The Kinesiology of “Stiff” and “Soft” Sides of Horses
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We spend a large amount of our time in the saddle evaluating if our horse is “stiff” or “soft” to our aids. While we are riding, or even when we are on the ground, we try to find the correct exercises that will strengthen or relax certain muscles in our horses to improve their performance.

One of the many qualities of a good rider is the ability to feel when and where the horse is stiff or soft. However, as you read through the articles about stiff and soft, many times the definitions seem confusing. Let’s take a look at the kinesiology (the study of movement from the basis of the physical sciences) of muscles and the qualities of a stiff and soft muscle, and then the body’s reaction to these states.

Excessive stiffness is something that our body does naturally in response to injury, performance or aging, to name a few of the most common reasons. Stiffness can be good, it is necessary for support of our bodies, but the body can take stiffness to the extreme and then stiffness becomes detrimental. On a day-to-day basis, excessive tightening or stiffening of our body happens when our stress levels increase, or simply because of habit. We all tend to clench our muscles without even knowing we are doing it, from the extremes of grinding our teeth when we sleep, to gripping the pencil too tight when we write. What we sometimes do “naturally” is many times the wrong thing to do to keep our body symmetrical and in top physical form.

Injury of a muscle also causes stiffness. A muscle that is exercised appropriately is constantly going through a breakdown and regeneration of muscle cells. Through this process, a muscle becomes stronger. A muscle that is physiologically sore is a muscle that has been over stressed so that the muscle fiber breakdown is extreme. When the muscle is over stressed, the body’s reaction is to “splint” this muscle, which keeps it from being over used and therefore causing more damage. This splinting will shorten the muscle fibers and results in the tight feeling (spasm) that you have in an over-used muscle. You know through experience that if you lightly work the stiff muscles you will feel better. Your instincts are correct because research has shown that muscular activity plays a key role in the recovery of damaged skeletal muscle.

Now let’s look at how this relates to a specific situation. We probably all have had stiffness at the base of our neck where the neck joins into the shoulder. We will use this example so that we can relate to what the horse feels when his neck is stiff. Also, for the basis of this discussion our neck (and the horse’s neck) will be stiff on the right side.

In addition, we will focus on the feel of the reins in the rider’s hands as a result of this stiff neck to keep the discussion brief. We could also select the stiff and soft feel the rider has under their seat bones, thighs or calves. The characteristics we will discuss about the muscles will be almost the same, irregardless of where these muscles are located.
If your neck is tight on the right side, these fibers will shorten as discussed above and the muscle will remain in a constant contracted state (spasm). **In response to these shortened right neck muscle fibers, you will generally tip the top of your head in the direction your neck is tight**, which would be to the right. Your chin will therefore tip the other direction or left. This tip of the head keeps the right side of the neck shorter in length and makes the left side of the neck longer in length. This then reduces the stretch on the muscle fibers on the right side of the neck, which in turn reduces the pain from those pulled muscle fibers. Stretching those sore right neck fibers causes a discomfort that is directly proportional to how sore the muscles are.

The body tends to default to the position that is the most comfortable, and in this case it would be the tip of the head to the right to **keep the tight muscle fibers shorter and therefore more comfortable**. Unfortunately, the body doesn’t always know what is best for the long-term healing process and sometimes short-term comfort does not lead to the best long-term results. The shortening of the muscle fibers on the right side of the neck will protect the muscle initially from further injury but will result in an asymmetrical twist, if it is not eventually corrected.

As we transfer this same problem to the horse, the result of a stiff right neck in the horse will produce a similar tip to the head. The horse will typically give one of two reactions as a result of this stiff neck. The first reaction is that the **horse will lean into the right rein because his neck is sore and he is trying to find some support** for it (FIGURE 1). The second result is that the **horse will hold their neck so tight, to protect the sore muscles, that he will not touch the rein** on the right and the rein will feel very light (FIGURE 2). This becomes confusing to the rider when their instructor says that the horse is stiff to the right rein and the rider feels no contact. Some people will define this type of light feeling that is not correct as “hollow”.

![FIGURE 1](image-url)
Stiff to the contact of the rein with a long neck
Of course, horses also throw in the multitude of other issues that may cause them to lean or be too light on their stiff side, such as their conformation or personalities. With horses that tend to weight their forehand more, they will tend to lean more onto the rein when they are stiff on that side. While horses with a more uphill carriage, may tend to be too light on the rein when they are stiff in the neck. A tense, nervous horse may tend to hold the rein rather than lean on it, a tired horse may tend to lean more on the rein when they are stiff, etc, etc. And of course, if we ride incorrectly, we can take a stiff, heavy carriage and turn it into a stiff, too light carriage or visa versa.

If the horse continues for a period of time to position their neck with a slight twist or tip to the right, the muscles on the right side of the neck will eventually become stronger to support the weight of the head being positioned off center and to the right. A stronger muscle fiber is a shorter muscle fiber. Therefore, this unfortunately also contributes to the neck being positioned with the right side of the neck being shorter. To illustrate the fact that shorter muscle fibers are stronger muscle fibers, think about the body structure of an Olympic weight lifter. The weight lifter has such strong muscles that when they walk, their stride is short and tight.

To even further complicate matters, if certain groups of muscles are over strengthened and the complimentary set of muscles is not used, then this will place an uneven pull on the joints associated with these muscles. For example, if the human athlete has a strained lower back from overuse, the therapist will stretch the muscles of the lower back and strengthen the muscles of the stomach. Doing both types of exercises will help keep the athlete from overusing the back muscles and under using the stomach muscles. If this overuse issue is not corrected in the lower back, the spine will be pulled out of alignment.
To correct the stiff-necked horse we must remember from our physiology discussion, that the muscles must be stretched to help relieve the tightness and reduce the tendency for overuse. **Therefore, to correct the stiff right side, rather than doing right circles, we would want to do more left circles.** Circles to the left place the tight muscle on the outside. On a circle the outside edge of the neck is longer which will gently stretch those muscles (FIGURE 3). Therefore, to stretch the tight right neck muscles, left circles would be helpful. Of course, small, tight circles would not be appropriate and keeping a horse in one movement for too long will only turn a good exercise into a bad problem! A variety of exercises will be necessary, but a majority of the stretching exercises for this example should be for the right side of the horse’s body.

![FIGURE 3](image)

**FIGURE 3**

Equal Bend Throughout Body

Then to compliment these right-side stretching exercises, strengthening exercises for the left side of the body will be important as well. One of the nice things about using the circle is, if the horse is correctly balanced, the left circles will not only loosen the right side but will also help strengthen the left side. So, all those 20 meter circles are not for waste after all!

We have spent the majority of this discussion on “stiff” muscles and have not even talked about “soft” muscles. We hope that all of our good work will turn those stiff muscles into soft muscles. **Soft muscles have a balance between tightness for support and looseness for flexibility.** Soft muscles can also move easily between increased tension and increased flexibility. If we go back to our human athletic comparisons, we would
visualize a gymnast as being more similar to the body structure we want for our equine athletes. For good performance, our horse must have the right proportion of flexibility and strength. **Unfortunately, it is much more difficult to maintain flexibility AND strength** rather than just creating strength in muscles during training. In addition, certain muscles are more easily strengthened than others making our job even more difficult when the muscles we want to become stronger are those that resist that education.

In summary, we must understand the general concepts of the physiology of muscle tissue during the training process. If we don’t evaluate this as part of our training, then we could be using the wrong movements to loosen or strengthen the appropriate muscles in our horses.