Laterality in Horses: What We Know and How Can It Help Us

Diane Howard, MMCP

In mentoring and coaching fieldwork students, some of the most frequent questions asked are about diagonals, for example, how to determine the diagonal and whether the diagonal can change between sessions. The certification course, in particular, provides excellent information on these issues, but because laterality in horses has been the subject of a fair amount of scientific study, in this article I'd like to summarize some recent findings. In addition to looking at *physical* laterality, I will introduce some fascinating research on *behavioral* laterality.

Physical laterality: Is it natural?

Another way to word this would be, "Do horses have foot dominance in the way that people are right or left handed?" The answer is that they, in common with other mammals, seem to have a favored side, which doesn't change, and that when the left foreleg is preferred, the right front and left hind (the diagonal we usually see) will be stronger, making it easier for the horse to bend to left, but causing problems bending to the right. The restriction in right bending is likely to create the reactivity in the upper right neck that we see so often. There's a very clear discussion of this sidedness and its consequences in the Meiji and Meiji article listed below, which is an old study, but well worth reading.

However, it should be noted that the Meiji and Meiji study was done in only 30 horses that were primarily adult Thoroughbreds who had already received a considerable amount of training. A more recent study in 29 nine-month-old untrained foals (Italian Saddle Horses, Lipizzans) found that 31% of the youngsters had a tendency to fall in when circling on the right, while the remainder of the foals circled evenly on both sides (i.e., were apparently ambidextrous). When 17 two-year-old horses who had been handled bilaterally but not yet been ridden were tested, 91% cut the circle on the right, showing that—as Meiji and Meiji suggested—difficultly flexing to the right was caused by an inability to bring the right hind under to support flexion to the right. These findings also suggest that laterality and asymmetry increase naturally with age (Lucidi, et al., 2013). The 91% figure is very much in keeping with the percentage of RF/LH horses we see.

There is also some degree of breed variation in laterality, with Thoroughbreds having a left side preference, making them typical RF/LH horses, and Quarter Horses being mainly ambidextrous (Beaver, 2019—I can hear all you QH fans cheering). And to answer the question about whether laterality and asymmetry are natural, a study measuring features such as third metacarpus length and width, carpal and tarsal joint width, and even nostril length and width in 100 animals found that directional asymmetry in horses and ponies is most likely a species trait that develops *in utero*, with right side traits usually longer and left side traits usually wider (Lesniak, 2013). So, while we can reduce asymmetries in our horses through bodywork, laterality appears to be an inherent trait and not something caused by human handling. It's one reason ridden or driven horses need bodywork.

Behavioral laterality

Laterality is not only expressed in movement, but also, due to specialization in the two hemispheres in the brain, in emotional responses. Because of the lateral placement of the equine eye, behavioral responses related to vision are particularly convenient to measure.

As everyone remembers from biology class, input from the eye on the left side is processed in the right hemisphere and vice-versa. In many species, running the gamut from toads to baboons, the right hemisphere responds to fear, novel objects, and in aggressive encounters (Austin and Rogers, 2012). In horses, who have a high rate of optic nerve fibers crossing from the eye to the opposite hemisphere (the crossing rate in humans is about 50%; in horses, it's above 80%), this predicts that the left eye will be associated with the negative emotions listed above.

In fact, several studies have shown this to be the case, including an observational study of feral horses in which a left eye bias was seen for agonistic behavior, vigilance, and reactivity (Austin and Rogers, 2012). More to the point for what we do, a 2011 study by Sankey and colleagues found that previously untouched young horses displayed more negative reactions when people approached them from the left and exhibited threat behavior when touched on the left shoulder. Conversely, they were generally accepting of being approached from the right and being touched on the right shoulder.

How to use laterality as bodyworkers

Jim's comment about starting on the left side because it's normally the easier side refers to physical tension and the usual RF/LH tension pattern (Masterson, 2011). Also, horses are used to being approached from the left, so this is simply a part of normal life for most of them. However, when working with very reactive horses or horses that are relatively new to being handled, the right side is the emotionally easier side. Knowing this can really help in getting a nervous horse comfortable in working with you and behavioral laterality is something to keep in mind when handling horses that are slow to settle.

References

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Lucidi, P., et al. (2013). Assessment of motor laterality in foals and young horses (*Equus caballus*) through an analysis of *derailment* at trot. *Physiology & Behavior, 109*, 8-13. Abstract only available at: https://www.ncbi.nlm.nih.gov/pubmed/23201413 (The article also has a lovely description of the care and kindness with which the young horses are trained at the Grosseto Military Center in Italy.)

Masterson, J. (2011). *Beyond Horse Massage*. North Pomfret, Vermont: Trafalgar Square.

Meiji, H., and Meij, J. (1980). Functional asymmetry in the motor system of the horse. *South African Journal of Science, 76*(12), 552-556. Available at: https://journals.co.za/docserver/fulltext/sajsci/76/12/5543.pdf?expires=1564474792&id=id&accname=guest&checksum=FDD328173339DE700A9027BD6414A76C (An old study, but very clear explanation of limb preference and resulting asymmetries under saddle. If the link doesn't work, Google the title.)

Sankey, S., et al. (2011). Asymmetry of behavioral responses to a human approach in young naïve vs. trained horses. *Physiology & Behavior, 104*(3), 464-468. Abstract only available at: https://www.sciencedirect.com/science/article/abs/pii/S0031938411002319?via%3Dihub