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Lessons from the "L" Program

Our look at session A continues. This month: biomechanics

By Trenna Atkins with Karen McGoldrick

In the July/August issue, I gave you a taste of the first day of session A of the USDF "L" Education Program. The first of three "L" program sessions that are open to auditors, session A introduces participants to the core concepts of dressage judging and to equine biomechanics. (For information about auditing, see "How to Audit an 'L' Program" below.)

This month, we'll move on to the second part of session A. In this article, I'll explain why a knowledge of equine biomechanics is important for all dressage enthusiasts—judges, riders, trainers, and instructors alike. Biomechanics is so fundamental in training and judging dressage, in fact, that in the "L" program we say, "Biomechanics *is* basics"!

How to Audit an "L" Program

You must be a current USDF member—group, participating, or education—to be eligible to audit sessions A through C of the "L" program. Participating membership is required only of those who wish to go on to part 2 of the program.

USDF GMOs apply to host the "L" program. Sessions are held over a series of weekends and are a combination of classroom lecture and practice evaluation of demonstration horses and riders.

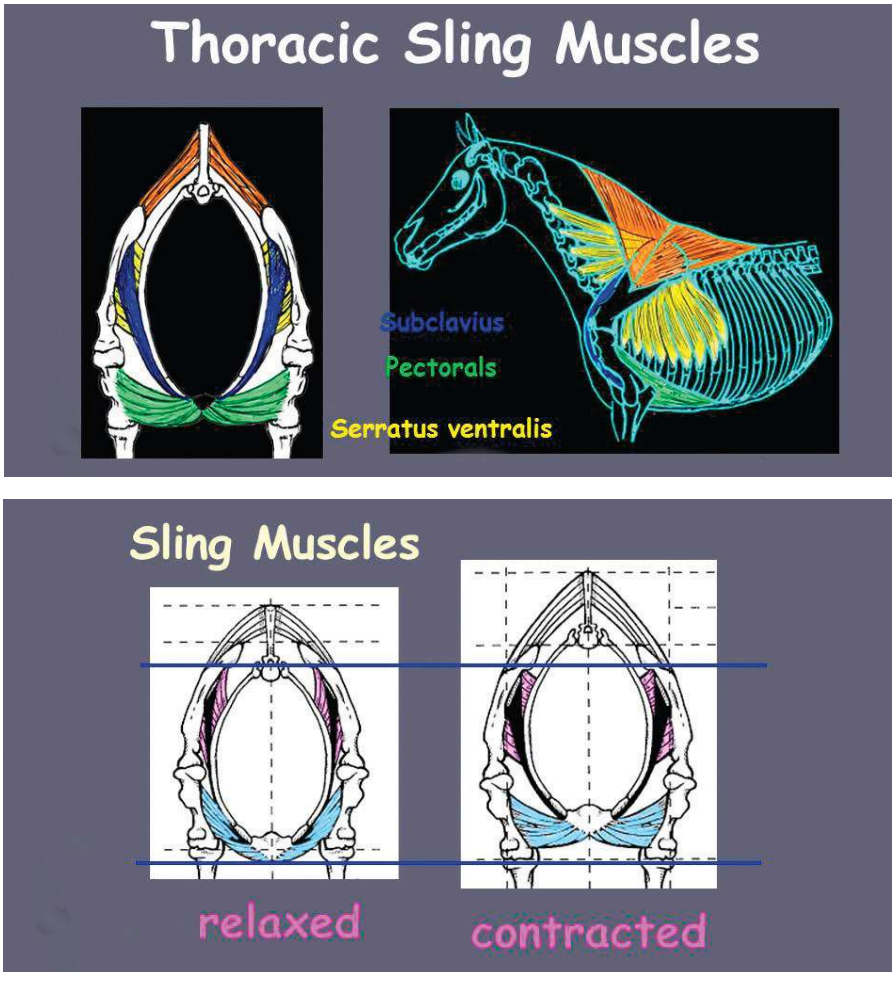
For more information about the "L" program and for the calendar of GMO-sponsored "L" programs, visit usdf.org and select Education / "L" Education Program.

Biomechanics Defined

Because the horse can't give us verbal feedback as we ride, I believe it's important to better understand how he functions biomechanically: that is, how he moves across the ground and balances himself and his rider. As we find better ways to influence the horse, we also help to preserve his soundness and well-being and promote better understanding with the rider. This is the object of dressage: to develop the horse into a happy athlete through harmonious education.

My own education in the biomechanics of the horse began in the 1980s when I began attending seminars on the subject, and I'm still learning new things all the time, thanks to veterinarians and other equine-biomechanics specialists who share their knowledge and findings in books, articles, and seminars. Renowned biomechanics expert and *USDF Connection* contributing editor Dr. Hilary Clayton is one who has been doing important research in this field, and she has been very generous in sharing her knowledge and findings with the USDF "L" faculty.

Here's an example of how biomechanics knowledge informs dressage training and judging. I recently participated in a webinar with the German equine osteopath Stefan Stammer. Dr. Stammer detailed the importance



ANATOMY OF TRAINING: *Understanding how the horse achieves collection and forehand elevation is necessary for informed dressage training and judging. The thoracic sling muscles do the heavy lifting; their engagement is similar to the action of using our core muscles.*

ILLUSTRATIONS COURTESY OF DR. HILARY CLAYTON

of the thoracic sling muscles and the tendons of the front legs in developing self-carriage and uphill balance. When the horse uses these muscles to lift the forehand, it is an action similar that of engaging our core muscles. He stressed that the hind legs are responsible for only 20 percent of the lift; the horse's forehand is the center of motion that dictates the direction of the motion. As a result of these research findings, trainers, riders, and judges can think differently about the concept of engagement as they develop a more accurate understanding of how the horse collects and elevates his forehand.

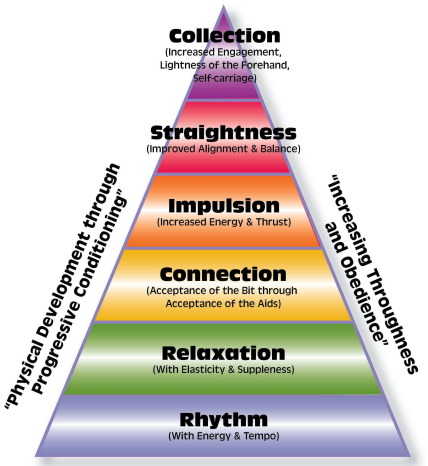
Biomechanics Takeaways: Lessons from Session A

When you learn more about biomechanics, the pyramid of training (illustration, below) takes on a deeper meaning. In session A of the USDF "L" program, we look more closely at the correct rhythms (repetitions of footfalls) of the walk, trot, and canter. We seek to better understand the looseness and suppleness we want from the dressage horse and how the horse can more easily carry the rider and respond to the rider's aids.

Biomechanics and the aids. In order to influence the horse with correctly timed aids, it is important for the rider to understand the biomechanics of the gaits. For instance, the canter has three beats plus a moment of suspension. During the third beat, the horse moves his head and neck forward and downward. If the rider does not follow this motion with her elbows, she may get an unintended result—a change in gait.

As the horse's training progresses, we want his balance to be more easily influenced by the rider's aids. Because it is so important for the rider to discern when the horse's hooves strike the ground and in what direction, biomechanics knowledge becomes even more critical so that the rider can apply the aids in the correct moment of the stride to best influence the horse's body and movement.

Biomechanics and equine anatomy. The horse's conformation is dictated by the length and angulation of his bones, which are connected at the joints and linked by fibrous bands of connective tissue known as ligaments. Ligaments also limit the motion of bones, and overstressing them can create soundness problems that many horse owners know about. ⇨



USDF ILLUSTRATION

The pyramid of dressage training

Tendons connect bones to muscles and are designed to withstand tension. The horse has specialized flexor tendons behind the cannon bone that store energy as the leg contacts the ground and then releases that energy by pushing against the ground upward, forward, or both.

Although we can't do much to alter a horse's ligaments or tendons, we can clearly influence one important part of his biomechanical system: the muscles. Correct gymnastic training develops strength and muscle tone. A muscle can act in only one way, by contracting (a muscle cannot actively extend), so good dressage requires that the opposing muscles are able to relax and stretch when needed. For example, the abdominal muscles play a role in lifting the horse's back; at the same time, the long back muscles need to be able to relax and lengthen in order for the lifting to happen. Dressage training tries to avoid so-called negative tension in the horse's muscles—unwanted muscle contractions that restrict the opposing muscles from lengthening correctly.

Biomechanics and collection. The horse bends the joints of his hind legs to develop the "pushing power" needed for such activities as clearing a jump or performing an extended trot. The hindquarter joints also play a big part in helping the horse to balance. The lumbosacral joint, which attaches the spine to the hind legs, must bend in order for the horse's back to swing or his haunches to lower, as in canter pirouettes or the piaffe. At the lower levels of dressage, a lesser amount of bending of the lumbosacral joint helps achieve the required level balance.

Biomechanics and bending. In session A of the "L" program, we explore the concept of lateral bending. Most dressage competitors have received the comment "needs better bending" or "could show better bending," but in the "L" program we strive to help our judge candidates to be more specific, and doing so requires an understanding of biomechanics.

So how does a horse bend, or balance himself laterally? On a curved line or in lateral movements, such as shoulder-in and half-pass, the horse balances himself by stepping closer to his midline with his inside hind leg while his outside front leg reaches in the direction of travel. The neck should be directly in front of the shoulders, giving the appearance that the horse is bent uniformly from poll to tail.

The "L" faculty members teach participants and auditors the visual indicators of correct and incorrect bend. Red flags include "falling in" with the inside front shoulder and the haunches' swinging out. When the horse is bent correctly, his ears are level. If the outside ear is higher, the horse's nose will be tilted to the outside and he will be unable to stretch his neck correctly into the outside rein.

Biomechanics and impulsion. Many riders misunderstand the concept of impulsion, which is the fourth "step" on the pyramid of training. In trying to get their horses to cover more

ground, they mistakenly go faster and quicken the tempo, which actually can shorten the stride. Slow-motion video footage shown during session A of the "L" program demonstrates that the horse covers more ground not by going faster but by pushing himself into the air with more suspension (air time). When he gains impulsion, he correctly overtracks (steps with his hind feet past the prints of his forefeet).

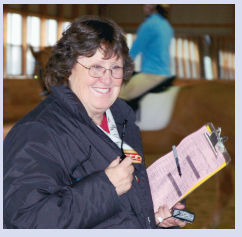
A Body of Knowledge

I find equine biomechanics a fascinating subject. With this article, I hope I've inspired you to learn more about this subject—ideally, by auditing an "L" program! Auditors will gain insight into the meaning of the judge's comments and will learn how to train, ride, and show better by applying the principles of biomechanics to their dressage work. ▲

Next month: Session B.

Meet the Expert

A USEF dressage judge since 1987, Trenna Atkins, of Coupeville, WA, joined the USDF "L" faculty in 2003. A computer user since the 1980s, she enjoyed making videos and presentations for her own dressage students. From there, she says, it was an easy step to her becoming involved with the "L" program's use of multimedia. She collects videos, edits content, and sets up teaching presentations that have been developed by the entire faculty.



JENNIFER BRYANT

In 2012, Atkins received the USDF Volunteer of the Year award in recognition of her contributions to the "L" program.