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Equine Vision and Its Effect on Behavior

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The more we know about the natural behavior of horses and why they react the way they do, the more we are able to work through problems. One aspect that may cause a horse to react differently than humans is its vision.

Eye Placement and Field of Vision

The horse is a prey animal in the wild and needs to have a large field of vision to see its predators early and outrun them. In order to have this wide field of vision, the eyes of the horse are large and placed out on the corners of it head giving it almost a 360-degree field of vision. Additionally, the eyes are placed high up on the head allowing it to have the greatest field of vision while down grazing.

A horse with small eyes may be more limited in its field of vision which can cause the horse to be spookier. A pig-eyed horse, with inset eyes may also exhibit the same problems with its field of vision.

Blind Spots

A problem with having the eyes set out on the side of the head is that there is a blind spot created directly in front of and behind the horse. The area in front of the horse may be a true blind spot, or an area of indistinct vision, depending on how far out the eyes are set. This area is triangular in shape, wide at the eyes and comes to a point about 3-4 feet in front of the horse. The area behind the horse is just slightly wider than the width of the horse's body and goes on indefinitely if the horse stands with it head straight in front of it. It is important to understand the existence and location of these blind spots so as to avoid standing in them for extended periods of time. The horse can lose track of us when we cross behind it and may startle when we reappear in the other eye. These are also areas where we may be injured due to the horse's lack of vision. At the front end, the horse could strike out with a front hoof or could knock over the handler if scared

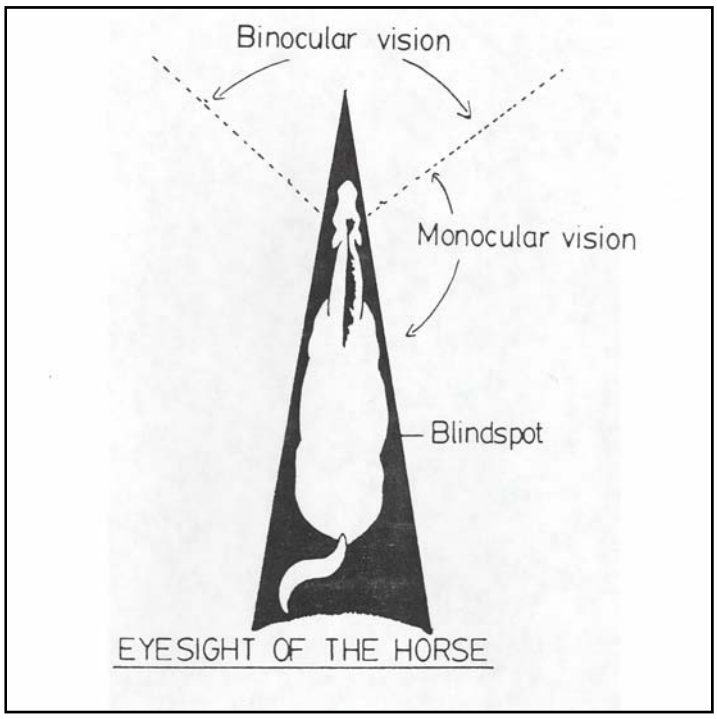

Figure 1. Adapted from Horse Industry Handbook.

from behind as it jumps or runs forward. At the hind end we need to be more concerned with the horse's ability to kick with one or both hind legs, having potential to do great harm. We should always make sure to approach the horse in areas of clear vision; one such area is the shoulder. Here the horse can see us and also we are not in the path of the front or hind hooves. Always speak to a horse when approaching it so as not to surprise it with a touch if it is dozing.

Regions of the Eye

Another aspect of the horse's vision that is different from ours is different areas of the eye for distinct and less distinct vision. One such area is the horizontal strip in the center of the eye which has a high number of ganglion allowing for a more distinct vision. The area outside of this strip is where motion is detected to alert the horse. The horse will then bring the object into the distinct area to determine if the object is something that should cause flight. To bring the object into clearer vision the horse will usually lift, lower, or tip its head to make use of the strip in its eye. The horse also only has two types of cones which allow some color vision. While further research needs to be performed, present data shows that horses can distinguish between blue and red but the horse might have difficulty with green and yellow (Timney & Macuda, 2001). They also have a large number of rods, more than humans, which allow superior night vision, a benefit in the wild.

Types of Vision

Horses also differ in how they see objects by having the ability to see with each eye (monocular vision) independently so they may see what is happening on each side of their body. This vision is flat visions unlike the three-dimensional vision humans have. It is used more for identifying movement at far distances. The horse's eyes "have an incredible ability to detect motion. The horse can see a small bird flutter in a tree across a canyon. Movement may mean danger and danger, of course, means move the other way at top speed" (Miller, 1999, p. 25). Horses also have the ability to view in front with both eyes (binocular vision) which gives three-dimensional vision with depth perception. If we understand this aspect of a horse's vision, we will allow the horse to view new objects in a more comfortable manner. Usually the horse will want to put its nose down to view and touch something that it will walk over. This allows the horse to use the binocular vision with better depth perception (McGreevy, 2004). If something scares the horse from behind it usually will jump forward and spin around so that it can use binocular vision. The horse cannot use both monocular and binocular visions at the same time, but must switch from one type to another by position of the eyes and head.

Head Position and Its Effect on Vision

The position of the horse's head can enhance or inhibit the horse's vision. A horse uses binocular vision very well when its head is extended and it looking past its nose. If we confine the horse's head in a position where the nose is behind the vertical, forward vision is inhibited, not allowing the horse to see where it is going (Figure 2). This can create a dangerous situation when riding as we approach an obstacle, jump, or unlevel ground.

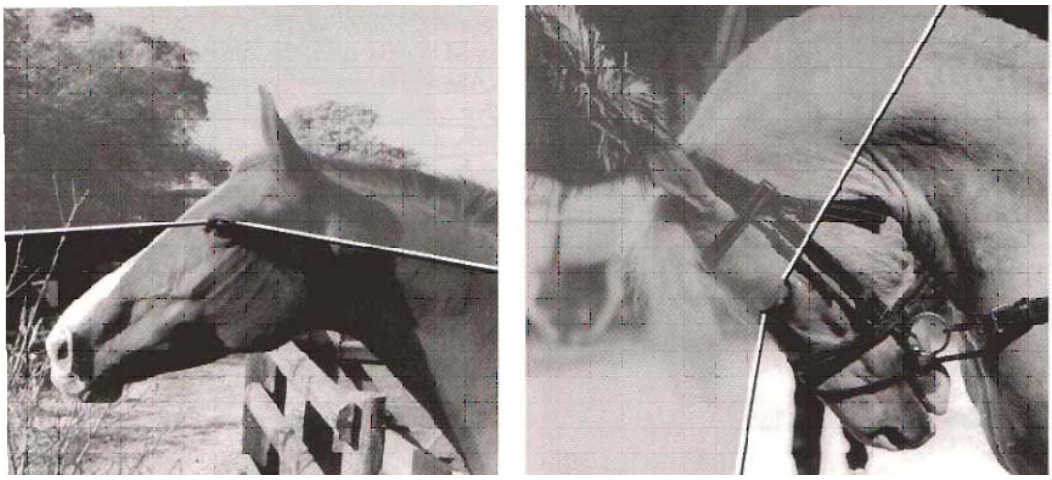

Figure 2. (Left) The visual field in front of a horse when allowed to carry its head naturally. (Right) The blind area in front of a horse when over-bent. Reproduced with permission, Elsevier's Health Sciences Rights Department,, Philadelphia.

Transferring of Information in the Brain

Until just recently it was thought that horses could not transfer information from one side of the brain to the other. This meant that information from one eye did not cross over to the other side of the brain. This has been the long time explanation for why horses acted differently when viewing an object first with one eye and then the other. While horses do need to be worked with on both sides to make them even in their responses, it is not due their inability to transfer information. Research by Hanggi (1999) demonstrated that horses do transfer information from one hemisphere to the other.

Conclusion

Equine eyesight is very important in our interactions with the horse. The horse will see movement and possibly react long before a person. As we gain more understanding in how the horse views the world, realizing that it is different from how humans view the world, we can work with them in a more realistic and safe manner. Exposing the horse to many objects and environments will help the horse not to over react to harmless everyday objects and situations.

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