. Examples:

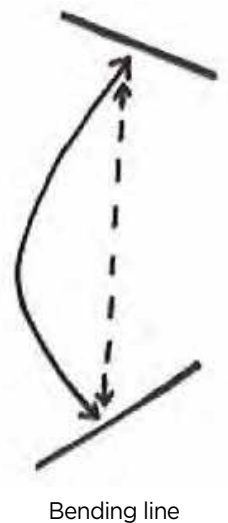
A fence following an exceptionally blocky, high or solid fence may ride at a longer distance than it walks.

Oxer to vertical combinations require excellent balance control and the ability to re- balance quickly and curl around the jump.

Oxer to oxer combinations require scope, balance and accuracy.

Vertical to vertical combinations require balance, engagement and accuracy.

Vertical to oxer combinations require the ability to land in balance but going forward with a driving stride. A wider oxer or an oxer with height and spread makes this more difficult.



## RELEASES

The release refers to how a rider's hands and arms allow the horse to stretch its head and neck over the jump. Releases include:

**Mane:** The rider holds the mane halfway up the crest. The reins remain loose throughout the jump.

**Long or crest:** The rider's hands slide one-third to one-half way up the horse's crest and rest one on each side of it.

**Short:** The rider's hands rest on either side of the base of the crest. The rider is afforded a greater degree of control while restricting the horse's independence and freedom.

**Automatic release, jumping out of hand or following arm:** The rider's hands maintain a soft, passive contact and follow the horse's mouth through the air, maintaining a direct line from bit to elbow.

Release faults include:

**Broken line:** The hands are below the level of the mouth, forming a broken line from the elbow to the bit. This puts pressures on the bars and interferes with the horse's forward movement.

**Hands above the neck:** This compromises a rider's balance in the air.

**Fixed hands or no release:** Hands that are fixed cause a rider to hit the horse in the mouth.

**Over release:** Hands that are thrown up the neck almost to the ears in an exaggerated manner. This is unattractive and quick hands create a quick horse.

**Backward release:** Hands that rotate backwards on takeoff.

**Nipping:** Rider attempts to lift horse off ground, causing an inverted jump.

**Exaggerated opening rein:** An exaggerated opening rein with little or no contact is unattractive, counter-effective and may spook the horse.

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# STABLE MANAGEMENT

## Arena

For the hunter/jumper segment of the horse industry, footing should be no deeper than two to two and a half inches.

Characteristics of poor footing include:

**Too hard:** Causes added jarring and concussive forces to the horse's hooves. Hard footing contributes to varying types of lameness, stiffness and muscle strain. It can also aggravate arthritic conditions.

**Soft or deep:** When the horse sinks into the footing, it must make an extra effort with each stride. Deep footing causes a suction or grabbing effect that invites muscle strain and fatigue and puts tendons at risk.

**Slippery:** With no traction, the horse has difficulty controlling direction, impulsion and deceleration. Significant shortening of the stride may occur.

**Dusty:** Dust is a constant problem to the horse's respiratory systems and the rider's eyes.

There are many considerations when building a new ring, including:

- Type of base
- Dust control
- Drainage
- Amount of shock
- Traction
- Packing
- Density of footing
- Depth of footing

The ring should have a good base. Consult a local footing expert and hire a reputable excavator to help with your installation. Remember that different disciplines require different footing and, therefore, one size does not fit all.

The arena or ring should be located in a quiet spot on the facility, with a fence surrounding it. Nail boards on the inside of the posts to minimize the chance to catch a toe or leg when riding by.

The ring should have a gate and, for safety, the gate should be shut when a rider is in the ring. It does not have to be fancy. A proper size ring with good footing is far better than one that looks beautiful but is not well thought out.

The ring should be no smaller than 80 feet by 180 feet. This controls the amount of strain on the horse's soft tissues. A smaller ring makes the horse turn more often and puts unnecessary strain on the horse's legs.

## Facilities

Horses do not require an elaborate facility. The most important quality of a facility is safety. This includes:

- Safe structures, grounds, horses and instruction
- Clean, neat, uncluttered, well-tended structures and grounds
- Professional, workmanlike personnel
- USHJA Certified Trainers
- Safe riding areas that are suited to the instruction
- Necessary equipment such as cavalletti, ground poles and jump standards
- Maintenance of good footing
- Well-lighted, well-ventilated, dry and pleasant smelling stables and stalls that are the correct size for the horse
- Sturdy, well-constructed fencing, including perimeter fencing around the grounds
- Adequate turnout
- A source of clean, free-choice water
- Feed and/or hay
- Adequate bedding

## Stable Routine

The day-to-day operation of a barn depends on an efficient and organized working staff that carries out a plan designed to give priority to the horse's welfare (e.g., exercise, feeding, grooming and detailed routine) for which it totally relies on humans.

Most barns have a barn manager. The manager should be experienced, calm and organized. A reputable barn manager is flexible, level headed and willing to take unexpected changes in stride. Some large facilities have a barn manager, facilities manager and a road manager, while smaller barns may be a one-person operation.

Except in one-person operations, the barn manager is responsible for supervising and directing the grooms, who are in charge of the actual care of a horse. A barn manager should train grooms to understand their responsibilities. A good groom has an even temper, a confident manner with horses, and takes pride in the horses and their surroundings.

Observant horse experts know that horses will communicate if they are being mistreated in any way.

Each barn develops its own stable routine to fit its situation. A routine helps the work to get done efficiently and economically. The general appearance of the barn reflects the hygiene and, subsequently, the general welfare of the horses.

## Sample routine:

1. Hay horses
2. Grain horses
3. Look at all horses for general signs of health; remove any bandages
4. First turnout
5. Start stall cleaning, dumping water buckets as the stalls are cleaned
6. Water horses
7. Prepare lunch feed and fill hay nets as necessary
8. Bring in first turnout; pick feet and change blankets as necessary
9. Second turnout (if necessary)
10. Sweep aisles
11. Bring in second turnout; pick feet and change blankets as necessary
12. Pick out stalls; feed lunch hay and grain as necessary
13. Employees go to lunch
14. Afternoon chores as necessary
15. Prepare afternoon feed and fill hay nets as necessary
16. Pick out stalls, feed afternoon hay and grain, top off water buckets
17. Prepare morning feed
18. Night check

## Daily jobs:

- Manure pile maintenance
- Sweep, rake and weed
- Facility maintenance
- Wrap legs and first aid
- Water to outside paddocks
- Rake riding arenas
- Horse laundry
- Fill out stable diary

## Weekly jobs:

- Scrub water buckets
- Scrub feed tubs and feed buckets
- Scrub field water troughs
- Check stalls for repairs and missing hardware (screw eyes, double end snaps, salt block holders)
- Check fences and paddocks
- Clean tack and feed rooms
- Wash brushes
- Order feed and bedding
- Update farrier and vet list



- Trim muzzles and legs
- Pull manes if necessary
- Set jumping course(s)

#### **Routine seasonal jobs (horses):**

- Dental care
- De-worming
- Vaccinations
- Coggins tests
- Unload hay and shavings trucks
- Clean and repair blankets

#### **Routine seasonal jobs (facility):**

- Fencing maintenance (boards, nails, holes in fencing)
- Pasture maintenance (mowing, drainage, holes, divots, nutrients)
- Barn maintenance (stalls, gutters, roof, plumbing, painting)
- Rodent control
- Fire extinguisher check
- Leaf clean up
- Landscaping
- Septic system maintenance
- Manure removal
- Drainage
- Water systems and wells
- Storm clean up
- Driveway maintenance
- Jump painting and repair

#### **Routine jobs (vehicles):**

- Maintenance of trucks, trailers, tractors, drags, etc.
- Fueling
- Administrative paperwork (registration and insurance)

#### **Precautionary jobs:**

- Fire plan
- Emergency preparedness (storms and other natural disasters)

## **Bedding**

When choosing a bedding type for your horse, the following factors should be taken into account:

- Cost
- Disposal
- Drainage and absorbency

The cost of bedding can vary not only from type to type but also by supplier. Make phone calls until you find a reliable, consistent source of the type of bedding you prefer.

Bedding is put in stalls to provide a soft and comfortable bed, minimize slipping, control odor, provide warmth and prevent pressure sores. Regardless of the type, it is usually banked up around the sides of the stall to minimize drafts and to help prevent the horse from becoming cast.

Bedding comes in two types: **absorbent and drainage**.

Absorbent bedding soaks up urine and minimizes odor to a certain extent. Examples of absorbent bedding are:

**Shavings:** Pine shavings are preferred. Avoid shavings from treated lumber. Horses should never be stabled on black walnut shavings (*Juglans nigra*) because laminitis develops within 10 to 24 hours<sup>130</sup>.

**Sawdust:** Care must be taken that there are no foreign objects in each load if the sawdust is received from a mill.

**ABM:** Pelletized bedding that expands as it becomes wet.

Shredded paper

**Peat moss:** Seldom used in the United States, but excellent for horses with respiratory complaints.

Straw is an example of drainage bedding. It requires some sort of drainage so urine does not pool in the stall. French drains or drains that tie into the septic system both work well.

Wheat straw is considered the best type of straw because it is the most durable and most horses do not like to eat it. Barley straw sometimes contains awns that irritate the horse's mouth. Oat straw should be avoided for two reasons. Being the softest straw, it can tangle around a horse's legs, making it difficult to muck out. It is also very sweet, enticing horses to eat it.

Straw has an extra advantage in that after use, it can be sold to mushroom farmers and therefore has no disposal cost. It also has natural oils that do not present the over-drying effect that kiln-dried shavings do.

## Manure Management

Manure management has become a very important topic. State environmental departments are beginning to scrutinize how barns dispose of their manure. The spreading of unprocessed manure is regulated in some parts of the country. New and constantly changing environmental laws pertain to manure piles and their runoff. Be sure to understand and follow the environmental laws that are in place in your area.

When thinking about manure, it is important to note that the average 1,000-pound horse produces eight to nine tones of manure (feces and urine) per year.

Gaining some basic knowledge about horses and how they digest and metabolize food and produce manure can help to more effectively control potential pollution. A horse digests about 60 percent of most feedstuffs. Feed that is 60 percent digestible indicates that if a horse is fed 25 pounds of dry feed, 15 pounds is digested and 10 pounds is excreted as manure.

A feed's digestibility depends on the following factors:

- Horse's size, age and work level (sport, pleasure, breeding, pregnancy, lactation or retirement)

- Amount of fiber. Feeds that are higher in fiber such as hays and grasses have a lower digestibility. Conversely, concentrate feeds that contain grains such as corn, oats, and/or barley usually have a higher efficiency of digestion and produce less manure

All nutrients that are digested are metabolized in the horse's body. Some of these, especially nitrogen in proteins, are excreted in the urine. After being digested and metabolized in the body, waste nitrogen is converted to urea in the liver and excreted in the urine. Additional undigested nitrogen is excreted in the feces. Overfeeding protein increases the excretion of nitrogen.

Nitrogen is a major component of protein. Horses need protein for maintenance, growth, reproduction, lactation and work. Phosphorus is a macromineral needed for maintenance, growth and other physiologic functions. Water is also essential for bodily functions. Water is lost from the body primarily in the excretion of feces and urine, sweat, evaporation from the lungs and skin, and in the case of lactation, from milk. It also affects the consistency of manure.

Overfeeding phosphorus increases the excretion of phosphorus, most of which is excreted in the feces. Horses should be fed a diet that is digestible and formulated to meet nutritional requirements, while avoiding excesses. Overfeeding can result in higher levels of nitrogen and phosphorus in the manure. Horse farmers should feed horses according to their nutritional needs.

Manure management begins with the transfer of manure and bedding from the horse's stall to the manure pile. This can be accomplished by wheelbarrow, manure spreader, tractor and cart, conveyor belt or other mechanical device. Considerations must include the ease and efficiency of the person cleaning the stalls and the amount of dust produced by the cleaning and transportation method. Some options:

### WHEELBARROW

Transporting manure by wheelbarrow is the most common and labor intensive method. Wheelbarrows come in both one- and two-wheel versions and in different capacities.

The choice of wheelbarrow depends on the strength of the handler. Check wheelbarrows for the tightness of their bolts and tire inflation on a regular basis. It is much more economical to maintain a wheelbarrow than to buy a new one.

### MANURE SPREADER

If using a manure spreader or tractor-pulled cart, make sure the barn aisle is wide enough for a vehicle. The vehicle is pulled down the aisle and manure is thrown from the stall to the spreader or cart.

This method requires less walking but often produces more dust and mess. Most pulling vehicles also produce exhaust, which may bother horses or their handlers.

### MANURE CONVEYER

Some barns are equipped with a manure conveyer belt, often made of metal and located underground in front of each stall. The belt is covered by heavy wooden planks that are removed for the stall cleaning process. It leads to an upward sloping ramp that deposits manure into a truck or tractor-pulled cart or dump truck.

Some disadvantages of a conveyor belt are the expense of its installation, noise, its use as a tunnel for vermin, and its downtime for any repairs. The conveyor belt was originally built for cow manure, which is more liquid and contains less bedding material.

## Manure Disposal

Disposal of used and soiled bedding can be both expensive and inconvenient. There are several methods for dealing with manure: spreading, dumpsters, composting and distribution to mushroom farmers. You should consider the expense of the manure disposal method when choosing the best one for your facility.

Typical manure disposal methods include:

### SPREADING

Spreading manure is still acceptable in some parts of the country.

To spread, manure is transported by wheelbarrow and up a ramp to the spreader, if the spreader is not driven through the barn. For the safety of the stall cleaner, the ramp should be sturdy and made from a non-slip material. Many barns have a ramp made out of packed dirt.

Clean under and around the spreader on a regular basis so manure spillover does not accumulate.

The spreader works similar to a manure conveyor. Metal bars across the bottom of the machine push manure toward blades that throw the manure as the spreader moves forward. Spreaders can be either ground driven or PTO (power take off) driven. Some farms spread manure mixed with shavings or sawdust outside during the winter as an inexpensive all-weather track.

Spreading manure has several potential problems:

The risk of infecting pastures with internal parasites.

Imbalance of nutrients. Manure should be spread equal to or less than the amount that plants can utilize in a year. When stockpiled manure is spread on crop fields, additional nutrients may be needed, due to the fact that the application of manure may not meet the total needs of the crop. Each source of horse manure varies, especially when different bedding sources are used. Typically, a ton of horse manure contains 11 pounds of nitrogen, two pounds of phosphorous, and eight pounds of potassium.

When not managed properly, horse manure can pollute the environment, primarily as ground- or surface-water pollution, due to the concentration of nutrients like nitrogen, phosphorus and carbon (organic matter). These nutrients can reach waterways as surface runoff or leachate from the manure pile.

Nitrogen excreted from horses is usually present as urea in urine, which is quickly converted to ammonia. Ammonia from horse manure can cause excessive algae growth and nutrient enrichment in a lake or slow-moving stream. This can result in waters rich in mineral and organic nutrients that promote a proliferation of plant life, especially algae, which reduces the dissolved oxygen content and often causes the extinction of other organisms. In the case of nitrogen, the excessive algae and conversion of ammonia to nitrate causes a reduction in dissolved oxygen in the water, which can contribute to fish kills through oxygen depletion.

Nitrogen present in organic matter in the feces is converted in the soil to ammonia and then nitrate, which can be taken up by plants. If plants do not take up nitrate, it easily moves through the soil and can eventually leach into the groundwater where it can become a human health concern.

To mitigate these problems, spread manure only when crops need the nutrients and avoid spreading on frozen ground, because of the elevated risk of runoff.

### MANURE DUMPSTER

The next method is renting a manure dumpster. Many local farmers have made the service of composting manure available at a lower cost than renting from a sanitation company.

The farmer composts the manure after removing it from a horse farm/facility. Manure that is intermingled with trash goes to a landfill.

The farmer's dumpster is often better for the environment because the manure is re-purposed as compost. Dumpsters come in all sizes, depending on the space allocated and the number of horses served. The dumpster must be located in an area that is accessible both for the stall cleaner and for the truck that picks it up. A ramp can be built so the manure is dumped from above. If this is not feasible, the manure can be pushed back either by tractor or by hand.

To save money, the dumpster should be packed as full as possible before pickup.

If a dumpster is not used, a manure pit or pile may be necessary to stockpile manure before the next pickup.

### DISTRIBUTION TO MUSHROOM FARMERS

Mushroom farmers benefit from barns that use straw bedding. Some may pay a small amount for the discarded manure. Since mushroom farmers do not accept manure with any string, trash or shavings, the barn manager must carefully police the manure pile to ensure that only manure and straw are present.

Mushroom farmers prefer a manure pit to a manure pile because it is easier to pick up manure that is contained in an enclosed location. The truck pulls up alongside the manure pit and a large mechanical claw is used to place the manure in the truck for transport. In most cases, the manure must be accessible by a tractor trailer.

## COMPOSTING

Composting takes manure and bedding and turns them into a dark, crumbly, earthy-smelling product similar to potting soil. This procedure is somewhat complicated and expensive to start up, and it is only a solution to manure disposal when done correctly. At a minimum, it requires a tractor with a front-end loader and the time to work the compost piles. If you do not have the time and interest to compost, you should probably choose a different manure disposal strategy.

The site of manure composting should have the following characteristics:

- Adequate space for storage and composting.

- The site must be in compliance with local ordinances.

- Distance of 50 feet from the property line and 150 feet from residences and businesses, according to general on-farm composting recommendations.

- Not be located in a flood plain unless protected against the 100-year flood.

- A concrete slab should be installed in the composting area or the lowest elevation of the facility should be above the seasonal high water table.

- Installation of a buffer zone between residences and water sources may be necessary.

- The area around the composting site allows access to the composting site all year round and is well drained. Wet weather can cause soils to become muddy, making it difficult to access and turn the piles.

- The use of asphalt or concrete around the composting site is preferred when cleanliness and aesthetics are important objectives. However, this option is more expensive and adds a permanent structure to the farm. Gravel beds are another option. When gravel is used, it is difficult to keep the site clean.

- Access to water in case the compost is too dry and water needs to be added.

- A mechanism for turning the piles or moving the compost from bin to bin, such as a pitchfork or a small front-end loader.

The following factors are important in producing compost:

### Pile composition

Manure is often mixed with bedding from stalls; dirt and grass picked up from pastures, arenas and trails; old, moldy or unwanted hay; grass clippings; leaves and household vegetable wastes. When composting the manure, avoid baling wire or twine, syringes and needles, soda cans and other trash, shoes, nails and other metals. Also avoid plastic or cedar wood (resistant to decay).

### Availability of air

Microorganisms need air (oxygen) to be able to properly decompose manure. To provide space for air to move in and out of the pile, manure should be combined with bulkier materials, such as wood shavings or straw bedding mucked from a stall, or even lawn clippings, leaves or hay.

Infusing air into the pile is also accomplished by mixing and turning the pile frequently or by inserting perforated PVC pipes into the pile.

### Moisture level

Microorganisms grow best with the moisture level at around 50 percent. The average moisture content of horse manure is 70 percent, but the manure may be closer to the ideal moisture content when it is combined with soiled bedding.

### Particle size

Small particles decompose faster because they have more surface area for microbial activity. If you own a shredder or tub grinder, consider processing straw bedding, hay and other coarse materials before adding them to the compost pile.

### Temperature

As microorganisms decompose manure and bedding, their body heat causes the temperature in the pile to rise. A hot pile decays much faster than a cold pile, and greater heat is necessary to kill weed seeds and parasites. Effective composting takes place around temperatures of 130 to 150 degrees.

### Pile size

The size of the pile influences whether the pile will hold heat. Small piles are usually colder and dry out faster.

### Nutrients

Microbes use carbon, nitrogen and other nutrients from materials added to the pile to support their own growth. Nitrogen is the main nutrient found in manure, while carbon is the main element found in bedding material. The challenge is to ensure the proper proportions of carbon and nitrogen needed for successful composting.

The carbon to nitrogen ratio (C:N) of a material is an estimate of the relative amounts of these two elements. A ratio of about 30:1 is ideal for composting. A mixture of one part manure with two parts bedding (by volume) usually gives a reasonable mix for rapid composting. However, the amount and type of bedding can alter the C:N ratio and influence the management needed for successful composting.

There are various methods of composting horse manure, ranging from piles or windrows to undercover or in-vessel facilities. However, on small horse farms, the choices are more limited because the purchase of dedicated equipment like a windrow turner is not efficient or affordable.

The two methods that are the most feasible are shed or pile composting. The investment costs for shed composters may be as high as \$5,000 per horse with half of the composting area under a roof. The investment costs for the pile composting are considerably less.

Shed composting is often used because of the easier handling, aesthetics and the smaller chance of run-off and leaching. Shed composting keeps batches separate and helps to ensure pathogen reduction in the batch. Manure contains many bacteria and pathogens that can be harmful to horses and humans. Examples are parasitic roundworms, *Escherichia coli*, *listeria monocytogenes*, *salmonella* and *clostridium tetani*. Protozoan pathogens such as *giardia* and *cryptosporidium* can be found in horse manure and are known to cause waterborne human disease. Careful composting helps to reduce these pathogens.

A shed composter consists of several three-sided bins. Covering the compost bins with a permanent roof, plastic sheet or tarp is recommended. Protecting the pile from rainwater and snow helps regulate the proper moisture level by preventing piles from becoming too wet in the winter or too dry in the summer. Roofs also reduce possible run-off. Because the bedding material is very absorbent, there is generally not leachate generated under the roof.

Covering also prevents rain and snow melt from leaching contaminants from the pile and creating a pollution hazard.

The shed should be wide enough to accommodate the bucket of a front end loader. The manure is collected in one bin at a time until the manure pile in the bin reaches approximately five feet high. Then, the contents should be turned into the next bin and the first bin refilled. The pile height should not exceed six feet to ensure that the compost is aerated.

Pile composting is generally chosen for economic reasons. Much care must be taken in choosing the site of the facility to reduce water pollution due to leaching and run-off and air pollution from odors.

The installation of a buffer zone between the composting facility and residences and water sources is recommended. In this method, the horse manure is piled in freestanding haystack-type piles. Waste is regularly added to the pile until it is four to six feet tall. The site should have room for two or three piles so that the first pile can mature while you are building your next piles. If there is enough room, windrows (large horizontal piles) of six to 10 feet wide by six feet tall can be used.

Regular mixing or turning is recommended to ensure the reduction of pathogens and to speed up the process. Some drawbacks to pile composting are the difficulty of working the site during inclement weather and the fact that turning the piles while ice is present shuts them down.

### **Turning compost**

The compost must be turned on a schedule. Turning moves the cooler outer portions of the pile into the hotter inner portions to reduce pathogen and weed seeds, homogenize the pile, and aerate the pile to some degree.

If managed appropriately (sufficient aeration), odors released from composting horse manure on small farms are less of an issue. However, stronger odors are expected when the horse manure compost is turned. If wood shavings are used as bedding material, and if the composting is operated properly, after several turnings the compost releases an earthy smell during turning.

The USDA requirement for the turning frequency to ensure pathogen reduction in windrows is five times in 15 days while keeping the pile's temperatures above 131 degrees. Because this is not realistic for farmers on small farms, weekly turning is suggested. This reduces pathogens in the compost, but does not comply with the requirements for compost used in organic agriculture.

After three to four months, compost turning can be reduced to once per month. At that time, the compost from two bins can be combined in one bin to compensate for volume reduction, which results as the material decomposes through the compost process.

If necessary, water can be added during turning to adjust the moisture content to 55 to 60 percent.

If the bins are full before nine months, the compost should be moved outside the bins to a dry, well-drained area. It is preferred that the compost is moved outside the roofed area after three to six months at the earliest. If stored outside, the compost should be covered loosely with a tarp or fleece until it is used.

### **Using compost**

Once the compost is ready for use, it can be applied to soil as a soil conditioner, mulch, or a supplemental nutrient source for plants. The compost can be used as mulch or on pastures after three months but it might still deplete the soil of nitrogen that is needed for crop growth. It needs to be composed for six to nine months to satisfy other uses. For example, it should be composed for more than nine months if its source material was high in wood chips. Generally, turned compost takes nine to 12 months to mature, while stacked takes up to two years.

The specific end use of horse manure compost depends on the quantity and form of nutrients present in the compost, which varies depending on the initial horse manure characteristics, the composting operation and the compost maturity or readiness for use. Compost that is not matured or stabilized can harm plants and seedlings either by harmful break down products or by depletion of the soil of nitrogen (nitrogen immobilization) that is needed for the crops to grow.

Compost adds organic matter to the soil and can benefit soil structure, aeration, moisture retention and permeability, but should be managed in a way to maximize plant utilization of nutrients and minimize runoff and leaching of nutrients.



The major fertilizer nutrients of horse manure compost are nitrogen, phosphorus and potassium. However, horse manure compost also contains the secondary nutrients magnesium, calcium and sodium, as well as micronutrients. The availability of these plant nutrients varies depending on the compost maturity, soil type and timing of the application. When applied at the optimum time, horse manure compost can be a supplemental nutrient source for pastures, field crops and horticultural crops.

Minimizing the amount of bedding used reduces the amount of total waste for disposal. Therefore, farms need to find the balance point in bedding amounts that ensure the horses' health and minimize waste. If straw is used as bedding, the manure is more easily composted than when wood shavings are used.

### **Pests**

Pests, such as flies and gnats, and vermin, such as mice and rats, should be eradicated in barns because they can carry disease.

The first step to getting rid of pests is to have a clean and neat barn. Feed should be kept in closed containers inside a feed room. Any spilled feed should be swept up and discarded immediately. Customers and staff should not leave any food inside the barn.

If you suspect the presence of rats or mice, a barn cat or Jack Russell terrier can help thin out the population. Rats' teeth are extremely hard and can grow at an alarming rate. Therefore, placing feed inside metal cans or steel-lined feed storage bins may be necessary in extreme cases.

Vermin can be poisoned, but precautions must be taken to make sure that children and pets cannot access the poison.

Manure piles should not be located too close to the barn, as they attract flies and are a potential fire hazard. Manure piles should be removed at regular intervals because vermin live there, especially in the winter. Rats and mice sometimes tunnel into stored hay or straw. For this reason, employ the principle of FIFO (first in, first out) when feeding hay or using straw.

Flies and other winged insects may bite horses hard enough to leave welts. Some horses are so sensitive to flies that they are unable to concentrate on doing their work. These flying pests may be somewhat controlled with fly sprays. Remember that most fly spray is made from chemicals, which may have a cumulative toxic effect. Fly traps and sticky fly paper may also be used.

Picking out stalls on a regular basis and emptying muck tubs help to cut down the fly population. Fans keep the air moving inside the barn, which helps to minimize the flying insect population. Horses that are very sensitive may need to wear fly masks and fly sheets even inside the barn.

Eliminate pools of standing water to help get rid of mosquitoes.

"Feed through" fly control can be used, but it has been linked to toxicity. A better way of dealing with flies is to use fly predators. The larvae of tiny stingless wasps are put anywhere there is manure. They hatch and eat fly eggs, causing fewer flies to hatch.

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# TACK

Understand the use and purpose of any piece of training tack before using it on the horse. This includes bridles, saddles, martingales, longeing equipment and bits.

## Bits

Before thinking of the mechanics of biting, a rider should understand that while the bit assists in positioning the horse's head to give maximum control over the horse's speed and direction, it is the extension of the process rather than the origin.

The origin of the head position lies in the early training of the horse, which should induce suppleness of poll, neck and spine, thus enabling the loins and hocks to become engaged. The bit is the last item in this chain. To attempt to obtain any form of advanced head carriage by the bit alone results only in stiffness and a restricted action. The power of the horse comes from behind the saddle and is controlled by the application of the rider's legs and seat. The bit, through the rider's hand, becomes an extension of the seat and leg.

There is no shortcut to success at anything to do with riding. No lasting good ever came out of the use of force. There is no substitute for sympathy, patience or tact, so the simplest and most direct means of communication will probably be the best in the long run.

Bits work on the principle of pressure, not pain. Even the mildest bit can cause pain if it is used in an incorrect manner or does not fit properly. Bits, including hackamores, work on pressure points on the horse's head. Each pressure point has a specific effect on the horse. The pressure points and specific effects, are:

**Tongue:** The pressure point required for flexion and yielding of jaw, chewing, activation of the salivary glands and production of foam. The tongue is a strong, elastic muscle with a noticeable bump halfway along it where the molars start. The edges of the tongue are more sensitive than the center.

The horse can push the tongue against the bit, sending the bit forward in the mouth. The tongue acts as a cushion action of the bit on the bars. If a horse has an extremely thick or sensitive tongue, or has suffered scarring of the tongue, it may not be able to tolerate excessive tongue pressure. Tongues vary in shape and size and a bit should not excessive interference with the tongue.

**Bars:** Pressure points that lead to flexion and yielding of the jaw and flexion of the poll. The bars are the most sensitive structures of the mouth. Wide, flat bars are less sensitive than their sharp, thin counterparts. The bars become more sensitive closer to the incisors.

Steady pressure on the bars generally makes the horse lower its head. Breeding determines a lot of the bars' width and sensitivity. Finely bred animals, such as Thoroughbreds, have very narrow bars that are thinly covered with skin. Thicker set or less finely bred animals, such as drafts, have wider bars with a fleshy covering making them much less sensitive. The bar area is easily damaged and care must be taken since constant rough use can cause calluses or even splinter the bone. Any damage ultimately makes the mouth less sensitive.

**Corners of the mouth:** Encourages extension of the head and neck and sometimes raises the head. The skin is flexible and less sensitive than the tongue. Pressure on lips comes mainly from the snaffle (particularly a gag snaffle). This type of bit causes the horse to open its mouth and point the nose out. Continual pressure on lip corners can cause soreness.

Pay attention to the front molars of a horse wearing a gag; as the bit is drawn up into the mouth, the lip corners and insides of cheeks are pushed onto the first molar teeth and can be cut if the teeth are too long or sharp.

**Palate (roof of the mouth):** Encourages the horse to open the mouth, tip the head or tuck its chin into its chest. This area is less sensitive than the bars. If the port of a curb bit touches the roof of the mouth, it produces a fulcrum effect and causes the cannons (sides of the mouthpiece) of the bit to push on the bars. Palate structures vary from horse to horse. A jointed bit may cause painful pressure in a horse with a low palate.

**Curb groove or chin groove:** Located on the underside of the horse's head where the lower lip meets the jaw. It is the location of the mandible nerve, which is a large and very sensitive nerve that runs down the edge of the under part of the jaw and goes into the bone just above the chin.

A curb chain used in conjunction with a curb bit causes the bit to act as a fulcrum and press on the bars. If a curb chain on a bit stays low in the chin groove as the bit is used, the horse should respond by flexing and relaxing the jaw. If the curb chain flips up out of the groove as the cheek of the bit is rotated, pressure moves to the upper curb area, which ultimately puts pressure on the sensitive jaw directly above the mandible nerve itself. This is far more severe and likely to cause resistance. The heavier the curb chain and the lower it stays when in use, the better the result. It is quite possible to cause severe bruising to the curb area and in rare cases a split can form from constant painful pressure.

**Sides of jaw:** Encourages the horse to turn away from lateral pressure. If the horse acts as if it is in pain, check the teeth (especially in young horses).

**Bridge of nose:** Encourages poll flexion. The bridge of the nose is a very complex, sensitive structure of bone and cartilage that is easily damaged. A noseband placed too low on the head is uncomfortable and, more importantly, interferes with breathing. Care must be taken to fit the noseband high enough above the nasal cartilage to ensure comfort.

**Poll:** Encourages the lowering of the head<sup>138</sup>. The poll area needs to be handled with care as all mechanical control relies on some form of bridle fitting partially or fully to the poll region. Poll pressure by itself is not very significant. It is the poll pressure when combined with the bit and/or nose pressure that gives the best result. If you push down on top of a horse's head, its automatic reaction is to raise the head, not lower it. The poll is an area that can be frequently and easily damaged--often without a handler's deliberate intention or knowledge.

## BIT SELECTION

The severity of a particular bit depends on several factors:

**Direct pressure:** One pound of pressure on the reins equals one pound of pressure in the mouth.

**Leverage:** This multiplies the pressure. Factors include length of shank, tightness of curb chain and ratio of upper shank to lower shank. The greater the leverage, the more severe the pressure. Leverage bits should be used by riders with sensitive, independent hands and light contact.

**Mouthpiece:** A thicker mouthpiece spreads pressure over a wide area while a thinner mouthpiece concentrates the pressure.

**Mouthpiece surface:** Smooth mouthpieces are the gentlest. Twisted, corkscrew, wire or sharp edge mouth pieces are more severe.

**Auxiliary equipment:** Nosebands and martingales make bits more severe by limiting the horse's options (i.e., stop the horse from opening its mouth, limit the horse's ability to lift the head, etc.).

Mouthpieces may be made out of, or covered with, plastic, different metals, rubber or leather. A softer material is generally easier on a horse's mouth. Horses can be fussy about the mouthpiece composition. Some metals such as sweet iron (which is rust on a steel mouthpiece), copper or aurigan may stimulate saliva production.

The bit sits in the mouth in the interdental space or bars. Dental issues, such as sharp teeth or the presence of wolf teeth, may cause discomfort for the horse and should be resolved by your veterinarian or dentist.

Consider shape and size of the lips, bars and tongue when choosing a bit for the horse. A bit should be ¼ inch wider than the horse's mouth. An ill-fitting bit can make the horse fuss and toss its head from discomfort.

When choosing a bit, remember that a horse with a bad mouth may benefit more from education than a stronger bit. Also, the stronger the bit that is used, the more the horse's scope and shape to the jump can be adversely affected.

Bits can be made more severe by:

- Improper fit
- Improper use
- Martingales
- Nosebands
- Draw reins

Bit selection depends on several factors such as:

- The horse's age, sensitivity, natural balance, training, maturity and experience level
- Any behavioral problems
- The size, shape, and conformation of the horse's mouth and head, including thickness of the tongue, length of the mouth, shallowness and width of the lower jaw, width of the face, height of the palate, shape of the lips, and condition of the corners of the mouth
- The job the horse is being asked to perform
- The horse's tolerance or acceptance of the bit
- The rider's experience level

The taste of the bit. A bit that is satisfactory in taste to the horse is more readily accepted. A steel or sweet iron in combination with copper stimulates salivation, which in turn causes the horse to move the tongue and relax the lower jaw. A relaxed horse is more responsive and carries the bit in a more natural manner.

Types of bits include:

### Snaffles

Direct pressure, non-leverage bits. Although snaffles are considered to be mild bits, the materials and the construction of the mouthpiece and the use of nosebands and martingales can actually serve to make their action harsher than leverage bits. Their action works on the tongue, lips and bars.

As with all bits, they should be fitted so that ⅛ to ¼ inch of the bit shows on both sides of the mouth. Jointed snaffles that are too wide may have a nutcracker effect and hit the horse in the palate.

Snaffles may be made of rubber, plastic, various metals or be covered with plastic, rubber or leather. The common types of snaffle cheeks are:



Loose Ring Snaffle



Mullen Mouth Snaffle



D-Ring Snaffle



Eggbutt Snaffle



Twisted Eggbutt Snaffle



Full Cheek Snaffle

**D-ring:** Has slight lateral pressure. The mouthpiece is fixed.

**Eggbutt:** Prevents the lips from being pinched. The mouthpiece is fixed. This bit is not seen much in the hunter ring.

**Full:** Helps with lateral guidance. The mouthpiece is fixed.

**Loose ring:** The mouthpiece is loose and rotates on the ring. This bit can pinch the lips if it is not wide enough or if the horse is particularly sensitive. Rubber rings or bit guards may be used to stop the pinching action of this bit. A loose ring allows the horse to set the mouthpiece for its comfort level.

Some common snaffle mouthpieces include:

**Corkscrew:** Mouthpiece has a tight “corkscrew-like” twist. This bit is stronger than a twist.

**Double wire:** Two mouthpieces made out of thin twisted wire. Each mouthpiece has a joint and the joints are asymmetrical.

**Dr. Bristol:** Similar to a French link, it has a rectangular plate in the center of the mouthpiece. The plate is at a 45 degree angle, rests on the tongue and gives greater comfort. The nutcracker and pinching action of the bit is lessened. This bit has two joints.

**French link:** Features a small bone-shaped plate in the center of the mouthpiece. The link rests on the tongue and gives greater comfort. The nutcracker and pinching action of the bit is lessened. This bit has two joints.

**Hollow mouth:** The mouthpiece is hollow and wide. It is also extremely light.

**Keys:** A mouthpiece used to accustom young horses to the bit. It has several keys dangling from the mouthpiece so that a horse can mouth them and consequently accept the bit.

**Mullen:** A bit with no joints. It is curved to follow the inside of the horse’s mouth and distributes its weight across the tongue and bars.

**Port:** A mouthpiece with a hump in the middle. Low ports diminish tongue pressure. Higher ports can sometimes act as a fulcrum and hit the horse in the palate.

**Roller:** Rollers on the mouthpiece move with tongue pressure from the horse. The rollers encourage a horse to mouth the bit and make it difficult for the horse to grab hold of the bit. The rollers can give more control without being painful. This bit generally has a single joint.

**Single joint:** Can exert a nutcracker effect on the horse’s palate. Horses with a low palate may be more comfortable in a multi-joint bit.

**Single wire:** A thin twisted wire with one joint.

**Twist (slow or sharp):** A bit with either a gentle or sharp twist to the mouthpiece. The slow twist is stronger than a plain snaffle and a sharp twist is stronger than a slow twist. The edge of the twist can make either bit more severe.

Mouthpieces may be combined types such as Dr. Bristol with twisted corners.

## Pelhams

This bit is the combination or bastardization of a double bridle, which consists of a bridoon snaffle and a curb bit.

Pelhams are bits that work from a combination of leverage and pressure. Each pound of pressure on the reins is multiplied by factors such as the length of the shanks, the ratio of the upper and lower shanks, the tightness of the curb chain, and the material of the mouthpiece.

It has two reins, referred to as the snaffle and curb. The pelham’s action is on the corners of the mouth when the snaffle rein is used and on the poll and curb groove when the curb rein is used.

For ease of recognition and use, the snaffle rein is generally wider than the curb rein. The snaffle rein may be laced, braided or rubber, depending on the discipline in which the rider is competing. It is held with more contact than the curb rein.

A pelham may be used with a bit converter, which allows the use of one rein.

The pelham's mouthpiece may be made out of the same materials as a snaffle and can be fixed, sliding or swivel. The looseness of swivel shanks and sliding mouthpieces may make the horse chew and accept the bit more readily. Some pelham mouthpieces are:

**Mullen:** Pressure is distributed across the tongue and bars.

**Jointed or broken:** May have squeezing sideways action on the bars and a nutcracker action on the palate.

**Multi-jointed**

**Low to medium port:** Pressure rests on the bars while the port provides tongue relief.

**High port:** Pressure concentrates on the bars, especially when the height of the port provides a fulcrum effect on the palate. No tongue pressure.

The other parts of a pelham and curb are:

**Shanks:** Broken into upper and lower shanks. The ratio of their length decides the action and severity of the bit. A longer lower shank increases the leverage and pressure on the bars and chin groove. A longer upper shank increases the poll pressure. The shortest shank pelham is called a Tom Thumb.

**Curb hook:** The attachment for the curb chain.

**Lip strap:** A small rolled leather strap that goes through the fly link (center link) of the curb chain. It stops the horse from taking the lower shank into its mouth and also holds the curb chain on the bridle when one side is unattached. A pelham may be used without a lip strap.

**Snaffle ring:** The point of attachment for the snaffle rein.

**Curb ring:** The point of attachment for the curb rein.

**Curb chain:** A short multi-link chain that attaches to the curb hooks. The chain should be twisted clockwise to lay flat in the chin groove. The curb chain may also be made out of leather or have a rubber or gel cover.

## Curbs

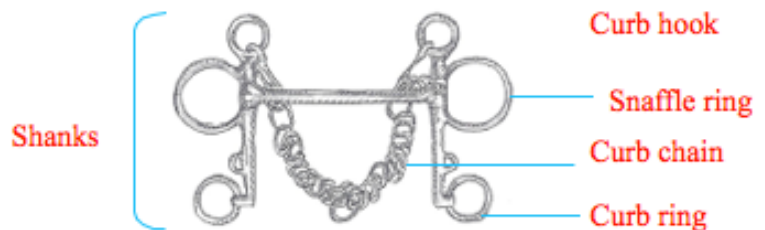
Leverage bits (see Pelham). Curb bits are sometimes seen in the equitation and jumper rings. When used with a bridoon (a small ringed, thin mouthpiece snaffle), they form a double bridle, which is also known as a full bridle or Weymouth.

Curb mouthpieces are generally straight, mullen or ported. As with all bits, nosebands and martingales can increase their action.

The curb operates first on the bars of the mouth. This action is dependent on the shape and size of the port. The second action of the curb is on the poll by means of an increased downward tension on the cheek pieces of the bridle when sufficient feel on the curb rein places the cheek of the bit at an angle of 45 degrees or more. When the curb chain tightens, a downward and backward pressure on the lower jaw is applied.

To adjust a curb or pelham, place it well up in the mouth on the wide part of the bars. Adjust the curb chain so two fingers held side-ways fit between the chin groove and the curb chain. The curb chain should activate when the shanks of the bit are at a 45 degree angle.

To adjust a double bridle, place the bridoon high in the mouth so it is not able to hang down below the mouthpiece of the curb bit.



Straight Bar Pelham

## Gags

Leverage bits. A gag has the general appearance and mouthpiece of a snaffle bit but the traditional gag has a hole in the top and bottom of the bit's cheek piece. Special cheek pieces called gag rounds slot through these holes and the gag reins attach to a ring at the end of the gag rounds.

When pressure is placed on the gag rein, the bit rotates and slides upward, causing pressure on the poll and the corners of the mouth.

Gags may have one or two reins. Two reins allow the rider to use the gag rein only when necessary and to ride on the snaffle rein while the horse is carrying its head correctly. Riding with only a gag rein can give a horse a stiff head carriage and may result in the horse finding other ways of evading the bit.

Start slowly when introducing a gag and use the least amount of leverage possible. One way of handling this is to:

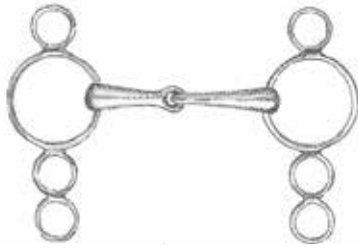
- Start with a hunter gag. This bit has no gag rounds.
- Move to a bit with gag rounds and two reins.
- Move to a bit with one rein.
- In between each change of reins, move downward to a softer mouthpiece. The leverage increases as you change between the different rein configurations.

Gags come in other forms such as:

**Elevators:** A bit with medium to long straight shanks and a snaffle mouthpiece.

**Three ring:** Similar to an elevator. This bit has three rings for the reins. Rein placement determines the bit's severity.





3-Ring Gag



Gag Snaffle



Hackamore

(Intrepid International and Horse Tack Now)

## Hackamores

A hackamore works on pressure on the bridge of the nose and the chin groove and comes in leverage and non-leverage types.

A leverage or mechanical hackamore has a noseband, curb strap or chain, and metal shanks and has some of the same actions of a curb bit. It encourages flexion at the poll but is not effective at turning a horse.

The non-leverage hackamore has a noseband with rings attached to it for the reins. It works only on pressure on the bridge of the nose and is more effective for turning than the mechanical hackamore. This type of hackamore includes leather covered jumping hackamores, side-pulls and western bosals.

Care must be taken that the hackamore does not sit below the end of the nasal bone. One that is adjusted too low causes discomfort and head tossing. Hackamores work well on horses who are very strong or those with fussy mouths and difficult minds.

## Boots

Boots come in many forms. All boots must be clean and well fitting. Make sure to check their fit once the horse has warmed up. Some horses stock up and boots can slide down the leg, causing irritation or injury.

Some of the more common boots include:

**Bell:** Used on the front legs to protect the horse from an overreach or grab. These rubber or plastic boots come in pull-on or Velcro varieties.

**Galloping:** Used on the front legs to protect the splint and tendon areas. They offer more protection than splint boots. They may be made out of leather or synthetic materials.

**Hind:** Used on the hind legs to provide the hind ankles with protection from the opposite leg interfering and traveling too close. May be made out of leather or synthetic materials.

**Open front:** Used on the front legs to protect the horse's tendons and provide support while jumping. The front of the leg is left unprotected so the horse can feel if it rubs the jump.

**Scalper or grab boots:** Used on the front feet to protect the horse from an overreach or grab. These rubber boots pull on and have a narrow piece of rubber across the front of the foot. They fit much more tightly than bell boots.

**Shipping:** Used on all four legs to provide protection without support. They are suitable for short trips.

**Splint or tendon:** Used on the front legs to protect the splint and tendon areas. They can be made out of leather or synthetic materials.



Hind Ankle Boots



Scalper Boots



Splint Boots



Open Front Boots

## Breastplates and Martingales

Breastplates are used on horses with high withers that run uphill and those with wide shoulders and narrow ribs. They keep the saddle forward on the horse's back.

Types of breastplates are:

**Hunting:** Features a yoke and girth strap, which attaches to the girth between the front legs. Straps attach from rings on either side of the withers to the saddle “dees” or to a nylon and leather strap around the stirrup bars. The shoulders may have adjustment buckles and can be made out of leather or elastic webbing. A martingale attachment may be attached at the chest ring.

**Breast collar or polo breastplate:** A strap that runs from one side of the girth to the other across the horse's chest. A strap across the withers stabilizes the breast collar and stops it from slipping down. Breast collars can be made out of webbing, leather or elastic.

**Elastic breast girth:** Similar to a breast collar except it attaches to the saddle “dees” or stirrup bars by means of a nylon and leather strap. It should fit snugly but not tightly across the base of the horse's neck. Breast girths are made out of elastic with leather ends.

Martingales are most commonly used to stop a horse from raising its head. They are restricted in some horse show classes. Hunters may only wear standing martingales. Jumpers may wear standing or running martingales, depending on the amount of prize money offered in the class.

Consult the USEF Rule Book for specifics.

Some types of martingales are:

**Standing:** A neck strap or yoke with a piece of leather that attaches to the girth at one end and the cavesson noseband on the other. A rubber donut at the neck stops the martingale from slipping in between the horse's legs. The neck strap buckles on the left side of the horse. This martingale prevents a horse from throwing its head up.

**Running:** Similar to a standing martingale, except this forms two branches with a ring on each end. The reins pass through the rings and buckle as normal. A rubber donut at the neck stops the martingale from slipping in between the horse's legs. The running martingale should be used with rubber or leather rein stops to prevent the rings from catching on the rein studs or the bit. When adjusted correctly, the rein will remain straight from the bit to the hand to the elbow. The branches can be made out of leather, elastic webbing or rubber tubing.

**Bib:** Usually used in racing, it resembles a running martingale with a solid piece of leather between the branches. It keeps the horses from getting caught on the branches of the martingale.

**Irish:** A short strap with a ring at either end. This martingale is worn under the neck. The reins are passed through the rings. The martingale prevents the reins from coming over the head. This martingale is usually seen only in racing.

## Cruppers and Head Bumpers

Some less-used types of tack are cruppers and head bumpers.

*Cruppers* are used on mutton withered horses and very fat ponies to keep the saddle from slipping forward over the withers. The strap passes around the dock and back to a “T” that fits into the saddle gullet or a fastening point on the cantle of the saddle.

*Head bumpers* are a thick felt and leather hat that slots onto a horse's halter crownpiece. The ears fit through two holes. Head bumpers are used to protect the poll on horses that throw their heads up while loading or unloading in a trailer.

## Girths

Girths can be made out of leather or synthetic materials and may have elastic ends on either one or both sides.

Girths should fit properly and, when tightened, have two spare holes above and at least one hole below the buckles. The girth should be even on both billets or girth straps. For maximum security, it should be attached on either the first and third or first and second billet straps. (This is due to the second and third billets being attached to the same place in the saddle.)

Girths must be soft and kept clean. Failure to clean girths regularly often results in a girth sore or gall, which may take several days to heal.

Girth sores can result from pinched skin under the girth, ill-fitting or poorly constructed girths, base wide conformation, friction from vigorous work, or a poor grooming job in the girth area. Dirt and sweat must be removed from the horse's girth area both before and after the horse is ridden. A horse is generally unable to wear a girth while suffering from a girth sore, although a fleece or tube sock-like girth cover may help. Some horses benefit from the use of a shaped girth, which allows extra room by the horse's elbows and helps to prevent girth sores. Girth sores will re- occur until the root cause is discovered and removed.

A belly guard is a special kind of girth used in the jumper ring to prevent a horse from injuring itself with caulks or studs. Belly guards can either be an integral part of the girth or slot onto a girth.

## Halters

Halters, like bridles, should be fitted to each individual horse.

The crownpiece rests behind the horse's ears and should not fall down the horse's neck or slip forward over the ears. The

noseband should fall approximately two inches below the point of the cheekbone. Halters that rest too high on the face make control difficult. Halters that fall too low may risk damaging the nasal bones. Cheek pieces should fit comfortably on the face.

Tuck in all loose ends of straps. Leather halters are preferred over nylon because they have a greater chance of breaking in an emergency if a horse is caught on an object.

## Saddles

The saddle consists of the following parts:

**Gullet:** The channel that runs down the length of the underside of the saddle.

**Flap:** The wide piece of leather where the rider's legs rest.

**Stirrup bar:** The piece of metal riveted to the tree for the purpose of attaching the stirrup leathers.

**Skirt:** The small flap of leather just below the pommel. The stirrup bars are located under the skirt.

**Tree:** The structure on which the saddle is built. Saddle trees may be broken by using a narrow saddle on a wide horse, allowing the horse to roll with the saddle on, or repeatedly pulling on the cantle when mounting the horse.

**Panel:** The under part of the saddle that sits on the horse's back. The panel may be stuffed with wool or foam. Wool stuffing (flocking) can be customized to a horse's back. Foam cannot be customized.

**Pommel:** The front arch of a saddle.

**Cantle:** The back of the saddle.

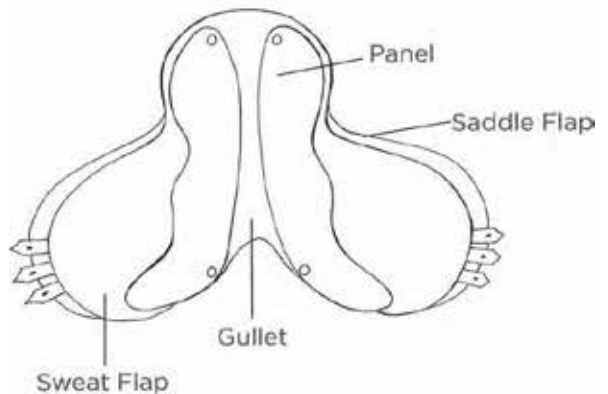
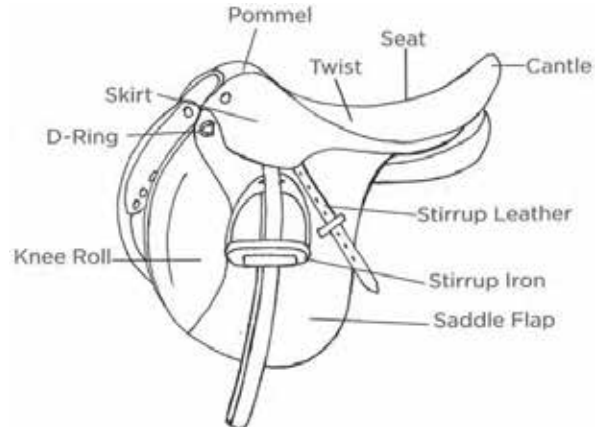
**Seat:** The place where the rider sits.

**Twist:** The narrowest part of the seat, where it meets the pommel.

**Knee roll:** The extra padding on the front face of the flap.

**Blocks:** The small pieces of leather under the knee roll or behind the rider's thigh to aid in stability when riding.

**Point pocket:** The place where the tree inserts into the leather of the saddle.



## SADDLE FITTING

Saddle fit is important for keeping riding horses happy and healthy and able to do their job. A well-fitting saddle ensures the horse has freedom of movement and comfortable equipment as it is ridden. It will also help the rider stay in a proper position so they can effectively use their aids.

Assessing saddle fit is extremely important when obtaining a new saddle for your mount, and it is also important to check fit throughout the year. Horses' muscling and weight can change depending on the type and amount of work they are doing, which can impact saddle fit.

If the saddle does not fit your horse properly, some problems may develop, such as:

- Sore withers, which can be caused by abrasion and compression
- Severe wither sores (can develop into fistulous withers)
- Pressure points
- Back bruises
- Saddle sores
- Nerve damage
- Inhibition of the horse's balance or movement
- Undesirable behavior, such as bucking, rearing, bolting, balking and head tossing

How to Assess Saddle Fit:

1. Make sure the horse is standing square and still, on level ground.
2. Without a saddle pad, place the saddle forward at the wither and then press it backward until it finds a natural resting place. Do this a few times to make certain you have found the correct resting spot for it. It should rest behind the scapula (shoulder blades) to ensure the front legs can freely move.

3. Check wither clearance. With your palm facing you, place three fingers side-by-side atop the withers, with the first finger closest to the pommel. If there is too much space, the saddle tree is too narrow; if there is too little space, the tree is too wide.
4. View the saddle from the side. An imaginary line drawn from the pommel to the cantle should be parallel to the ground. The deepest part of the saddle should also be parallel to the ground, not tilting uphill or downhill.
5. Assess saddle points. Run your hand under the saddle, while pressing the pommel down with the other hand. The points of the saddle (the long part of the tree, on either side toward the front) should allow for movement of the shoulder muscles. If they are pointing into the horse's shoulder muscles, the saddle is too tight. If they are too narrow, they will dig into the horse's shoulder muscles and will limit movement. If the angle is too wide, the saddle will sit down too low in the front, will distribute weight unevenly and will create pressure points at the withers.

Note: All horses are asymmetrical. Use your horse's widest shoulder as your guide, when comparing the angles of tree points. The fit on the narrower side can be adjusted through the use of flocking, shimming or correction pads. It is best to consult a professional saddle fitter when accommodating a horse's asymmetry.

6. Check channel or gullet clearance.

When examining the underside of the saddle, note the gullet--the channel that runs down the length of the saddle--running down the center. It allows freedom of the spine so the horse can move properly. You should be able to slide the width of three fingers down the entire gullet. If the gullet is too narrow, the edges of the panels will sit on the spine. If the gullet is too wide, the center of the saddle will sit directly on the spine. Both of these issues will cause discomfort for your horse.

When the saddle is on the horse with no saddle pad, you should be able to see light coming through the gullet. That means the panels rest on the horse's long back muscles and not directly on the spine.

7. Check panel pressure and contact.

Saddle panels are supposed to distribute weight evenly along the horse's back when you ride. Panels can be stuffed with wool, foam or synthetic-filled systems to absorb pressure. When pressing on the seat of the saddle with one hand and running the other hand under the front of the panels, you want to feel even pressure under the saddle points. The front of the panels should not pinch the horse's withers.

When you run your hand under the entire panel along the back, on both sides, you should feel for even pressure. Any unevenness in pressure that you feel your horse will also feel as you ride.

Bridging occurs when the front and the back of the panels are in contact with the horse, but there is no even pressure in the center of the saddle. This is a common problem in saddle fitting.

8. Check saddle stability. The saddle should remain fairly stable, without shifting from side to side or rocking front to back. Shifting may be a result of your horse's natural asymmetry and it is important to lessen or eliminate the problem.
9. Check seat length. The weight-bearing surface of a horse's back is the thoracic region: the area supported by the ribs. The thoracic region runs from about the point of the horse's shoulder to the middle of its back. The lumbar region of the back has no ribs and, therefore, no support structure; it should not bear weight. This area runs from about the middle of the back to the point of the horse's croup. Ideally, your saddle should not extend past this point. If your saddle is too long and you have no choice but to use it, regularly check your horse for soreness.
10. Girth the saddle, mount and recheck the fit.

When you've finished all the steps to check the saddle fit, put on a girth. Use minimal padding to be able to assess the saddle's fit. The girth should sit approximately five inches behind the horse's elbow. While sitting in the saddle, check the wither clearance and gullet clearance again.

The pommel should still clear the withers by two to three fingers. Have a helper check to see that there is daylight running the length of the saddle when looking at it from the rear.

Notice the feel of the saddle. You should be balanced, not leaning backward or forward or struggling to sit up straight.

Assess how your horse is feeling. If it acts calm and relaxed and can move out freely, these are good signs that your saddle fits. If it shows signs of irritation, you may need to continue looking for the right fit.

Other saddle fit considerations:

Note sweat marks after working your horse. Check for any dry spots or unevenness in the marks, as this could mean your saddle does not fit.

Note your horse's mood and facial expressions as you work through the saddle fitting process. Signs of irritation or distress like tail wringing, bared or gnashing teeth, or pinned ears, as well as moving away from you when placing the saddle, or threatening to kick, may be signs that your saddle is bothering your horse.

To maintain proper fit and integrity of your saddle, as well as save your horse's back, use a mounting block. If you regularly mount from the ground on the same side of the horse, the saddle tree may become twisted over time.

If you have a difficult-to-fit horse and cannot seem to get the right saddle clearance, you may need to focus as closely as possible on other saddle fitting steps, and then monitor your horse's back closely over time. Although not ideal, you can sometimes help a saddle to fit by using special padding or customized flocking to improve wither clearance, as well as saddle point and panel fit.



## STIRRUP LEATHERS AND IRONS

Check stirrup leathers for loose or rotted stitching on a daily basis.

Switch leathers and irons from left to right when cleaning the saddle. This ascertains that the stirrup leathers will stretch evenly. Pressure from mounting tends to stretch the left stirrup leather. Riders who put more weight in one stirrup than the other can also create uneven stretching. Note that stirrup leathers are not always made from the same piece of hide and, therefore, a great amount of variation in stretching is possible.

Stirrup irons should be one inch wider than the ball of your foot.

Children generally use Peacock irons, which are safety stirrups with a strong rubber band on the outside that comes undone if the rider's foot pushes against it. Safety stirrups are necessary when the rider's foot is small enough to get caught in the stirrup iron if they fall off.

## The Bridle

The bridle consists of the following parts:

**Headstall or crownpiece:** Fits over the top of the head and serves as the attachment point for the cheek pieces and throatlatch.

**Cheekpieces:** Attach to the crownpiece on one end and the bit on the other. The bit is usually attached by a stud that slots through a hole on the underside of the cheek piece. Certain jumper and schooling bridles have buckles on the outside of the cheekpiece to attach the bit. When properly adjusted, the buckle attaching to the crownpiece should be level with the horse's eye and have at least two holes above the buckle.

**Browband:** The strap that fits across the front of the horse's face directly below the ears. The crownpiece and upper strap of the noseband are threaded through the ends of the browband. The browband keeps the bridle in place directly behind the horse's ears.

**Noseband or cavesson:** Consists of a top strap that fits under the crownpiece on top of the horse's head and a band that goes around the horse's head at the end of the nasal bone but above the cartilage. Many types of nosebands exist, which are explained further in the following subsection.

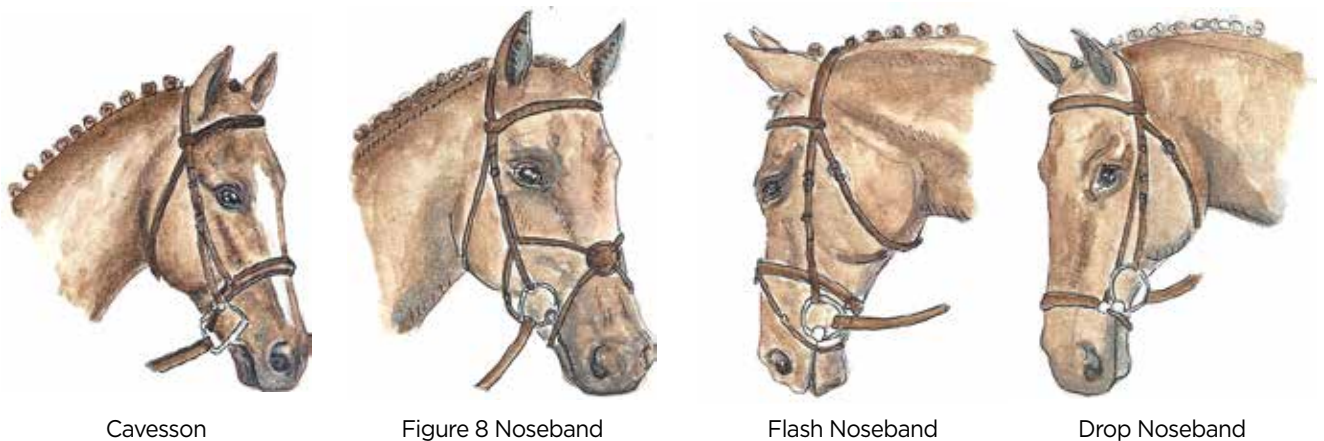
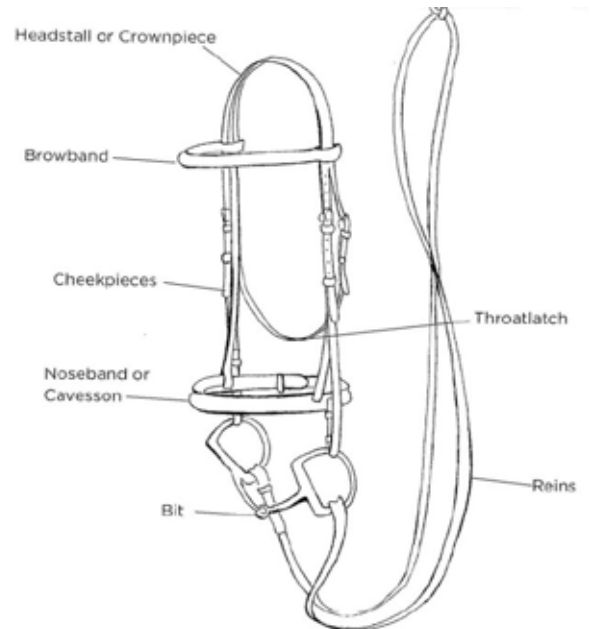
**Throatlatch:** A long thin strap on the crownpiece that buckles on the left side of the horse where the head and neck join. Four fingers or a fist should be able to fit between the jaw and the throatlatch.

**Reins:** Attach to the bit and are held by the rider. Reins can be made out of leather, rubber and leather, or webbing. They are usually laced, braided or plain if they are made from leather.

**Converters:** Not a bridle part, but used as accessories to convert two-rein bits, such as pelhams and gags, to a one-rein bit.

Types of nosebands include:

**Cavesson:** The most basic noseband. The cavesson is somewhat effective at keeping a horse's mouth closed and is the attachment point for the standing martingale. Two fingers should fit between the noseband and the horse's jaw. These nosebands can have chain, tacks or rope sewn in under the front and, used with a standing martingale, they serve to discourage a horse from lifting the head too high. Crank cavessons are used to keep a horse from opening the mouth. They attach by means of a ring that provides more leverage to tighten the noseband.



Cavesson

Figure 8 Noseband

Flash Noseband

Drop Noseband



**Figure 8 or grackle:** Used to stop horses from opening their mouths and/or crossing their jaw. The noseband resembles a figure 8. It consists of two straps that are slotted through a leather- or leather-and-sheepskin-lined button placed on the horse's nasal bone. The upper strap goes under the cheek pieces and is buckled high on the horse's jaw but below the cheekbones. The lower strap goes over the bit and around the muzzle to buckle on the left side of the mouth. The noseband is adjusted fairly snugly. Care must be taken when cleaning these nosebands. Saliva and food particles can rot the stitches and leather, if not dealt with each time the noseband is used. These nosebands are not meant to be used with a standing martingale. If a martingale is necessary, a running martingale may be used or the horse can wear a cavesson noseband over top of the figure 8 noseband. Named for the horse "Grackle" that won the 1931 Grand National steeplechase wearing this type of noseband.

**Flash:** A cavesson noseband with a strap that runs diagonally from the front of the cavesson over the horse's bit and is buckled on the left side of the mouth to keep a horse from opening its mouth while still being able to use a standing martingale. A flash can be sewn into the cavesson or attach by a buckle to the front of the cavesson.

**Drop noseband:** Used to keep a horse's mouth shut. The drop noseband changes the action of the bit by exerting pressure on the horse's nose, which follows the pressure of the reins. The head lowers due to this pressure and the bit has more action on the bars of the mouth. This gives the snaffle bit a more downward and inward pressure than it has on its own, which allows the rider to produce flexion of the lower jaw and poll that is not usually possible with the snaffle alone. Correctly adjusted, the drop noseband is a far better tool and far less damaging than putting on a double bridle too early in the horse's education. The drop noseband consists of a broad noseband that fits two and a half to three inches above the nostrils, just below the end of the facial bones. The back strap goes around the outside of the bit and under the chin groove. It should be adjusted snugly but not tightly. The drop noseband is not meant to be used with a standing martingale. A flash noseband may be substituted if a martingale is necessary.

**Kinton noseband:** Used for hard pullers, this noseband resembles the drop noseband when seen from the front but has the addition of two metal loops on the side. The loops are placed inside of the bit rings and behind the mouthpiece. The action of the noseband is to lower the head by nose pressure. The metal loops also create a squeezing action when rein pressure is applied.

## Tack Cleaning and Care

Most tack is made out of leather--animal skin that has been tanned, which seals the top, or grain side, and leaves the underside, or flesh side, with its natural ability to absorb water, fat or oil. Leather loses its natural fat on a daily basis, and also when it is exposed to water, heat, sweat, salt, dirt and neglect.

Leather requires constant checking to make sure that it is not dry rotting, stretching, weakening, wearing, aging or has loose or rotten stitching. For safety purposes, check your tack every time before you ride and inspect it closely when you are cleaning it.

Your tack should be safe, clean and supple. Clean tack should every time you ride.

To clean tack:

1. Dip a sponge in warm water and wring it out until it is nearly dry. Wash the dirt, sweat and hair from the tack, keeping the leather as dry as possible. Water rots tack, so instead of making a sudsy lather with the soap, use elbow grease instead.
2. If the tack is especially dirty, use castile soap to help loosen the dirt and grease that has accumulated (particularly on the underside of the leather).
3. If the tack needs oiling, put a light coating on the leather. Leather does not need to be oiled often and over-oiling can be just as destructive as under-oiling.
4. Finish with a light application of glycerine soap, which seals the leather. From time to time, jockeys or small accumulations of greasy dirt are found, especially on saddles. Jockeys are an indication that the tack has not received proper cleaning.
5. The buckles on unused tack can be treated with petroleum jelly to prevent rust.

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# TEETH

Like humans, horses are born without teeth and grow baby teeth through the gums between birth and approximately nine months of age.

At approximately two and a half years of age, the permanent teeth start to erupt and push the baby teeth out of the jaw. The remains of a baby tooth is called a cap. This cap usually falls out without assistance but sometimes require dental intervention.

The horse is said to have a full mouth when all of the permanent teeth have erupted, which generally happens at about five years of age.

Horses have the following teeth:

**Incisors (12):** Six in the upper jaw and six in the lower jaw which are used to tear off grass.

**Premolars and molars (24):** The molars are located at the back of the jaw and the premolars are in front of them. There are 12 each (six on each side) in both the upper and lower jaws that are used to grind food.

**Canine teeth or tusches (4):** Small pointed teeth found in both the upper and lower jaws just behind the incisors. Usually found only in male horses, although they can be present in mares.

**Wolf teeth (1 to 4):** Small extra premolars located right in front of the first premolars. These can cause biting problems, but are easily removed.

The eruption of the third molars completes the dental arcade (the rows of upper and lower back teeth).

Teeth continue to grow throughout the horse's life. The grinding action of the teeth wears them down and changes their shape, especially on the grinding surface, called the table.

Horses grind food in a sideways, one-way action, causing the teeth to wear unevenly. In addition, the upper jaw is wider than the lower jaw, so "hooks" or sharp edges form on the grinding teeth. Teeth require regular examination to check for even wear and detect any problems. An equine dentist or veterinarian floats (files) the teeth with a special rasp and other tools. This should be done as needed, usually every six to twelve months.

This constant shape changing and the markings on the teeth allow us to age horses. The aging system works well through about eight years of age; after that it becomes more uncertain.

INCISORS	AGE OF ERUPTION
Central incisors	4 weeks
Intermediate (middle) incisors	6 weeks
Corner incisors	9 months
Permanent central incisors	2½ years
Permanent intermediate (middle) incisors	3½ years
Permanent corner incisors	4½ years
Canine teeth	Between 4 and 5 years
MOLARS	AGE OF ERUPTION
First premolars	5 to 6 months
First molars	9 to 12 months
Second molars	2 years
Second premolars	2½ years
Third premolars	3 years
Fourth premolars	Between 3½ and 4½ years
Third molars	4 years



Fig. 1. Permanent upper corner incisor wider than tall (age 5–9 years).



Fig. 4. Upper central incisors taller and wider than middle (intermediate) viewed from labial surface (under 10 years old).



Fig. 2. Upper corner incisor square-shaped (age 10–14 years).



Fig. 5. Upper central incisors same size or slightly smaller than middle incisors (middle age; 10–15 years).

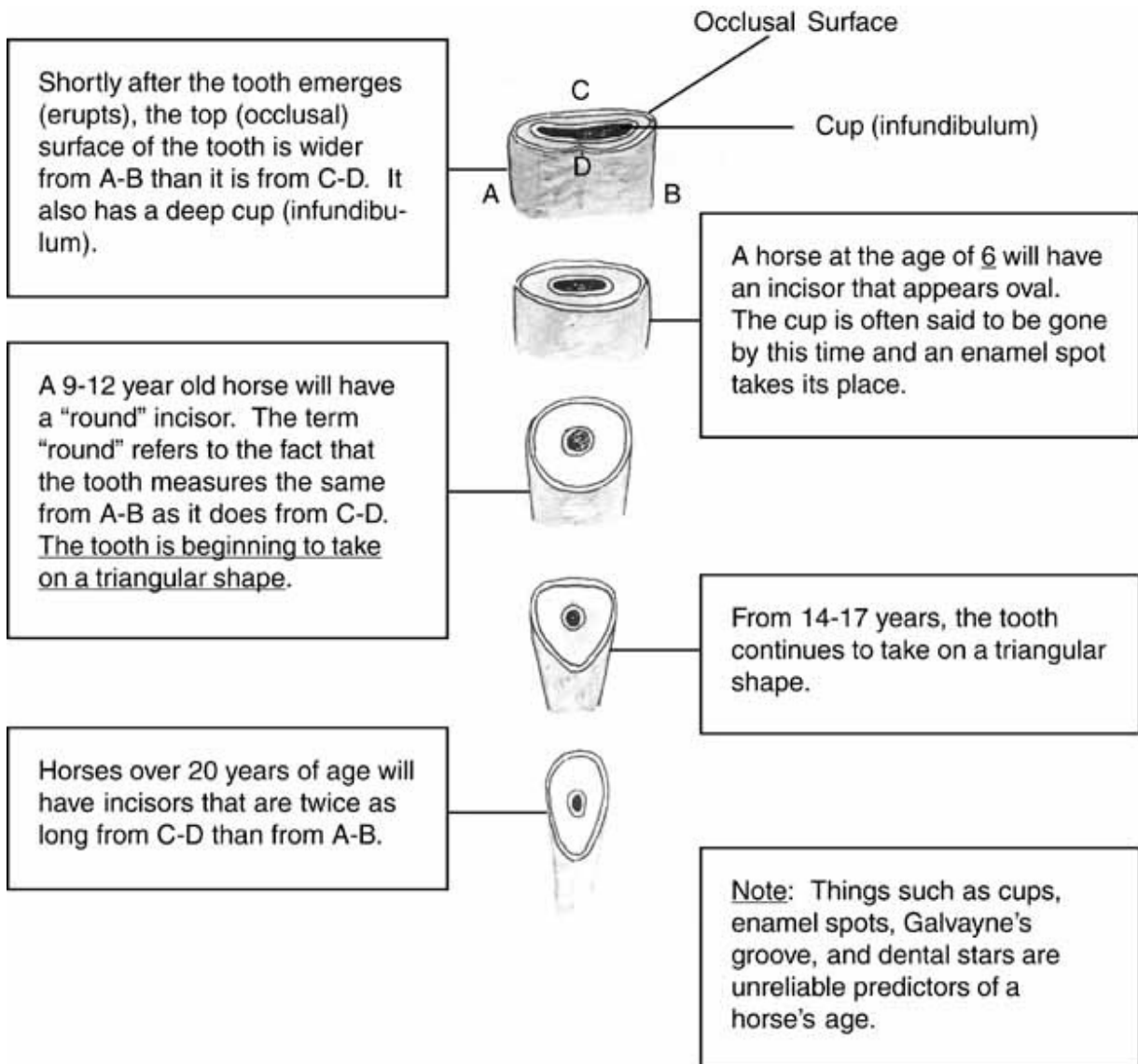


Fig. 3. Upper corner incisor taller than wide (age 15 years or above).

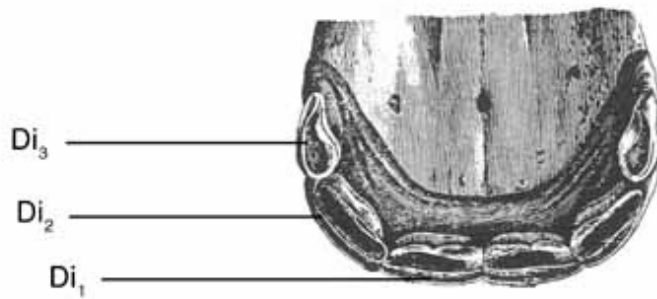


Fig. 6. Upper central incisors significantly narrower and shorter than middle incisors (older horse; usually older than 15 years).

PHOTOS USED BY PERMISSION, AMERICAN ACADEMY OF EQUINE PRACTITIONERS.



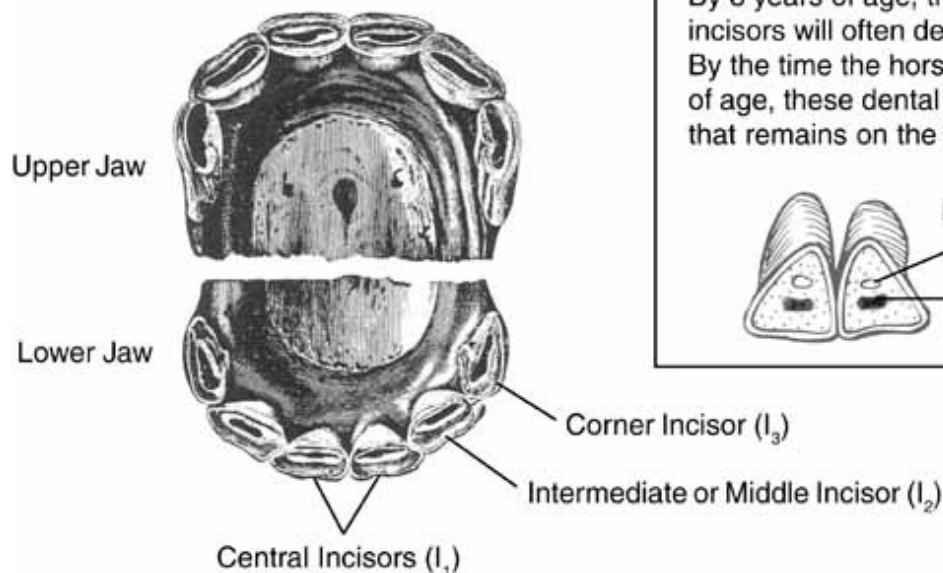
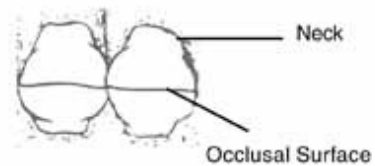




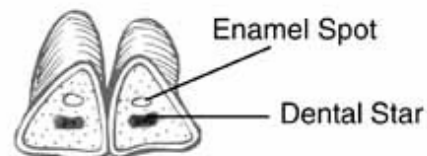
	$Di_1$	$Di_2$	$Di_3$
<b>Erupts</b>	8 days	8 weeks	8 months
<b>*In Wear</b>	1 year	1 year	2 years

\* In wear means that the occlusal surfaces are touching on both the upper and lower incisor.

**Foals and Yearlings:** The bottom deciduous incisors erupt or break through the gums at 8 days, 8 weeks, and 8 months. The deciduous teeth are wide at the occlusal surface and have a distinctive neck. They are smaller than permanent teeth.



By 8 years of age, the lower permanent incisors will often develop dental stars. By the time the horse reaches 16 years of age, these dental stars are often all that remains on the occlusal surface.





FIVE YEAR OLD



The central, intermediate, and corner incisors are permanent and all are in wear.

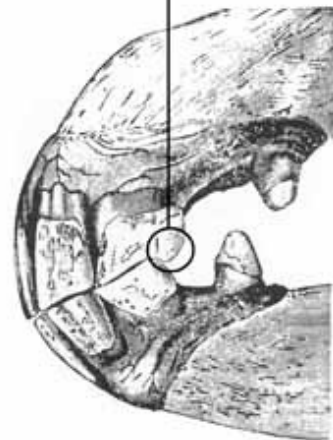
SEVEN YEAR OLD

Cups are still present in the lower corner incisors.

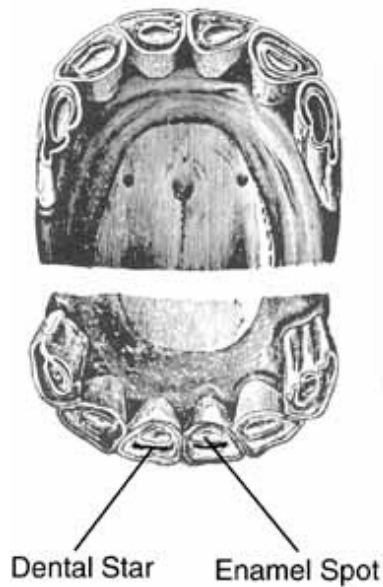


Cups are generally gone from the lower central and intermediate incisors.

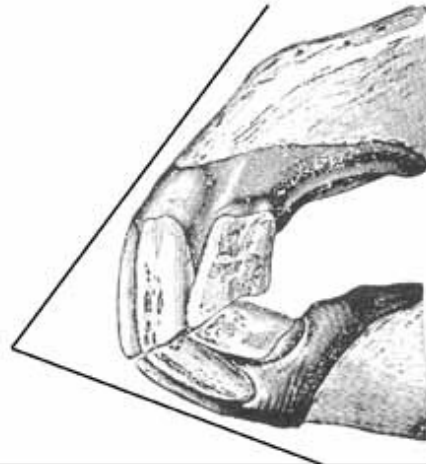
A small hook is often present on the top corner incisor.



TEN YEAR OLD

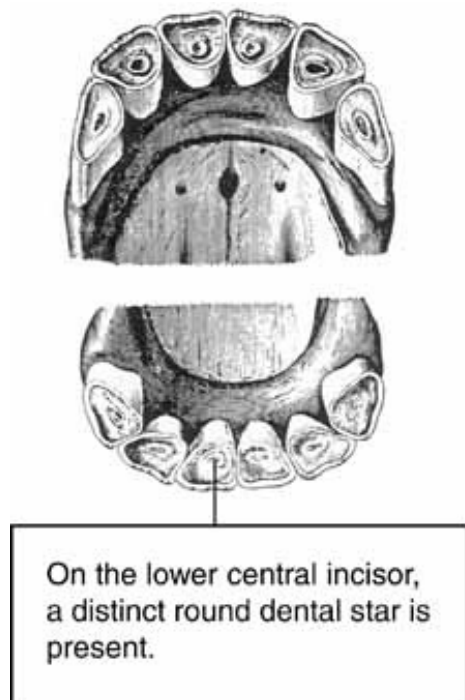


On the lower central incisor, the enamel spot (what remains of the cup) moves towards the tongue and the dental star is in the middle of the tooth.

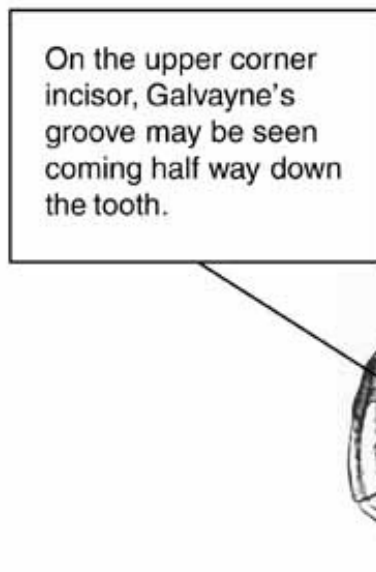


As the horse ages, the top and bottom rows of teeth become more V-shaped. Galvayne's groove may be seen at the gum line of the upper corner incisor.

FIFTEEN YEAR OLD

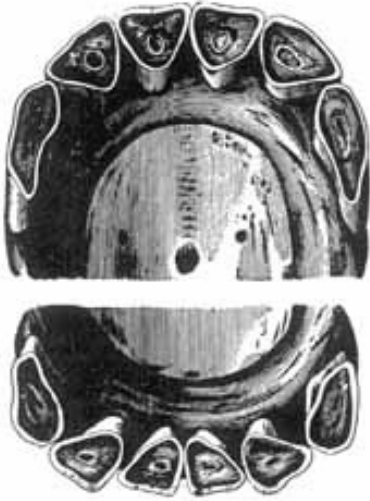


On the lower central incisor, a distinct round dental star is present.



On the upper corner incisor, Galvayne's groove may be seen coming half way down the tooth.

## TWENTY YEAR OLD



The lower central incisors are wider from front to back than they are from side to side. They may be worn nearly to the gums.



On the upper corner incisor, Galvayne's groove may extend completely down the tooth.

# THERAPIES

There are many therapies available for horses to treat various conditions, whether it's stiffness from strenuous work, acute injury or chronic discomfort from arthritis. The following therapies can help a horse stay comfortable, speed healing and help to maintain longevity and performance abilities.

## Cold Therapy

Cold therapy, also known as cryotherapy, is an effective method for alleviating pain and swelling. This simple and inexpensive treatment can be used for new or existing injuries or to help general recovery after a workout.

Cold therapy may take the form of ice, frigid water or commercial cooling products.

Cold hosing can be a way to immediately address swelling, but it usually cannot get cold enough for the best effect. A bucket of water supplemented with ice will be cold enough for effective therapy. You can also use a muck tub with a towel in the bottom for more secure footing. Alternatively, you can use ice packs that are pliable enough to wrap onto your horse's leg with a stable bandage or polo wrap. There are commercially available ice boots, and even higher-tech systems for cooling limbs, depending on how frequently you may need to use cold therapy.

Cold therapy is often effective in the following situations:

**Acute injuries:** When ice is applied to a part of the body, it numbs the tissue, which lessens pain. This is known as an analgesic effect. Also, when a horse damages tissue, damaged blood vessels in the area leak fluid into the surrounding tissues, creating swelling and pain for the horse. When tissues at a new injury site are dramatically cooled, the blood vessels constrict (vasoconstriction), which results in less swelling. The horse's body has less fluid to "clean up" afterward, which shortens healing time. The goal is to reduce the inflammatory response and reduce pain.

For acute injuries, the faster ice is applied, the better. It should be done for about 20-30 minutes at a time. You can do damage to the tissues if you do it too much or for too long, so a minimum of 30 minutes between treatment is necessary. The first 36 hours after an injury are the most important for applying cold therapy.

**Injury rehabilitation:** Cold therapy can aid in recovery from older injuries. During rehabilitation, ice therapy can encourage circulation around an injury site, bringing additional white blood cells and other natural chemicals that help to "clean up" an injury site of dead or damaged cells.

The alternating cooling and warming cycles brought about by icing intervals creates a "pumping" action that encourages and speeds up healing.

If rehabilitating a horse recovering from an injury, ice therapy can help minimize stress and inflammation to the area as the tissues begin working again. For this use, icing after exercise for 20 minutes is sufficient.

**Post workout:** For a horse in strenuous work, icing can help minimize inflammation. When a horse works hard, the capillaries that serve the muscles, tendons and ligaments expand to bring in needed blood. Once the work stops, the excess flow may persist and the fluid that is left is not only unnecessary, it can also spark inflammation, causing stretched tissues and soreness. This causes stocking up, which can be short- or long-term in nature. Using cold therapy restores post-workout circulation quickly by constricting the blood vessels.

## Arthritis Maintenance Medications

Arthritis is caused by chronic joint inflammation that leads to permanent degradation of the horse's joints. When utilizing "arthritis maintenance," the goal is to reduce inflammation, manage pain and minimize further damage.

Common approaches to arthritis management:

**Corticosteroid injections:** Injecting corticosteroids directly into the synovial fluid halts inflammation within a joint. Steroids are potent, relatively inexpensive, alleviate pain and can slow the progression of deterioration.

Typical joint injection treatment is done every six to twelve months. While the medication will not work for that length of time, the inflammation will be stopped and a greater range of motion will return, which allows for other therapies or changes in work to occur.

**Hyaluronic acid (HA) injections:** HA is a component of synovial fluid as well as articular cartilage. It can be injected directly into arthritic joints, or be given as an intravenous injection.

Both forms have an anti-inflammatory effect, and they also seem to stimulate the body to produce more HA, which thickens the synovial fluid and increases its cushioning ability within the joint.

HA injection protocols vary by product, but many veterinarians give one dose a week for three weeks.

**Polysulfated glycosaminoglycans (PSGAGs):** PSGAGs are naturally occurring compounds found in joint cartilage. PSGAGs can be used in both intra-articular and intramuscular injections. They have an anti-inflammatory effect, and are believed to stimulate the production of synovial fluid as well as prevent further degradation and facilitate repair of the cartilage.

Adequan is the PSGAG most frequently used and is injected into the muscle every four days over 28 days.



**Interleukin-1 receptor antagonist protein (IRAP):** IRAP blocks interleukin-1, a protein that can accelerate joint damage. It is naturally produced in the body, but there is a way to increase the amounts available.

The most widely used type of IRAP therapy involves taking blood from the horse and stimulating IRAP production as well as other beneficial mediators from the white blood cells. The resulting serum, called autologous conditioned serum (ACS), is then injected into the same horse's inflamed joints in three treatments once a week.

IRAP can be a viable alternative to injecting steroids into joints, especially for older horses or ponies, where steroid treatment could lead to laminitis.

**Platelet-rich plasma (PRP):** Platelets are small blood cells that are responsible for the clotting process. PRP therapy delivers a high concentration of platelets in the form of blood plasma to a lesion, increasing the amount of growth factors at the site, to help the injury heal. The plasma is created by spinning whole blood down in a centrifuge, eliminating the red and white blood cells and leaving behind a high concentration of platelets. A veterinarian injects the plasma directly into the lesion or to multiple areas immediately surrounding the lesion to aid in healing.

PRP therapy can be useful in treating tendon injuries, suspensory desmitis and lesions of the superficial digital flexor tendon. Most horses receive multiple doses.

**Stem cell therapy:** Stem cells are used in healing soft tissue because they can transform into any type of cell. These cells can be found in both bone marrow and fat. Once the small sample (either bone marrow or fat) has been gathered, there are two ways the cells can be prepared for administration.

They can be spun in a centrifuge (which is quicker, but tends to yield a lower number of usable stem cells as no increase or growth has taken place), or they can be sent to a laboratory for growth (which takes longer, but yields a more concentrated and larger stem cell population).

The veterinarian injects the stem cells either directly into the lesion (the most common method) or via an intravenous (IV) catheter. Because stem cells have the ability to "home" to the damaged area, the cells are able to travel through the horse's veins to the lesion.

Stem cells aid in inflammation reduction and also help fill in the lesion with more proper fiber alignment (as seen under a microscope) than lesions that heal without the aid of stem cells.

Although there is no set number of treatments required, many horses receive multiple stem cell treatments.

**Extracorporeal shock wave therapy (ESWT):** A method of applying energy waves to hard or soft tissue in a particular area of the body. It reduces pain and stimulates healing in some types of injuries. "Extracorporeal" refers to the fact that the treatment is given from outside the horse's body, in contrast to oral medications, injections or surgery.

The horse remains standing and is usually lightly sedated to keep it from moving excessively during the treatment. A veterinarian uses a portable unit to generate high-pressure acoustic (sound) waves. The apparatus is held against the injured area (bone, joint, tendon or ligament) for about twenty minutes. A typical course of therapy involves three treatments at three-week intervals, although use for back issues may only require a single treatment.

ESWT commonly leads to improved circulation due to blood vessel dilation in and around the injured area. Significant pain relief is almost immediately evident, although slight swelling and sensitivity may be noticed for a few days. ESWT also has a positive effect on the concentration of transforming growth factor beta 1, which stimulates cell activity. In addition, ESWT influences bone remodeling by thickening the outer layers and strengthening the cell network underlying joint cartilage.

ESWT is commonly used for hock arthritis and proximal suspensory ligament injuries. It is also used to treat back pain. It is sometimes used for other joint arthritis, tendon injuries and navicular syndrome.

USEF has rules regarding the use of ESWT, due to the numbing of nerves in the treated area. The numbness begins almost immediately after treatment and subsides slowly during the next two to four days. Horses shown during the pain-free period may suffer more serious injuries.

**Chiropractic:** A form of manual therapy that uses controlled forces applied to specific joints or anatomic areas to cause a healing response. This response is due to changes in joint structures, muscle function and neurologic reflexes. The principle common to all chiropractic theories is that joint malfunction affects the normal neurological balance found in healthy individuals.

The goals of chiropractic treatment are to restore normal joint motion, stimulate nerve reflexes, and reduce pain and abnormally increased muscle tone. Successful manipulation requires proper technique (i.e., correct direction, force, amplitude and speed).

The main indications for equine chiropractic evaluation are back or neck pain, localized or regional joint stiffness, poor performance, and an altered gait that is not associated with obvious lameness. Chiropractic consultation may be indicated in muscular or skeletal conditions that are chronic or recurring, not easily diagnosed or not responding to traditional veterinary care. The primary signs that equine chiropractors look for are localized muscular or skeletal pain, abnormally increased muscle tone, and restricted joint motion.

Trained equine chiropractors should be able to evaluate vertebral disorders and determine if the back problem has the potential to respond to chiropractic care or if the condition would be better managed with traditional veterinary diagnostics and treatment.



Horses with acute episodes of sprains or strains, arthritis, or impinged spinous processes are not good candidates for sole chiropractic care. However, chiropractic care may contribute to the rehabilitation of most cases after surgery or severe medical conditions by helping restore normal muscle and skeletal function. Chiropractic care cannot reverse severe degenerative processes or obvious abnormalities in tissue.

**Acupuncture:** Involves the insertion of a needle through the skin at predetermined sites (acupuncture points) for the treatment or prevention of disease, including pain. Acupuncture points are associated with certain anatomic structures of the nervous system. The effects of acupuncture therapy involve a series of interactions between the nervous system, the endocrine system and the immune system.

Acupuncture needling can increase local tissue immune response, improve local tissue blood flow, and aid in muscle and tissue relaxation. Some acupuncture points are known as “trigger points.” These are tender areas found in skeletal muscle associated with a tight band or knot in the muscle. Besides using acupuncture points for treatment purposes, reactivity of acupuncture points can aid in diagnosis. When palpated, these points might show some sensitivity if there is a problem at that point or with the acupuncture meridian or pathway that is associated with the point.

The most common acupuncture techniques include:

**Dry Needling:** Uses the typical “Chinese” or acupuncture needle.

**Aquapuncture:** Injects a fluid into the acupuncture point. The most commonly used fluid is Vitamin B 12.

**Electrostimulation/Electroacupuncture:** This procedure involves attaching electrodes to the acupuncture needles and applying a pulsating electrical current to them.

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USHJA Trainer Certification Manual & Study Guide, 2010

# HORSE WELFARE

Horse welfare is the concern of every horse person. Whether you are a rider, trainer, owner, parent or groom, it is your responsibility to ensure that horses are treated correctly and humanely.

Our sport is constantly changing, so become acquainted with proper horse handling and have a good working knowledge of the rules.

If you witness abuse or cruelty, you should take photographs or video and, if at a show, call the steward.

Here are some rules that explain inappropriate behaviors when dealing with horses:

## GR803 Use of Whips

No item may be used inside or outside the ring while showing a horse except one whip per handler. If whips are allowed, they must be no longer than six feet including the snapper or lash. No appendages of any kind are permitted. One longeing whip is permitted only when longeing. Some breed and/or disciplines may have use of whip division rules that depart from this rule and as such, the division rule governs. (GR151.1)

## HU106 Equipment (also found in JP111 Tack and Attire)

4. Whips. Competitors are prohibited from carrying a whip that is longer than 30" (75cm) while jumping or schooling over fences. A rider may not carry more than one whip. Whips that are weighted at the end are prohibited. (Exception: Ladies Side Saddle and appointments classes. See HU148.)

## GR839 Cruelty to and Abuse of a Horse

1. Cruelty to or the abuse of a horse present on the grounds of any Licensed Competition is forbidden, constitutes a violation under Chapter 7, and renders the offender subject to penalty. The Show Committee, or Competition Management in the absence of a Show Committee must bar violators from further participation for the remainder of the competition. It is the duty of the competition officials to report to the Federation any person who indulges in this practice for such further action as may be deemed appropriate.
2. Any person or trainer, as defined by Federation rules, who presents for competition a horse that exhibits signs of recent cruelty or abuse will be subject to penalty under this rule.
3. The Federation or the Judge, Steward, or TD may appoint a veterinarian to inspect any animal on competition grounds or entered to compete. Refusal to submit an animal for examination by an authorized veterinarian after due notification shall constitute a violation.
4. The following are included under the words Cruelty and Abuse but are not limited thereto:
  - a. Excessive use of a whip on any horse in a stall, runway, schooling area, competition ring or elsewhere on the competition grounds, before or during a competition, by any person. Except in emergency situations, any striking of the horse's head (on the poll and forward of the poll) with the whip shall be deemed excessive.
  - b. Any evidence of cruel or abusive training techniques.
  - c. Rapping the legs of a horse with the butt end of a riding crop or other implement.
  - d. Use of any substance or method to induce temporary heat.
  - e. Manual poling with any object.
  - f. Use of a wire or chain in conjunction with any schooling jump.
  - g. Use of electric device in schooling or showing.
  - h. Use of shackles, hock hobbles and similar devices (not to be construed as rubber or elastic exercising devices).
  - i. Showing a horse with raw or bleeding sores around the coronets, pasterns or legs.
  - j. Use of any explosive (e.g., fire crackers, torpedoes, fire extinguishers except in case of fire, etc.) or laser beam devices anywhere on the competition grounds, except in an exhibition or if required in class specifications.
  - k. Withholding of feed and water for prolonged periods.
  - l. Letting blood from a horse for other than diagnostic purposes.
  - m. Inhumane treatment of a horse in a stall, runway, schooling area, competition ring or elsewhere on the competition grounds, by any person.
  - n. Use of any object that prevents the horse's ability to close his mouth. (Exception: use of an oral speculum by a veterinarian or equine dentist to provide legitimate dental/oral medical care.)
  - o. Soring and/or the use of an action device on any limb of a Tennessee Walking Horse, Racking Horse, or Spotted Saddle Horse (each a breed not recognized by the Federation) in any class at a Federation Licensed Competition

is prohibited. An action device is defined by the USDA as any boot, collar, chain, roller, or other device that encircles or is placed upon the lower extremity of the leg of a horse in such a manner that it can rotate around the leg or slide up and down the leg so as to cause friction or strike the hoof, coronet band, fetlock joint or pastern of the horse. (Protective bell boots or heel boots are specifically excluded from this definition). The use of a weighted shoe, pad, wedge, in conjunction with a hoof band or other device or material (commonly referred to as a performance package) placed on, inserted in, or attached to any limb of a Tennessee Walking Horse, a Racking Horse, or Spotted Saddle Horse (each a breed not recognized by the Federation) constructed to artificially alter the gait of such a horse, and which are not protective or therapeutic in nature, at a Federation Licensed Competition is prohibited.

- p. Soring of any horse, including but not limited to the application of caustic chemicals to a horse's legs or hooves, in order to cause pain and/or affect a horse's performance, and/or used as a training technique.
- 5. Any action(s) against a horse by a competitor or an exhibitor, which are deemed excessive by a Federation judge, Federation steward, technical delegate or competition veterinarian, in the competition ring or anywhere on the competition grounds may be punished by official warning, elimination, or other sanctions which may be deemed appropriate by the Show Committee. Such action(s) could include, but are not limited to excessive use of the whip or spurs. Competitors and exhibitors have the right to contest any action taken pursuant to GR839.5 by filing a protest or grievance pursuant to Chapter 6 of the Rules for hearing and determination by the Hearing Committee.

## **HU100 Horse Welfare**

- 1. The following acts are prohibited:
  - a. Riding an exhausted horse.
  - b. Excessive pressuring of a tired horse.
  - c. Riding or longeing an obviously lame horse.
  - d. Excessive use of a whip on any horse in a stall, aisle, schooling area, competition ring or elsewhere on the competition grounds. The use of a whip must be for a good reason, done at the appropriate time, in the proper place and with appropriate restraint. Excessive whipping will not be tolerated.
  - e. Any striking of the horse's head (on the poll or forward of the poll) shall be deemed excessive.
  - f. Repeated jerking on the reins and sawing on the bit unless applied to an unruly horse that is jeopardizing its own safety or the safety of the rider.
  - g. Improper use of the bit resulting in bleeding, broken skin or broken mucous membrane.
  - h. Excessive use of the spurs or spurring resulting in broken and bleeding skin.
  - i. Rapping the legs of a horse with the butt end of a riding crop or other implement.
  - j. Use of any substance to induce temporary heat causing hyper-sensitization.
  - k. Poling.
    - l. Use of a wire or chain in conjunction with any schooling jumps.
  - m. Use of electronic shock devices in schooling or showing.
  - n. Use of shackles, hock hobbles and similar devices with the exception of kicking chains while the horse is in the stall or in transport. This does not prohibit the use of rubber or plastic exercising devices.
  - o. Showing a horse with hypersensitive, raw or bleeding sores around the coronets, pasterns, legs or body.
  - p. Use of laser beam devices anywhere on the competition grounds, except in an exhibition or if required in class specifications (Exception: Lasers used in a therapeutic manner).
  - q. Withholding of feed or water for prolonged periods.
  - r. Letting blood from a horse for other than diagnostic purposes.
  - s. Inhumane treatment of a horse in a stall, aisle, schooling area, competition ring or elsewhere on the competition grounds, by any person.

## **JP102 Horse Welfare**

- 1. Conduct in the competition ring:
  - a. Any action against a horse by a competitor in the ring, deemed excessive by the judge, may be penalized by any one or combination of the following: official warning, or elimination from the class.
  - b. Such action(s) could include, but are not limited to, excessive or improper use of the whip, spurs, reins, rider's weight or rider's hands.

- c. In addition, after consultation with the Competition Manager and a Competition Steward, additional penalties may be assessed, including one or more of the following: the issuance of an official warning card, disqualification from competing within the upcoming 24-hour period, disqualification from the balance of the competition.
  - d. All such violations must be recorded in the Steward's Report and, if cruelty or abusive behavior is evident, a charge must be filed against the individual.
2. Conduct outside of the competition ring: any action(s) against a horse by an exhibitor, deemed excessive by a Judge, Federation Steward, Certified Jumper Schooling Supervisor or Competition Veterinarian anywhere on the competition grounds may be punished by official warning or elimination from the class. Such action(s) could include, but are not limited to, excessive or improper use of the whip, spurs, reins, rider's weight or rider's hands. In addition, after consultation with the Competition Manager and a Competition Steward, additional penalties, including one or more of the following: the issuance of an official warning card, disqualification from competing within the upcoming 24-hour period, or disqualification from the balance of the competition. All such violations must be recorded in the Steward's Report and, if cruelty or abusive behavior is evident, a charge must be filed against the individual.

Drugs and medications must be used within the Drug and Medications guidelines. Consult your veterinarian or call the Drug and Medications hotline.

**USEF Rule Book, 2019**