

How Many Gaits Are There?

Dressage horses may have more than you think

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SEPARATE GAIT? Biomechanically, piaffe (performed here by Liberty and Yvonne Barteau) stands alone

A FEW MONTHS AGO, I WAS ASKED a question about the gaits of dressage horses that made me pause to think about these gaits and how they fit within the broader spectrum of equine gaits. In this article, I'd like to share some of my thoughts on this issue and to stimulate a philosophical discussion of the classification of the gaits used in dressage.

What Is a Gait?

A gait is a repetitive pattern of limb movements. Specific gaits are recognized by the sequence of the footfalls and the coordination of movements of the four limbs, which determine the number of beats and the rhythm of the footfalls that are characteristic of each gait.

In the animal kingdom, horses are particularly versatile in terms of the number

of gaits that they can perform, either naturally or after training. In my book *The Dynamic Horse*, I describe more than 20 gaits that have been included in my re-

search program, and this is certainly not a comprehensive list. True, some gaits are difficult to distinguish from others, and aficionados of various breeds may assign their own names to gaits that are biomechanically quite similar. Regardless of the exact number of equine gaits, however, only a small fraction are used in dressage.

Dressage Gaits

In dressage horses we recognize three basic gaits: walk, trot, and canter. Let's review the characteristics of each.

To help you to visualize the pattern of limb movements for each gait, I'll describe the *footfall sequence* and the *limb-support sequence*. The footfall sequence is the order in which the footfalls occur. The limb-support sequence indicates which combinations of limbs support the body sequentially during each stride. It can be represented simply as a number, or it can be described in greater detail by showing which limbs are involved. In the following table, I've used the abbreviations LF (left front), RF (right front), LH (left hind), and RH (right hind).

LIMB SUPPORT PHASES IN DRESSAGE HORSES			
Number of Supporting Limbs	Type of Support	Limbs in Contact with the Ground	Gaits
0	Suspension	none	Trot, canter
1	Unipedal	LH, RH, LF or RF	Canter
2	Bipedal	Diagonal pair: LH and RF or RH and LF	Walk, trot, canter
	Bipedal	Lateral pair: LH and LF or RH and RF	Walk
3	Tripedal	Both hind and one front: LH, RH, and LF or LH, RH, and RF	Walk, canter
	Tripedal	One hind and both front: LH, LF, and RF or RH, LF, and RF	Walk, canter
4	Quadrupedal	LH, RH, LF, and RF	Piaffe, reinback

Now let's look at each gait in detail. In the following descriptions, I've begun each stride with the left hind leg (LH) contacting the ground.

The Walk

In the walk, each limb moves independently and strikes the ground separately, so there are four distinct footfalls or beats in every stride. This gives the walk a four-beat rhythm.

Walk Footfall Sequence

LH : LF : RH : RF

The walk limb-support sequence alternates between phases of bipedal support (a lateral or diagonal pair) and tripodal support (two hind limbs and one front limb, or one hind and two front limbs). There are eight limb-support phases in each complete walk stride.

Limb-Support Sequence of Walk

3 : 2 : 3 : 2 : 3 : 2 : 3 : 2

LH-RF-RH : LH-RF : LF-LH-RF :

LF-LH : RH-LF-LH : RH-LF :

RF-RH-LF : RF-RH

The Trot

The limb movements in the trot are coordinated by diagonal pairs, so the footfall sequence is LH and RF together followed by RH and LF together. (Sometimes there is a slight diagonal dissociation or advanced placement between footfalls of the diagonal pair, but because this is not visible without slow-motion replay, I have not addressed it in this article.) There are two beats per stride.

Trot Footfall Sequence

LH AND RF : RH AND LF

Between each diagonal support phase, the diagonal pair of limbs pushes off into an aerial or suspension phase. Thus the support phases alternate between diagonal bipedal and suspension. There are four support phases in each stride.

Limb-Support Sequence of Trot

2 : 0 : 2 : 0

LH-RF : AIRBORNE : RH-LF :

AIRBORNE

The Canter

In canter, the movements of one diagonal pair of limbs are synchronized, so there are three beats per stride. Because canter is performed with a leading limb, there are two possible footfall sequences, one for the left lead and one for the right lead, which are mirror images of each other. The right-lead sequence is shown in the footfall and limb-support sequences below.

Canter Footfall Sequence (Right Lead)

LH : RH AND LF : RF

There are six support phases in each canter stride, starting with the LH. After the diagonal pair of limbs contacts the ground, the horse is supported by LH, RH, and LF. The LH leaves the ground, so the RH and LF are in a phase of bipedal support. The next limb to contact the ground is the RF, which initiates a period of tripodal support of the RH, LF, and RF. The diagonal pair then lifts off, leaving the RF in unipedal support. Finally, the RF pushes off into a suspension phase.

Limb-Support Sequence of Canter (Right Lead)

1 : 3 : 2 : 3 : 1 : 0

LH : LH-RH-LF : RH-LF :

RH-LF-RF : RF : AIRBORNE

Are Some Movements Actually Gaits?

Most of the movements in dressage competition, including leg-yield, shoulder-in, travers, renvers, half-pass, pirouettes,

MEET THE EXPERT

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counter-canter, and flying changes, are performed using the footfall sequence and limb-support sequence of walk, trot, or canter. The question that gave me pause for thought was where the passage, the piaffe, and the reinback fit into the gait spectrum.

Passage

The FEI Rules for Dressage describe passage as "a measured, very collected, elevated and very cadenced trot." The limbs move by diagonal pairs, giving the passage a two-beat rhythm.

Passage Footfall Sequence

LH and RF : RH and LF ➤



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Diagonal stance (ground contact) phases are separated by suspension phases, so the support phases alternate between diagonal-support and suspension phases.

Limb-Support Sequence of Passage

2 : 0 : 2 : 0

LH-RF : AIRBORNE : RH-LF :
AIRBORNE

The passage has the same footfall sequence and the same limb-support sequence as the trot, suggesting that it is appropriately classified as a type of trot rather than a separate gait.

Piaffe

The FEI Rules state that "piaffe is a highly collected, cadenced elevated diagonal movement." The limbs move by diagonal pairs, which gives the piaffe a two-beat rhythm.

Piaffe Footfall Sequence

LH and RF : RH and LF

Although the steps of piaffe should have cadence and swing, there are no suspension phases, so the piaffe limb-support sequence alternates between diagonal bipedal support and quadrupedal support.

Limb-Support Sequence of Piaffe

2 : 4 : 2 : 4

LH-RF-RH-LF : LH-RF :
RH-LF-LH-RF : RH-LF

Although the presence or absence of a suspension phase in piaffe may still be a controversial topic, I have not encountered piaffe steps with consistent suspension phases, either in competition horses or in horses at the Spanish Riding School of Vienna. If the piaffe really does have a different limb-support sequence than the trot, with the piaffe including quadrupedal support but not a suspension phase, then it might be considered a distinct gait.

Reinback

The FEI Rules describe the reinback as a "rearward diagonal movement with a two-beat rhythm but without a period of suspension."

Reinback Footfall Sequence

LH and RF : RH and LF

Unlike the trot, the reinback lacks a suspension phase. Instead, the reinback support phases alternate between diagonal bipedal and quadrupedal. There are four support phases in each stride.

Limb-Support Sequence of Reinback

4 : 2 : 4 : 2

LH-RF-RH-LF : LH-RF :
RH-LF-LH-RF : RH-LF

Reinback resembles piaffe in that it has a diagonal two-beat rhythm and a limb-support sequence that alternates between diagonal and quadrupedal support without a suspension phase, but with the obvious difference in the direction of movement. This suggests that reinback might also be considered a distinct gait.

The Five-Gaited Dressage Horse?

My purpose in writing this article was to stimulate discussion about how we define and classify different gaits. The gait descriptions I used conform to the ideal as specified in the FEI Rules for Dressage. If we accept the original definition of a gait as a repetitive pattern of limb movements, with specific gaits being recognized and distinguished by the sequence of the footfalls and the coordination of movements of the four limbs, it could easily be argued that dressage horses have five gaits: walk, trot, canter, piaffe, and reinback. What do you think? ▲



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