

# ADVANCED EQUINE BIOMECHANICS

## Equine Biomechanics: The Natural Gaits

For a non-veterinary equine professional, such as a veterinary technician or soft tissue therapist, knowing the exact footfall of each gait is overly onerous. This is the realm of veterinarians and dressage judges. However, understanding some basic concepts of each gait and how it should look is extremely important. Often, seeing something “odd” in a gait will be your first clue that there is an issue that needs addressing.

The ideal way to view a horse’s gaits is in a large, flat, open area without any tack or handler influence, such as an arena. However, this is not always possible for a variety of reasons. The next best way is to have a horse led on a loose lead line in straight lines, with you (the therapist or technician) watching from behind, and then from the side.

The least preferable way to evaluate the gaits is on a tight circle or in a small round pen, as this can make sound horses appear lame. In a study conducted in the early 2000s, a group of experienced equine veterinarians were asked to determine a specific subtle limb lameness while watching horses moving straight versus on a circle. The majority of the veterinarians were unable to accurately determine the subtle lameness when the horse was on a small circle. If a group of licensed veterinarians have trouble, then even the most gifted technician should think twice before trying to assess gaits on circles.

That said, if the only option is to watch a horse being lunged, it is best to do so in a large round pen (loose) or on the largest lunge line available (around 30 ft / 10 m). The take-home message is that it is better to develop your ability to assess movement on a simple lead line with the horse moving in a straight line.

Master watching the gaits of horses that are loose first, before progressing to evaluating gaits in horses under saddle.

First, let’s discuss each gait.

## The Natural Gaits

### THE WALK

The walk is a four-beat gait, meaning that in each cycle of movement there are four separate footfalls, and each hoof strikes the ground at a different time than the others. In a walk sequence, only one foot is completely off the ground at a time. However, there are several times in the walk sequence when only the tip of one foot is on the ground, essentially leaving only two limbs supporting all the weight.

In the walk, there is always at least one hind foot and one forefoot on the ground at the same time. The walk should have a diagonal motion, meaning that front and hind limbs on opposite sides of the body are often in opposite motion, and limbs on the same side of the body are not protracting or retracting together.

This latter motion describes a lateral walk or pacing, which is natural only in a subset of gaited and Standardbred horses, but in almost every other circumstance reveals a disruption to normal gait biomechanics. One of the reasons upper-level dressage horses are scored double points on their walk gait portion of the dressage test is because chronic training flaws (such as overuse of the hands) often reveal themselves in a distorted walk gait.

Subtle lameness issues can easily be masked at a walk, and it often takes a practiced eye to note a slight restriction in the ease of the walk gait.

In the natural walk, because there are generally two to three limbs on the ground at all times, the back does not work as much as in the other gaits and remains in a more “suspended” state.

The horse in the video below is one of the author’s client horses who was quite elderly but still being ridden and in excellent health and care.