What Are the Biomechanical Reasons We Teach The Horse Leg Yield Before Half Pass?
Dr. Sheila Schils, Ph.D.

When we are training horses we are told that teaching the horse leg yield should precede the teaching of half pass. We accept that strategy and then one day a student comes along and asks “why do we teach leg yield before half pass?” We may then find ourselves struggling to answer that question, and then we also may wonder – why exactly DO we teach leg yield first?

The horse is taught the leg yield in the first year of training to some degree. The leg yield is performed with the horse slightly bent away from the direction of movement (FIGURE 1- leg yield to the right). Due to the physical structure of the joints, it is more difficult for the horse to move side ways when bent in the direction of the movement, which is the position for half pass (FIGURE 2- half pass to the right). When discussing these general characteristics, we are talking about balanced movements, when the horse is truly set on being disobedient, it is amazing what physics principles they can overcome.

FIGURE 1  Leg Yield to Right
FIGURE 2  Half Pass to Right

FIGURE 1  Leg yield to the right. Movement of the horse is away from direction of bend. Horse is bent slightly to the left and movement is to the right.
FIGURE 2 Half pass to the right. Movement of the horse is toward direction of bend. Horse is bent to the right and movement is to the right.

In general, we teach both leg yield and half pass to assist the horses in finding their balance under saddle. Almost all horses, (like all of us) will tend to lean more to one side than another. Specifically, leg yield and half pass helps to shift the weight of the horse from side to side while moving forward. The horses should be able to shift their weight between their two right legs and their two left legs. This is an important skill for horses to learn so that they can carry their weight, and the weight of the rider, evenly distributed between all 4 legs, not just on the two legs that are the strongest and most coordinated. This is the same reason why we should try to carry water buckets with both our right and left hands, so we stay balanced and don’t over use one set of muscles.

An earlier article on turning (See “The Biomechanics of Turning a Horse”) discussed how and why horses move away from and toward their direction of movement. A quick review of these concepts will offer some useful background as to why leg yield and half pass are taught at different points of the horse’s education.

1. The horse is rigid in the inside belly and therefore to get around a corner the horse flexes to the outside (relative to the turn) and places almost all of their weight on the inside legs to get around the corner. (FIGURE A, FIGURE B) This is a “leg yield” type movement to the inside with the horse crossing the legs on the outside of the circle over the legs to the inside of the circle. However, rather than being balanced during this movement the horse falls to the inside of the circle. Because the horse is so stiff, this movement doesn’t feel very comfortable or balanced. The legs on the outside of the circle are so unweighted, they almost appear to be higher than the inside legs

2. The horse is taught to “give” in the belly and bend in the direction they are going. The inside leg of the rider brings the horse onto the outside rein. (FIGURE C)

3. The horse then learns to do a leg yield moving away from the direction of bend and toward the outside of the circle. (FIGURE C)

4. The horse can then learn to over compensate and “leg yield” to make a larger circle than you want or “leg yield” to the side of any jump they don’t particularly like… This is especially true if the horse is over bent in the neck during the leg yield.

5. To correct this problem, the rider uses moments of counter flex to keep the horse from falling out on the circle or falling out on the leg yield. The counter flex makes the undesirable sideways movement to the outside more difficult. Again, this is due to the physical characteristics of limb rotation that makes movement toward the direction of bend more difficult than movement away from direction of bend.

6. The rider then refines the counter flex technique and teaches the horse to half pass, which requires the horse to move toward the direction of bend.

7. In the final stages of training these two movements, the leg yield and half pass exercises can be combined so that the horse can be moved to the right or to the left in a balanced way with either bend. The most advanced movement is that the
horse can change between leg yield and half pass at any time, moving in any direction.

FIGURE A  In an unbalanced turn, the horse is rigid to the inside and flexes to the outside (relative to the turn) with the weight falling on the inside legs

FIGURE B  The unbalanced horse will use a leg-yield type movement to fall to the center of the circle

FIGURE C  The balanced horse “gives” to the inside and bends in the direction they are going. In this position the horse learns to do a leg yield toward the outside of the circle.

As horses learn to perform a leg yield they are typically taught it first through a corner. This is because it is easier for the horse to fall out on a circle once they are bent to the inside. (FIGURE C) Once the horse has the general idea of moving away from bend on a curve, the horse is typically taught the leg yield from the quarter line to the wall or from the wall to the quarter line. This develops the “straightness” of the leg yield. Sometimes the straightness is emphasized first, while other times the bend is emphasized first, depending on what makes the most sense to the horse. Both techniques are useful, and it becomes evident that the ability to do both will be necessary in the long term to keep the horse from over compensating. Some horses will pick up the leg yield quickly, while others will struggle with this simple form of redistribution of weight from side to side.

Of course, we don’t just want side-to-side movement during the leg yield, the horse must also move forward. This is because, not only do we want the horses to learn to coordinate their weight shift, we want them to do it while they are going someplace. The type of forward and sideways movement, required in both leg yield and half pass, helps the horse to develop the locomotion muscles together with the coordination muscles. You can do the leg yield standing still (sometimes referred to as a side pass) but you
won’t develop the pushing and supporting muscles that the horse needs for locomotion. With only a side-ways motion you’ll just develop the weight-shift muscles, which can be useful in certain situations too.

The horses will also need to gain the confidence to stand clearly on only two legs while they reach into the air sideways and forward with the other two legs. Of course, this “wobbly” feeling the horses have as they are learning the leg yield is only exaggerated if we don’t stay balanced as a rider. In addition, the horses will prefer to shuffle their feet sideways because this type of movement doesn’t require as much energy as shifting weight distinctly from foot to foot.

Typically, after the horse has mastered the fundamentals of leg yield, the half pass is introduced and perfected about 2 years after the leg yield has been learned. The half pass adds to the degree of difficulty of the side-to-side movement by asking the horse to remain bent in the direction they are moving. To make the discussion even more complex, some horses actually prefer to do half pass rather than leg yield, although that preference for half pass is typically one sided and is usually due to a distinct preference to bend in one direction over the other.

The previous discussion is useful information, but we really still have not answered the question of why is leg yield easier than half pass. In review, the leg yield asks the horse to move away from the direction of lateral flexion (the side-to-side bend that makes the horse look like a banana), and the half pass asks the horse to move toward the direction of lateral flexion.

Typically, we focus on the weight bear of the hind legs as being the most influential in determining the difficulty of the movement. This is because if we get the hind end doing what it is supposed to do, we have a better chance of the forehand following along but, of course, not always. It is much more difficult to maintain weight on the outside leg during a sideways movement than on the inside leg, basically because of the strong forces (centripetal) that pull the weight to the inside during a slow turn.

The degree of difficulty between the leg yield and half pass has to do with several factors.

1. Which leg is the initiator and which leg is the follow through
   - Leg yield: initiator-inside hind follow through-outside hind
   - Half pass: initiator-outside hind follow through-inside hind

   Similar to other sports, the horse has an initiating moment and a follow through for each movement. Which one of these two is the most important is up for debate, and some horses find one aspect easier to master than the other.

   In leg yield the movement begins with the inside hind crossing to the center of the horse’s body together with the outside front (Figure 1 – left hind and right front). The follow through is when the outside hind and inside front completes the movement.
In half pass, the movement is initiated by the outside hind crossing to the center of the horse’s body together with the inside front (Figure 2 – left hind and right front). The follow through is when the inside hind and outside front completes the movement.

2. Which leg must bear the majority of the weight
   - Leg yield outside hind
   - Half pass inside hind

   The weight bears of the legs is directly related to the initiating and follow through legs. For the initiating leg to begin the movement, the horses must clearly shift their weight to the opposite leg.

   In the leg yield the weight shift must be distinctly to the outside hind and for the half pass the weight shift must be distinctly to the inside hind. During half pass, shifting the weight to the inside hind (Figure 2 shift of weight to right hind or inside), without falling inward and losing their balance, is much more difficult than during the leg yield shifting to the outside hind (Figure 1 shift of weight to right hind or outside). This is because a weight shift to the inside can easily tip the shoulder and hip inward and downward “squirting” the weight of the body to the outside, exactly the opposite direction the half pass is supposed to be going!

3. The degree of flexion of the joints
   - Leg yield slight
   - Half pass great

   The height of the stride has to do with how much that leg flexes before it reaches forward. To “coil” the energy to obtain a higher and longer stride, the flexion of the joints of that same leg must be increased. This is similar to why a snake will coil itself before it strikes. In addition, the higher the leg stays in the air and reaches forward (swing phase of the leg) the longer the time the opposite leg must stay on the ground. Ideally, that leg that stays on the ground will accept weight by flexing the joints, which will make the stance phase more comfortable for the rider as well as store more energy for the next stride.

   During half pass the inside shoulder must remain under the horse. The height of the inside shoulder is very. If the inside shoulder stays high then the horse’s weight will stay well balanced onto the inside hind. When the entire position of the horse is compared during half pass (FIGURE 2) and leg yield (FIGURE 1) the overall height of the shoulder during half pass is greater than in leg yield.

4. Control of the location of the horse’s center of gravity
   - Leg yield slight
   - Half pass great

   The half pass requires the horse to careful control their center of gravity (FIGURE 2). When the horse’s weight is shifted to the inside hind (right) to allow the outside hind to cross over, the horse cannot fall to the inside and lose balance. This requires considerable strength and coordination to keep the center of gravity between the two legs. This control of the center of gravity is not as great for the leg yield that is performed by
the young horse. The center of gravity is actually encouraged to move slightly to the
outside of the bend of the horse to assist the horse in first performing this simple exercise.
As the degree of training improves, the shift of the center of gravity for both the half pass
and leg yield will become much more similar.

5. The degree of rotation of the joints
   Leg yield      minimal
   Half pass     significant

The rotation of the joints is another distinct difference between the two movements. In
leg yield the swing of the limbs to the outside of the bend of the torso is a natural
movement for the joints. As you watch the legs of the horse move during the leg yield, or
even perform this movement with your own body, you will notice how much easier the
rotation of the shoulders is when the movement is away from direction of bend. When
the horse must swing the limbs toward the bend of the torso, the rotation of the joints is
much more unnatural and therefore more difficult.

We learn quickly that the leg yield and half pass are connected movements because one is
used to stop the other from being used as an evasion by the horse. This starting and
stopping of movements is what keeps the horse between our aids, creating an obedient
horse.