

THE IMPORTANCE OF



The length and angle of your horse's incisors must stay consistent throughout his life because they affect the TMJ and molars, which in turn impact topline and muscle mass, brain function, agility, emotions and more.

Photo courtesy of Mary Ellen Pierce.

INCISORS AND THEIR EFFECT ON THE WHOLE HORSE

The importance of your horse's incisors goes far beyond eating – the health of these teeth is necessary for his overall well-being. Unfortunately, incisors may not always get the care they need. Consequently, improper length and angle, and a lack of anatomically correct rotation/guidance of the temporomandibular joint (TMJ), can cause pathologies that include hooks, ramps, waves and other irregularities on the molar table surfaces.

WHAT'S SO IMPORTANT ABOUT INCISORS?

What do we mean by proper incisor length and angle? If you look at the aging chart for horses (theedgeequine.com/equine-dental-aging-chart), you will notice a commonality – the length and angle of

By Spencer LaFlure

HAND FLOATS VS. POWER FLOATS

Does the type of float make any difference to your horse's oral health? In my opinion, power floats eliminate edges and points, thus reducing the natural inclination of the molar arcades. The heat from power floats polishes the surface of the molars, removing the natural texture of enamel folds across the entire surface of the teeth. In some cases, the heat may morph the tooth substance and the horse may be unable to lay down secondary dentin, the main component in a tooth's strength.

Depending on the age of the horse, teeth may take years to recover, or may never return to their natural state. The lack of texture and stability in the molars will impact the horse's ability to maintain body mass and perform to his full potential.

When molar surfaces no longer make contact due to improper inclination, they move vertically instead of laterally. This causes the temporalis muscles to enlarge due to the excessive vertical motion of the mandible. Commonly, the left temporal muscle is more enlarged than the right, due to over-floating by right-handed dentists or vets.

After a period of repeated power floats, there is a good possibility that the horse will develop hypercementosis, the hyper-eruption of incisors due to a lack of stability in the molars. If you research this on the web, you will find there is no known cure, only damage control using pain killers until the teeth become too loose and need to be extracted.

Extraction can be highly detrimental to a horse's health, since I believe there are neuroreceptors in the dentition surrounding the incisors. Instead of extraction, I use a procedure in which the upper incisors are gapped from the lower incisors by 2mm. This eliminates contact and stops hyper-eruption of the incisors. The incisors will then tighten up, and the molars will return to contact.

Hypercementosis has been around for about 20 years, and coincidentally, so have power floats. While extracting the incisors treats the symptom, perhaps looking at the cause will help reduce the epidemic of this dysfunction.

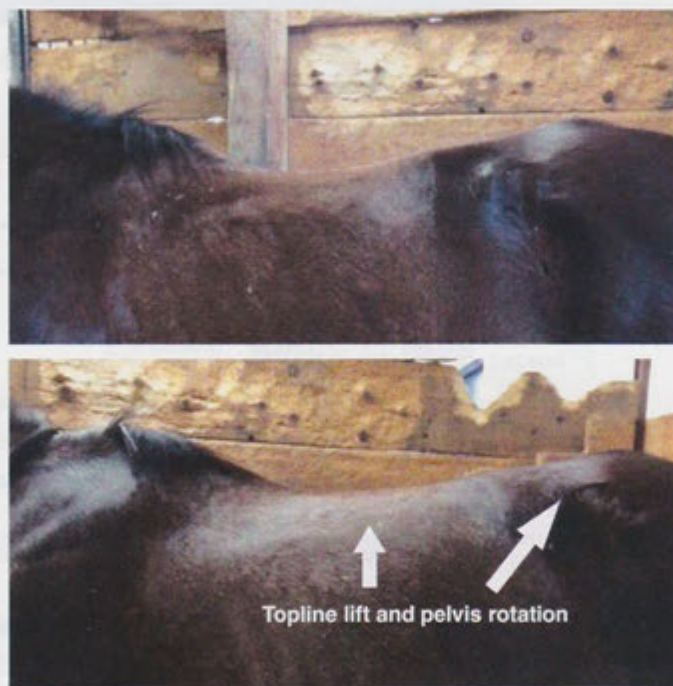
the incisors should never change throughout a horse's life, just like a properly balanced foot.

Horse owners would never let a horse get "long in the hoof". We understand that the foot needs to be trimmed to provide and maintain balance and function to the whole horse. But when it comes to dentition, this concept is misunderstood and often overlooked. Incisor length and angle must be consistent throughout the horse's life because they dictate TMJ rotation. The angle in the TMJ mirrors that of the molar table, and thus controls the balance on the surface of the teeth.

As the aging chart has consistently shown for a few hundred years, if the length and the angle of the incisors are correct, eruption and wear should be equal. An older horse who is "long in the tooth" is merely the result of eruption without equal wear.

HOW DOES BALANCING THE INCISORS AFFECT THE WHOLE HORSE?

Balancing incisors to be anatomically correct for each individual horse affects his whole body, starting with proper rotation of the TMJ. In a study performed on dude ranch horses from 12 to 20 years of age, researchers used a balanced dentistry paradigm* to attempt to restore each horse's muscle mass to that of a more youthful animal. To measure the results, they utilized terrestrial photogrammetry, a science used in human medicine to document tumors and aneurysms, and which can detect changes within 5 microns (less than the thickness of a human hair). No feed or



Photos courtesy of Montana Harman.

WHAT IS PROPRIOCEPTION?

Proprioception means "sense of self". In the limbs, the proprioceptors are sensors that provide information about joint angle, muscle length and muscle tension; this information tells the brain about the positions of the horse's limbs in space. Proprioception is the process by which the body can vary muscle contractions in immediate response to incoming information about external forces, by utilizing stretch receptors in the muscles to keep track of joint positions in the body.

In the TMJ, a group of enteroreceptors provides information about the position of parts of the body in space – they are the receptors of posture and movement. They are highly specialized types of mechanoreceptors (consisting of the terminal dendrites of sensory neurons encapsulated in structures of connective tissue) that respond to tension or movement included by associated structures.

The proprioceptors of the musculoskeletal system are found in the tendons and muscle fibers. These proprioceptors include:

1. The muscle spindles (stretch receptors): these are the primary proprioceptors in the muscles and are sensitive to changes in muscle length. Found in the body of the muscle, they allow a horse to know when to stretch his legs while in motion.
2. The Golgi tendon organ: this proprioceptor in the tendon near the end of the muscle fiber is sensitive to changes in muscle tension. For example, for a weight lifter, the Golgi tendon organ senses how much tension the arm muscles are exerting. If the muscle has too much tension, the Golgi tendon organ will prevent it from creating any force (it's at this point that the weight lifter would probably drop the weight or realize he has to put it down). This helps prevent injury.
3. The Pacinian corpuscle (PC): PCs are encapsulated end organs of peripheral nerves. This proprioceptor is responsible for detecting changes in movement and pressure within the body. In joints, they are activated under compression through angle changes in the joint capsule. PCs are also the most sensitive mechanoreceptors and play a significant role in haptic perception, the tactile sense that provides animals with vital information about their immediate environment, such as object location and surface properties.


environmental changes took place over the length of the study. Within two months, there was an average overall gain of 69.3% in the horses' topline mass.

How were these changes achieved? When a horse's TMJ is able to properly rotate, the anterior/posterior motion of its mandible is increased, which in turn increases the range of motion in the horse's entire body. Increased range of motion leads to increased muscle stretch, stimulating the local release of hormones allied to the insulin-related growth factor. The result is an increase in the number and length of sarcomeres, the basic element of a striated muscle fiber. The ability to move and therefore stretch through the topline stimulates the development of these muscles.


PROPRIOCEPTION AND NEUROLOGICAL FUNCTION

The importance of the TMJ isn't limited to just movement and muscle mass gain – it also has huge neurological significance.

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Posture change,
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The TMJ in a horse's body is the joint that's closest to the brain and brainstem, and the most proprioceptive. Correct rotation of the TMJ is the cornerstone of your horse's neurological function. Neurological function starts with proprioception.

The constant stream of proprioceptive information from the muscle spindles and the Golgi tendon organs (see sidebar on previous page), which occurs as the joints are moved and the muscles change in length, provides the central nervous system with detailed information concerning the body's current position and changes in its orientation.

THE FINAL ANALYSIS

By balancing the teeth, we allow the TMJ to function properly, thus allowing the horse to receive maximum proprioceptive information. To the average horse owner, this translates into a horse with an awareness of his surroundings and the ability to adapt to changing situations, whether they occur in the environment or on terrain.

To a performance horse owner, this translates into increased stride length and power, diminished risk of injury, more agility, greater ability to learn, increased calmness, improved anaerobic threshold, and the list goes on.

Through research and continuing education, we can continue to move towards a more precise understanding of the interconnection between a horse's neurology and his teeth. 🐾

**Based on the Natural Balance Dentistry approach.*

Spencer LaFlure, founder of Natural Balance Dentistry (NBD), is director of Dental Studies at the Center for Natural Balance Horse Dentistry in Athol, NY. For more information visit centerfornaturalbalancehorsetdentistry.com or email us at 4thorse@gmail.com.