A SADDLE-FITTING GUIDE FOR EQUINE HEALTH PROFESSIONALS

by

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A STUDY TO HELP DETERMINE IF A LAMENESS IS EITHER A POORLY DESIGNED SADDLE, OR A FITTING ISSUE FOR HORSE & RIDER
INTRODUCTION

I have often been approached by members of the horse health professions: chiropractors, massage therapists and veterinarians, to explain how a saddle should correctly fit a horse. Unfortunately, the cause of an injury/lameness due to improper tack fitting only comes to these individual’s attention after the fact.

There is a lot more to analyzing whether the saddle fits than just the appearance. Often, the horse has had to make some physical compensations to adapt its back to the fit of the saddle. Ideally, the design and fit of the saddle should be dictated by where the horse’s back must be to physically carry the weight of the rider, while still moving in their natural bio-mechanic frame.

Therefore, the purpose of this booklet, is to give you some insights, from my side of this profession, to help you understand what effect the design and fit of different saddles can have on the position of the rider, and the fit to a particular frame of a horse, and the all too often resultant negative influence on the way the horse moves to compensate their frame in order to carry the weight of the rider.

There are 4 parts to the design and fit of a saddle for a horse; correct design for the anatomy of a particular horse, the correct design for the anatomy of a particular rider, the correct adjustment of the saddle for a particular horse, and the least understood, how the saddle is being used to develop the correct musculature of the horse through exercises and training.

So if you do come across a saddle-fitting issue that seems difficult to address, don’t hesitate to contact me – I can be reached at gagullikson@yahoo.com, or my phone number is: (727) 784-3212.

Sincerely,

George Gullikson
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SADDLERY - HISTORY

Saddles have basically been the same since man started riding horses; placed behind the shoulder, cinched around the abdomen, and stirrups to keep a rider’s legs in place for balance.

The picture on the left was taken around the 1890 in Walsall, England. This was the beginning of the assembly-line saddlery; each individual had a responsibility for a particular part of the saddle. Once all those parts were made by those individuals in that assembly line, another person assembled those parts into a completed saddle. As you can see by their attire and condition of the shop, those craftsmen were extremely neat, and must have had a sense of pride in their work.

However, today is a different story; as shown on the picture to the right, also taken at Walsall 120 years later, the pride factor is still there, but the neatness, not so much.

As you can imagine, saddles today are made quite differently. The saddlery that once had a lot of Master Saddlers, today has factory workers cutting the leather with hydraulic presses, sophisticated sewing machines that make perfectly straight seams not requiring highly-trained operators and the assembly of those saddles is often pieced out to other countries where labor laws are not enforced; Schleese Saddlery from Canada, is made in India; the once considered best saddlery in the world, Passier, may be made in Romania; and many of the saddles that were the pride of Germany, are now made in England.
PART I – THE DESIGN OF THE SADDLE FOR THE HORSE

The saddle tree

The tree to the left is an old Passier PSL made around the late 50s. A multi-layered wooden tree, wrapped in leather, foamed, and then wrapped in ‘ticking’. In addition, brass stirrup-bars, a very strong Sprenger steel ‘head iron’ (gullet plate), and bands of spring steel to give the saddle flexibility were also used. There were many steps into this production of this saddle, and I wish they would have continued with that magnificent product – they don’t make them like they used to...

This is the Walsall wooden tree, still made from beech wood, but due to disease to those trees, other material will soon need to be used. The green arrow shows the weak laminated gullet plate that can be adjusted once, but will lose its integrity if adjusted again. The red arrow is showing the spring steel which gives this saddle the term, ‘flex tree’. These trees are used by Albion, Custom Saddlery, County, Cliff Barnsby, Frank Baines, JRD, Passier, Windsor and other saddles made in England.

These are the wooden trees that are still made the same way they have been made for centuries. Not that this is a bad thing, but wooden trees add more time to the construction of the saddle, whereas the plastic, fiberglass or composites, shorten that process by days or weeks.

How to determine if the saddle has a wooden tree.

Turn the saddle upside down, and place your fingers between the panels; you should feel an indentation with nothing solid underneath. If you move your fingers under the panel, there you will feel the spring steel bands. By running your fingers along those bands, you can feel if they are broken. Caution, if they are broken, they can be very sharp.
There are 3 manufacturers that use the plastic tree: Kiefert, Prestige, and Niedersuss (KN). You will often see that these saddles at one time fit well, as the horse develops latissimus dorsi, the shoulders have a tendency to rise, or what Dr. Deb Bennett calls ‘coming up in the wither’. In that case, the saddle will appear to be too wide, sit on the wither, and make the horse very uncomfortable. The Stubben saddle is OK, as it can be adjusted, but with the forward placement of the stirrup-bars, makes this a man’s saddle and will usually put a woman rider ‘behind the motion’, forcing them to sit on the lower thoracic/lumbar vertebra area.

**How to determine if a saddle has a plastic tree**

Turn the saddle upside down and feel the channel area between the panels, the Niedersuss, Prestige, and Kiefert will be very hard, instead of having that indentation as with the wooden tree. Passier at one time also made a plastic tree. The Stubben will feel like a wooden tree, and the Hennig and Schleese may feel hard, but have synthetic trees, which also have gullet plates and spring steel like wooden trees, but do lack the flexion of the wooden tree.

The tree to the left is a KN or Neidersuss. The expense in making a plastic tree like this is in the injection molding. After that, they are inexpensive to produce; no spring steel, no gullet plate, no webbing to stretch, just glue the foam to the tree, add the stirrup-bars, staple the leather and you’re good to go. The biggest problem with these saddles, in addition to not being able to adjust the width of the gullet plate as the horse changes, is that without any flexion of these trees, as a horse moves with the reciprocal action of the ilium the saddle tree point rotates with that same lateral motion, which often times digs the tree point into the shoulder.

The tree to the left is a Kiefert plastic tree, which like the Niedersuss and Prestige, cannot be adjusted.

The saddle to the right is a Stubben. It is kind of a hybrid; it has the characteristics of the wooden tree, requiring a gullet plate that can be adjusted, and webbing that needs to be stretched for the configuration of the seat of the saddle. However, it is still made of a plastic/fiberglass tree that can be very stiff and will affect the movement of the horse.
THE GULLET PLATE (Head Iron)

This is the underside of a Walsall wooden tree. The red arrow is showing the gullet plate (called ‘head iron’ in Germany). This is what gives the tree its integrity. The distance between the bottom of that plate, called ‘tree points’, is what determines the tree width; narrow, medium, wide etc. When certain saddlerys measure that distance in centimeters, that becomes an arbitrary measurement – if those tree points were longer, the same tree width, would register a higher number. In addition to the plate being connected with rivets to the tree, it also has to be connected to the stirrup-bars (blue arrow), and the spring steel bands (green arrow). With each hole that is drilled through this plate, the plate loses some of its integrity.

One of the biggest problems I find with the gullet plate used in the Walsall tree, is what the saddle industry thinks the shape of the wither of a horse looks like; it’s as if all horses are narrow withered thoroughbreds and even if the tree points are widened, that narrowness at the top of the plate (red arrow) would remain the same, and still place too much pressure on the thoracic trapezes.

With some resistance, I have convinced a select group of saddlers to make the shape of the gullet plate more reflective of the shape of the particular horse’s wither for whom the saddle is being made: narrower for a thoroughbred, wider for the Warmblood, very wide for the Friesian and Baroque horse and so on – let the horse’s wither dictate the shape of the gullet plate, versus the other way around.
A term I use, which is starting to make its way around the saddlery world, is ‘Yoke of the Saddle’, shown by the area between the green arrows. Instead of just measuring the need of a saddle by tree width, shown by the area between the orange arrows, a saddle has to have the ability to make a consistent pressure from the top of the plate (where red lines intersect), to the bottom of the tree points for maximum equal weight distribution. As shown by the 4 red lines, each horse would not only require a wider tree width, but the plate ‘yoke’ would also need to be the correct width to make the saddle have consistent pressure from the area of the yoke, to the bottom of the tree point.

In addition, the length of the plate should also be determined by the amount of thoracic trapezes of a particular horse. That wither muscle is a muscle of protection, not a muscle of strength; if at all possible, the weight of the rider should never be put on that muscle group.

There are a number of Saddlerys that have incorporated the ability to change the width of the saddle by replacing gullet plates. Great idea, but unfortunately, all plates have the exact same ‘yoke’ width, making it difficult to adjust a saddle for either the narrow-withered horse, or the wide-withered horse where equal weight distribution cannot be achieved along the length of the plate.

**PANEL ATTACHMENT TO THE SADDLE**

When we hear the term ‘banana tree’ which is often associated with County Saddlery, as shown to the left, the panels are set high into the pommel, forcing the horse to carry the weight of the rider on the thoracic trapezes. In addition, as you look down the panels, you notice that the shape of the panels looks like the shape of a banana. However, if they were to attach those panels where the green arrows are, the weight of the rider would not be on the wither, and the panels would be more reflective of the shape of the horse’s back.
The green arrow to the left is where the contact of the panels of a saddle is located on most saddles. The red arrow is showing where a banana tree would be placing weight on the thoracic trapezes (blue arrow), a muscle of protection.

The analogy here would be what this mother cat is doing to her kitten to make it more manageable to carry. The ‘bite’ of the cat on cranial nerve 11, is placing this kitten into a fetal position – the bite of the saddle can have the same effect on the horse by placing too much weight of the saddle and rider on the sensitive thoracic trapezes.

By attaching the panels lower in the pommel and extending the length of the gullet plate, the weight of the rider is now sitting on two muscles of strength; the latissimus dorsi, and longissimus dorsi. In the saddles that we make like this, the horse responds by a more forward motion of the humerus, thereby strengthening the lattes, developing the top-line faster, and because of the freedom of movement of the scapulas, the horse’s reciprocal motion of the ilia allows for those horses to work underneath themselves.
PANEL CONTACT OF THE SADDLE

It is hard to believe that today I am still finding saddles with channels as narrow as a quarter. Not only are these saddles sitting on the supraspinoeeus ligaments, but even the skeletal processes of their horses. The result of the position of the rider makes it impossible for the horse to lift their backs, use their abdominal muscles, forces the horse to work out-behind, and eventually become high-spined and extremely back sore. The saddle to the right is how I designed the channel for our saddles; not only does it allow complete movement of the supraspinoeeus ligaments, but it does not sit on the thoracic trapezes either.

Soo...the kitten being carried analogy without being placed into submission... I guess this picture tells that story.
In addition to using all available back to design a saddle for a horse, we sometimes even make the base of the saddle longer or shorter to assure that we can distribute that weight correctly. For an example, if a rider is petite, but rides a very large up-hill horse, we sometimes will put the base of an 18" saddle on a 16 ½" seat. This will prevent the saddle from sitting in a hole, which can occur on horses with longer backs. On the other hand, for a larger person that rides a horse with a shorter back, we have to make the panels wider, rather than longer for that weight distribution.
The Cair system is used in the Bates and Wintec saddles in place of wool. The upside of these panels is that they distribute the weight of the rider equally across the back of the horse. Downside is, that they are pressure sensitive to changes in ambient temperature.

Boyle's Law \[ \frac{p_1 \cdot V_1}{T_1 \cdot n_1} = \frac{p_2 \cdot V_2}{T_2 \cdot n_2} = \text{constant} \]

What this means, is that when temperature rises, air pressure in the panels increases – that could be a good thing. However, as the temperature becomes cooler, air pressure decreases. When temperatures go below freezing, I have seen these panels get almost flat. [Best rule, is to keep these saddles in either a heated Tack room or take the saddle home when temperatures near freezing.]

The worst problem with these panels is human error – saddle-fitters will attempt to flock these panels with wool if the saddle appears to be too wide, or behind the motion. Although that is recommended by the manufactures, it is the fitters that often cut the bladder of these saddles as they attempt to make an additional ‘navel’ for inserting their stuffing irons. Once the bladder is punctured, the saddle panel will become completely deflated, which can result in an injury/lameness to a horse.

On the other hand, the Flair system is adjustable. So when there is either a change in temperature, or altitude, the rider can simply adjust the panels to achieve front-to-back and lateral balance.

Again, the biggest problem with these panels is human error. I have seen too many saddles where the installed panels were excessively long, causing an overlap of the front and rear air panels. So between the pressure exerted from girthing, the saddle on the point billet, and a rider that sits in the rear of the saddle, the resultant air winds up in the middle of the panels, and will force the horse to hollow their backs – contradictory to building a strong top-line. Another complaint I hear from riders, is that when those panels are over-lapped, or over-inflated, the saddle is like sitting on a rubber ball – ‘bouncy’.

These panels can be found in DK, Regal, and Schleese saddles. I use a lot of these panels myself, but only for narrow-withered horses that the bio-mechanical movement of the scapulas has been compromised, due to deep shoulder holes.
THE AESTHETIC VALUE OF THE SADDLE – THE LEATHER

With the exception of the newer materials used to make saddle trees quicker and less costly, the reduced cost of constructing the saddles in countries that don’t enforce labor laws, the Saddlery business hasn’t changed much from the 1800s.

It seems that clients today are more interested in the aesthetics of a saddle than if their position in the saddle allows them to communicate their aids, or whether the horse is comfortable. So to accommodate their clients’ wishes, the Saddleries are now using some incredible leather to make their saddles softer and richer in color, sacrificing maximum durability.

Two examples of aesthetically pleasing saddles are Devoucoux and Hermes, beautiful to the eye. The price of these saddles exceeds $6,000, which gives the trainers that recommend them to their clients a handsome commission. Sadly, not only do riders need to compensate their frame to try to ride comfortably in these two saddles, but also these expensive saddles dictate the shape of the horse’s back, instead of the horse’s back dictating the shape of the saddle.

Years ago, leather came from older cows that were milked until they couldn’t. This made thicker tougher leather that often was just dyed, which soon faded or rubbed off with wear. Today, milk cows are slaughtered before they reach 4 years of age, when their production starts to decrease. These younger hides make better hides for clothing, car seats, upholstery and, of course, saddles. The leather industry has really added a lot of steps to guarantee that the leather is processed to meet their customers’ needs. These are the steps used to process those hides:

(As an engineer, I find this fascinating and disturbing at the same time. Instead of putting more effort into the structure of the tree of the saddle to make it more comfortable for the horse, or allow the rider a better position to communicate their aids, the industry is more concerned with the aesthetic value of the saddle…)

The preparatory stages are when the hide/skin is prepared for tanning. During the preparatory stages many of the unwanted raw skin components are removed. Many options for pretreatment of the skin exist. Not all of the options may be performed. Preparatory stages may include: preservation- the hide/skin is treated with a method which renders it temporarily unputrescible. Soaking - for purposes of washing or rehydration is reintroduced. Liming - unwanted proteins and "opening up" is achieved. Unhurring - the majority of hair is removed. Fleshing - subcutaneous material is removed. Splitting - the hide/skin is cut into two or more horizontal layers. Reliming - the hide/skin is further treated to achieve more "opening up" or more protein removal. Deliming - liming and unhairing chemicals are removed from the pelt. Bating - proteolytic proteins are introduced to the skin to remove further proteins and to assist with softening of the pelt. Degreasing - natural fats/oils are stripped or as much as is possible from the hide/skin. Frizing - physical removal of the fat layer inside the skin, also
similar to Slicking. Bleaching - chemical modification of dark pigments to yield a lighter colored pelt. Pickling - lowering of the pH value to the acidic region, must be done in the presence of salts. Pickling is normally done to help with the penetration of certain tanning agents, e.g., chromium (and other metals), aldehydic and some polymeric tanning agents. Depickling - raising of the pH out of the acidic region to assist with penetration of certain tanning agents.

Tanning Barrel for leather tanning, Igualada, Spain Tanning is the process that converts the protein of the raw hide or skin into a stable material which will not putrefy and is suitable for a wide variety of end applications. The principal difference between raw hides and tanned hides is that raw hides dry out to form a hard inflexible material that can putrefy when re-wetted (wetted back), while tanned material dries out to a flexible form that does not become putrid when wetted back. A large number of different tanning methods and materials can be used; the choice is ultimately dependent on the end application of the leather. The most commonly used tanning material is chromium, which leaves the leather, once tanned, a pale blue color (due to the chromium), this product is commonly called “wet blue”.

The acidity of hides once they have finished pickling will typically be between pH of 2.8-3.2. At this point the hides are loaded in a drum and immersed in a float containing the tanning liquor. The hides are allowed to soak (while the drum slowly rotates about its axle) and the tanning liquor slowly penetrates through the full substance of the hide. Regular checks will be made to see the penetration by cutting the cross section of a hide and observing the degree of penetration. Once an even degree of penetration is observed, the pH of the float is slowly raised in a process called basification. This basification process fixes the tanning material to the leather, and the more tanning material fixed, the higher the hydrothermal stability and increased shrinkage temperature resistance of the leather. The pH of the leather when chrome tanned would typically finish somewhere between a pH of 3.6-4.2.

Crusting is when the hide/skin is thinned, retanned and lubricated. Often a coloring operation is included in the crusting sub-process. The chemicals added during crusting have to be fixed in place. The culmination of the crusting sub-process is the drying and softening operations. Crusting may include the following operations: wetting back - semi-processed leather is rehydrated. Sammying - 45-55%(m/m) water is squeezed out the leather. Splitting - the leather is split into one or more horizontal layers. Shaving - the leather is thinned using a machine which cuts leather fibers off. Neutralization - the pH of the leather is adjusted to a value between 4.5 and 6.5. Retanning - additional tanning agents are added to impart properties. Dyeing - the leather is colored. Fatliquoring - fats/oils and waxes are fixed to the leather fibers. Filling - heavy/dense chemicals that make the leather harder and heavier are added. Stuffing - fats/oils and waxes are added between the fibers. Stripping - superficially fixed tannins are removed. Whitening - the color of the leather is lightened. Fixation - all unbound chemicals are chemically bonded/trapped or removed from the leather.
Setting - area, grain flatness are imparted and excess water removed. Drying - the leather is dried to various moisture levels (commonly 14-25%). Conditioning - water is added to the leather to a level of 18-28%. Softening - physical softening of the leather by separating the leather fibers. Buffing - abrasion of the surfaces of the leather to reduce nap or grain defects. Surface coating for some leathers a surface coating is applied. Tanners refer to this as finishing. Finishing operations may include: oiling, brushing, padding, impregnation, buffing, spraying, roller coating, curtain coating, polishing, plating, embossing, ironing, and glazing.

PART II – THE DESIGN OF THE SADDLE FOR THE RIDER

As shown with these two thoroughbreds, the strength of the horse for either running faster, or jumping higher, determines the horse’s capability of carrying the weight of the rider in their aerobic frame, ‘live’ weight frame, a position closer to the shoulder than it is to the middle of the back.

Jockeys and Hunter/Jumpers have that ability to use their abdominal muscles thus allowing their horses to use their aerobic frame. However, for a dressage rider, who sits in a vertical position, the ability to use their abdominal muscles is almost impossible – and herein lies the problem.

The ability for a rider to sit in their aerobic frame is dictated on how that saddle is designed for the frame of that particular rider. In no other sport, is the equipment used to participate in that sport, determined by another individual as is often the case by the recommendation of a trainer, or the influence of a famous rider that they aspire to be.

As an example: I have a client that is a World Class bicyclist. Every measurement of her body has a reflection on how her bicycle was made; length of femur, length of humerus versus ulna/radius etc. Even the disparity of the length of her legs, which is 7mm’s, had a reflection on the disparity of the thickness of her pedals – how did this affect her competitiveness? On a 20 Km time trail in 2009, before her custom-made bike, she was 32 seconds off her time in that same race in 2010, on her custom-built; more importantly it was a difference of finishing in 22nd place in 2009, to a 2nd place finish in 2010.
When checking for the placement of the saddle on a horse’s back, the saddle should fit right up against the shoulder – if it is set back 1 or 2 inches as some fitters suggest, it will end up against the shoulders anyway – Newton’s Law of motion. Normally speaking the saddle should sit between the 8th and 18th thoracic vertebra. That would make the center of the saddle thoracic vertebra 13. Of course an Arab influence will move that forward.

Again, the same green arrow, as in the previous sketch, is indicating the center of the saddle (T-13); this woman rider is exhibiting exactly how a dressage horse should move. The front and hind quarters are working in harmony (indicated by right fore and left hind on the same red line). Both horse and rider are relaxed and other than the bridle sitting on the TMJ, this is what every saddlery should be working on to build saddles to fit both horse and rider.

The picture to the left, is a poorly designed dressage tree, that would place the weight of the rider in the back of the saddle (red arrow), instead of the center of the saddle (blue arrow), here the weight of the rider would not only make this horse back sore, but would force the horse to work out behind, or what I call the ‘long frame’. Here we would also have hock issues, suspensory problems and on and on… However, this is not the fault of the rider, but the saddle’s design which places that rider in a compensating frame.
In the picture to the left is an example of ‘behind the motion’ – the sloucher. This position is caused by saddle design. Although this is a dressage rider, she is having a difficult time achieving the preferred shoulder-hip-heel position, as with the rider in the top picture. So with that inability to ride in her aerobic frame, she is forced to place her weight, as indicated by the blue line, into her horse’s lower back – the resultant position makes the horse hollow his back, work out behind and is struggling to even get off the ground.

The other form of ‘behind the motion’ is a training issue – ‘the driving seat’. Here the rider is rocking back on her ischial tuberosities to drive the horse forward – which works, but in doing so, forces her weight to also be centered on the horse’s lower back, as indicated by the blue line. Not only will this cantilevered position eventually cause wear and tear on the sacrum, stifles, and hocks, and it would almost be impossible for her not to hang on her horse’s mouth for balance – that resultant pressure is evident by the uneven muscling of the splenius, rhomboid, and cervical trapezes muscle groups – that knotty mess plus the tight brachiocephalic muscle tell me this horse isn’t comfortable.

The reason why some women’s position is compromised in the seat of the saddle, where other women can sit naturally, is often times a genetic trait; lordosis, tipped pelvis, and upper-to-lower leg length disparity, which I will cover later.

In the picture to the left, the position of the stirrup bars on the left tree are set forward, indicated by red line, which would be a comfortable position for men, and some women. However, for the first woman ‘behind the motion’, on the previous page, those stirrup-bars are going to make her hunch forward for balance. By bringing the stirrup-bar back, allows the rider to sit vertically in the center of the saddle – relaxation.
In the upper-level movements of dressage, in this case the pirouette, the ‘behind the motion’ becomes a little more subtle. In this case a very promising young rider that was short listed for the World Games last year, is showing what a slight degree of ‘behind-the-motion’ is having on her horse. The picture to the left is a saddle that allows her to sit in her natural aerobic frame; shoulder-hip-heel, which has resulted in relaxation for horse and rider, correct reciprocal action of the ilium, and a sense of lightness with her aids. In the picture to the right, she is riding in another manufacturer’s saddle where her position is being compromised by making it impossible to sit in that same relaxed frame – now her horse shows the stress of carrying her weight on the lower thoracic vertebra, and she seems to be manipulating her horse’s frame instead of allowing the horse to come through from behind – notice tightness in the reins.

So, both saddles are fitting the horse correctly, but the saddle on the right is not allowing the rider to use her core strength to represent live weight to her horse. That small compensation in her position is causing other compensations in her horse.

As an overview of ‘behind the motion’, in the sketch to the left is a horse that is being compromised by the rider sitting in the back of the saddle (red arrow) and unable to represent ‘live’ weight to their horse – the horse can’t use their abdominal muscles, engage their hindquarters, and is forced to flatten their pelvis, and raise their neck. This will create bracing on the brachiocephalic muscles, an inability to strengthen their top-line, longissimus dorsi, force the horse to work out behind, and create a very sore unhappy horse.

The bottom sketch is when the rider is able to sit centered (green arrow) in the saddle use their core strength to represent ‘live’ weight to their horse, and allow the correct muscles to develop – happy horse.
DESIGN OF THE SADDLE FOR THE POSITION OF THE DRESSAGE RIDER

This is where it becomes complicated; one can become quite proficient in determining if a saddle is fitting a horse correctly, but the ability to determine how it fits the rider is a different story. The sales of saddles are often driven by individuals who have become successful in their respective discipline. An example, is our nation’s best dressage rider, Steffan Peters riding Ravel in a saddle manufactured by Custom Saddlery; the Steffan Peters Advantage. Although this is a great saddle for Steffan and some fortunate riders built like Steffan, for most women, the position in that saddle would be detrimental to building the correct musculature of their horses - that ability to ‘ride like me’, unfortunately, is most often impossible.

So what to look for

The horse will tell you the story; as shown in the top sketch of the previous page, the horse that stands in a static frame (cross-ties), with a flattened pelvis, camped under, middle hollow, lacking a top-line, most likely carrying the weight of the rider in the lower thoracic or even lumbar area of their back. The saddle may appear to fit the horse correctly, but often, the saddle is not allowing the rider to sit in the area of the horse’s back that would allow the horse to carry the weight of the rider comfortably. So if the saddle appears to fit the horse correctly, then this is most likely a case where the saddle is not fitting the rider.

If the horse is standing in cross-ties in a frame like the bottom sketch on the previous page, chances are that the saddle is fitting both horse and rider.

THE EFFECT A RIDER’S POSITION CAN HAVE ON THE HEALTH OF THE HORSE

Although a saddle may seem to fit a horse correctly, it doesn’t mean that the saddle is allowing the rider a position that will allow their horse to work in their natural bio-mechanic frame.

The basics - What separates a woman’s ability to ride effectively, compared to a man, is the structure of their child-bearing pelvis; wider and taller than their male counter-parts, their weight is distributed over an area, ischial tuberosity to pubis, called the ischium or plate. However, women from different genetic backgrounds will distribute their weight differently. For that reason, when we build a saddle for a woman, the seat of the saddle has to reflect that genetic disparity.
The 3 illustrations above are depicting the different pelvis positions for women. The far left, is the northern European lineage pelvis, the center, is a woman with mid-European lineage, and the pelvis to the right, is the Mediterranean pelvis. The importance here, is that genetics has engineered these women to all be built with a different pelvis position - therefore, their aerobic frame, or a pelvis position where they can effectively use their core strength are all different, and each will require a different seat configuration...you are who you are.

With a straight spine, as shown in the right sketch, whether it is a man or a fortunate woman built like a man, the center of their ischial tuberosities is slightly forward in their frame, or what we call a posterior frame.

However, for the woman, left sketch, the center is placed further back, which makes their weight bearing area in the seat of the saddle, further towards the cantle on their ischial tuberosities, or what we call an anterior frame.

In addition to their difference of ischial contact within the seat of the saddle, is that those riders that are built like the sketch on the upper right, their "pivot point", blue arrow, allows these riders to ride in a two part frame; or the area that they separates their upper to lower torso with the movement of the horse - their sitting bones.

However, the ‘pivot point’ that separates the upper and lower torso for a woman, upper left sketch, becomes the most anterior vertebra of the lordotic spine, in this case L-3, orange arrow. The complexity here now becomes the fact that women with a lordotic spine end up having two ‘pivot points’, orange arrow and blue arrow. This is a huge obstacle for a woman trying to ride in this 3 part frame; upper torso to L-3, L-3 to ischial tuberosities, ischial tuberosities to lower torso. It becomes harder to use their core strength, they will need to develop stronger oblique muscles for lateral balance, and with that constant activity at that L-2/ L-3, in this case, will have more back pain than their male, fortunate female counterparts with their straight backs.
Not all women are built the same!

Some fortunate women seem to have the ability to get in any saddle, and ride as effortlessly as most men do, while other women find it very difficult to sit in a saddle at all - there are reasons for that.

We have found, that those women who can ‘naturally ride’ a horse have some significant physical traits that allow them the correct position and balance when riding. When looking at the way some of the nation’s best women riders are built, you see some common characteristics; tall, straight back, long legs, balance off their heels, and have a short closed pelvis. This position, allows women with these builds, to sit in a saddle on the back of their pelvis, or ischial tuberosities, much the way a man can sit in the saddle.

This natural straight build, is often times a genetic trait; usually associated with women with a Northern European lineage; Scandinavian, British Isles, and northern Germany, or coincidentally those regions that produce the best Olympic women dressage riders.

Having excelled in their discipline, these naturally gifted women often become trainers. Unfortunately, it becomes hard for them to realize what a rider with a different frame than theirs, has to go through to just sit in a saddle, let alone ride effectively. Without regard to the unique challenges of their students’ physiques, unlike their own, their instructions will promote bodily compensations making riding all that more frustrating.

It would be great, if women had the ability to ‘ride like me’, but honestly, no matter how many classes in yoga, palates, or time spent in the gym, most women cannot actually reconstruct their skeletal system, or change the muscular, tendon and ligament insertions, in their skeletal frame.
WOMEN WITH MEDERTERIAN LINEAGE

The lordotic frame

The lordotic spine - this may be the ‘in’ look for Hollywood superstars, as in the case to the right, but it is a frame that would make it almost impossible to sit effectively in a dressage saddle made for a man, or a Tack Store stock saddle; a position where a woman wouldn’t be able to make the bodily compensations for correct balance and position.

In this frame, a rider has a genetically hyper-extended spine that causes her pelvis to tip forward. In order to ride in her natural frame, the rider often has to sit against the cantle of the saddle where the upward curve of the seat of the saddle, is more reflective of downward ischium position of their pelvis. This has a negative two-fold effect; first is that the rider will be placed in a chair seat, have no use of their core strength, slouch, their knees will go over the thigh-rolls, and lower leg will go back of the girth for balance. For the horse, now forced to carry the weight of the rider on their lower thoracic and lumbar vertebrae, will not be able to raise their back, will be forced to work out behind, and create tightness from poll to hocks, not to mention a lot of Vet bills for their horse, and chiropractor and massage sessions for the rider.

This takes a very special saddle that has to have a different tree and the seat webbed in such a way that the female rider with a lordotic spine, can sit naturally in the center of the saddle, and at the rising trot, where these riders often hit their pubic bone on the pommel, the stirrup bars have to be positioned for minimal pelvis travel in that gait. A trainer asking a student with a lordotic frame to ‘ride like me’, is asking for the impossible. If you walk, run, dance or do any aerobic exercise in a lordotic frame, why wouldn’t you also want that same abdominal, back muscle interaction while riding a horse? Besides, by forcing a lordotic spine into an unnatural position is exposing the lumbar vertebra into possible herniated or ruptured discs. You are what you are...
To have a saddle fit a rider correctly, the seat of the saddle has to reflect the exact shape of the rider’s ischium, to allow that rider a position that represents their natural aerobic frame; a frame where a rider will have the ability to ride in a relaxed position and have the correct interaction of their abdominal, back, and oblique muscle groups.

In addition to the shape of the seat, a custom saddle for a woman also has to have the following:

Correct seat size - that measurement is determined by the circumference of your pelvis - it has nothing to do with the length of your femur.

Correct length of the flap - which is the distance from the top of your inseam (crotch), to the top of your show boots, minus 1 1/2”. This will allow maximum amount of lower leg on your horse’s side, yet long enough where your boot won’t get caught on the flap.

Correct rotation of the flap and placement of the thigh roll - a complicated measurement that has to do with how the rider balances with their quadriceps - usually a side effect of women with lordosis that who often have an anterior frame for balance, which causes over-developed quadriceps.

Correct position of the stirrup bar. This crucial position, will allow a rider to sit in that much sought after shoulder-hip-heel position, but more importantly, keep the rider from sitting on their horse’s lower thoracic vertebra and the lumbar region of their horses back.

The depth of the seat has many contributing factors; it may be determined by the strength of the riders abdominal muscles, whether the rider is seeking a more secure seat due to a previous injury, or for a horse that is still ‘green’, or it can be a required for those riders that like a confined position, for communicating their aids at upper levels movements.

In addition, there may be other alterations needed for the saddle for the rider that has experienced arthritic spurs on their ilium, have injured their coccyx, or have pulled or injured an array of muscles, tendons and ligaments found in the pelvis region. – The goal of a Saddlery should not only be to make the rider sit comfortably, but also ride in their natural aerobic frame.
THE NARROW-WITHERED HORSE

The before and after pictures to the left was one of my projects that I have done with the Thoroughbred horse. Prone to having narrow withers, the placement of the saddle behind the scapulas, often times blocks the natural bio-mechanical movement of the shoulders – without the ability to open their humerus, they pace, lose the development of the latissimus dorsi, start popping their shoulders, tear the serratus ventralis, and start a downward spiral of compensations that create a very lame horse – And like so many thoroughbreds either off the track, or from Hunter/Jumper barns that wind up looking like this, end up at the auction and eventually go to slaughter.

This is definitely a saddle design and/or fitting problem that can be solved. I do this all the time.

As you can see by the picture on the top, this horse has had a saddle that not only was sitting on top of the wither, but also digging into the shoulders.

Here again, I have addressed this issue with David Kempsels’s Flair air panels system. The picture on the bottom was the same horse six months later, on his way to eventually becoming an excellent dressage horse, living a very happy life.

When I design a saddle for the Thoroughbred horse, or other horse breeds with narrow withers, I add a stronger gullet plate that will hold its integrity, due to the narrowness of the tree. The panel contact, blue arrows, does not sit on the sensitive thoracic trapezes. The special air panel, green area, only sits in the area of the panel, which has the deep shoulder hole, and can be adjusted for the lateral asymmetry.

With little resistance from the saddle, these horses make remarkable changes not only to their wither musculature, but also the important muscle groups that make these horse incredible athletes.
With the popularity of the Baroque and Friesian horses, saddles for these breeds have become a huge problem. The inherent problem for these breeds is that they tend to lack reciprocal motion of the ilium; they naturally don’t sit down like a Warmblood. The Friesian, with the disproportional shorter femur in reference to the ilium, indicative of a cart horse, is a genetic trait. However, the Baroque horse which often times prefers to go in a vertical frame; piaffe, passage, always seems to be in a bracing frame. The result on both of these breeds, is that they tend to develop more ilocostalis, and brachiocephalic muscles, which often makes their backs middle hollow, and gives them the appearance of a back like a barrel, as shown in the picture above.

Here I have designed a longer and stronger gullet plate which allows me to drop the panels even further than I do for the Warmbloods. In addition, I also make half-panels which will not interfere with the follow-through of the fore quarters, due to the presence of triceps in the Baroque horses, and occasional fat pockets on the Friesians. This ability to move with a follow-through on the fore also allows the hind-quarters to move the same; with natural ilium movement, comes the all-important interaction of the longissimus dorsi, and abdominal muscles.

The saddle on the left is the basic Walsall saddle, which could be any of 60 models made there – they all are about the same. What we have done and what I have tried to get some other saddlerys to do, is to install a longer and much stronger gullet plate, drop the panels, as seen in the right picture, and make the tree of the saddle be more reflective of how those horses are actually built. Or in this case, a channel 4 ½”s wide, versus our 7” wide channel.
TREENESS SADDLES

This can be very controversial. I have had some made for me in the past, and didn’t get the results I was looking for. However, if the horse has the correct musculature in the first place, can easily carry the weight of the rider, and you don’t particular want your horse to do upper-level dressage, these saddles can work. However, if you have a high-spined horse that needs to build muscle, or a horse that really raises their back in the collected gaits, these saddles have the opposite effect on the horse than what they are advertised to do. In addition, the twist on most of these saddles is very wide, and for women riders, especially if they have wide-backed horses, these saddles can be very uncomfortable.

PART III – THE FIT OF THE SADDLE TO THE HORSE

Perhaps my biggest peeve is how the saddle industry is training their saddle-fitters to adjust a saddle for a particular horse. The classes for a certification, ‘Master Saddle-Fitter’, can be achieved in 4-5 days, with little time actually working on a horse, and often taught by people with very little training other than measuring the rider for the correct size of the seat of the saddle, the width of the wither for the size of the saddle needed for the horse, and of course, how to market their product; which unfortunately includes, informing their potential clients about how bad their present saddles are, when more often, the saddles being replaced are better than the saddles that the Rep. is trying to sell – musical saddles.

Each company has developed a method of identifying a saddle fitting problem; Schleese is now up to ‘9 points of saddle-fitting’. It is a great guide for an inexperienced client seeking to buy a saddle, but seldom does the product live up to the changes that the Rep. is promising. The problem is, that new saddle would have possibly resolved some of the issues it was sold to do, but the ‘Certified Saddle-Fitter’ lacks the knowledge to adjust the saddle to correctly fit the horse – which unfortunately, gives their reputation a bad name.

I personally have been in a stable where a number of saddles had just been delivered from a supposedly high-end Saddlery, and all the horses being ridden in those saddles looked lame; saddles were either too wide, too narrow, behind the motion, or completely the wrong size for the horse and rider.

BROKEN OR WARPED SADDLE TREES

I sometimes hear from a client that an equine professional; chiropractor, trainer, veterinarian, and even another saddle-fitter, told them that their saddle has a bent, broken, crooked, or warped tree. First of all, for a saddle made out of plastic or fiberglass, that would be next to impossible. However, for a saddle made from a wooden tree, the bent and warped tree is expected; a flex tree will conform to the asymmetry of the horse’s back. It is not a problem, in fact, if that same saddle were
used on a horse with a different asymmetry, eventually it would reconfigure to that position – it is meant to do that.

**BROKEN GULLET PLATE**

Different story – There are a number of saddles that have a problem with broken gullet plates (head iron), mine included. Hennig saddles with serial numbers starting with 0801, 0802, 0803, and some 0804, had titanium plates installed, and with time they all broke. This is a problem, in that when they break, they can ‘pop’ and instantly drop on the withers which can cause an injury to both horse and rider.

**BROKEN AND STRESSED STEEL BANDS**

When a horse is extremely one sided, the weight of the rider will always gravitate to the horse’s stronger side. This uneven pressure on that side of the saddle, will often stress that side’s steel band, which can leave a crease on the seat of the saddle – with time, that band can actually break – by running your hand under the panels, a broken band can easily be felt.

**SADDLE PROBLEM – Behind the motion**

A term used to describe a rider that is sitting against the back of the saddle (cantle), which makes it very uncomfortable for the horse to carry the weight of rider there, and for the rider, it is a position that most riders find it difficult to sit comfortably.

The saddle to the right is sitting on the horse’s back, pommel high. The red line indicates where the balance of this saddle is, the green line is where it should be.

This is usually indicative of a saddle being high in the wither, or low in the cantle - commonly known as “behind the motion”.

**What does this do to the rider’s position?**

For a male, usually nothing; because of the anatomical structure of a man’s pelvis; the small narrowly spaced seat bones, provides a very small base in the saddle. A man merely has to pivot slightly forward, and can usually balance himself quite easily.
For the woman rider, who does not have a problem with position and balance, usually indicative of a woman with narrow hips, a naturally straight back, and equal length of their upper and lower leg, this may not be a problem either.

However, for the other 90% of women, this can be an extremely frustrating position. Not only do they have to struggle to keep forward in the saddle to maintain balance, they will usually be forced to lean forward, their knees will try to move over the thigh rolls of the saddle, and their lower leg will move back of the irons. This is the “compensating frame” of a rider struggling to maintain balance, thereby creating a frame unable to communicate with their mount.

What effect does this have on your horse?

There are a number of reasons why a saddle will sit pommel high. The first is for a horse that is excessively wither high, or uphill. Although this is supposedly a favorable conformation for a dressage horse, for that 90% group of women, it will throw them to the rear of the saddle. For a horse forced to carry the weight of the rider against the cantle, or over their lower back and lumbar area, it will most often keep a horse from using their abdominal muscles and eventually force the horse to work “out behind”, or what I refer to as moving in a long frame.

Another result of a saddle being too high in the pommel, or too low in the cantle, can be from a saddle that is too narrow. In the picture below, the tree points are digging into the shoulder of the horse. In addition of forcing the horse to carry the weight of the rider in their lower back, the saddle that is too narrow will block the movement of the horse’s shoulders, preventing them from moving in their athletic frame.

The last reason a rider may be forced to sit behind the motion, can be from a horse that really “sits down” when being ridden. Some upper level dressage horses have so much reciprocal motion of their ilium, that their rear end can drop as much as 2-3 inches in the collected gaits. This frame can also be a breed related trait such as some specific lines of Warmbloods that genetically have this naturally articulated pelvis when they move.
For the horse that is forced to carry the rider “behind the motion”, this can be a very harmful to the horse. Not only will the horse be unable to use their abdominal muscles, or ‘bring up their back’, there can be some serious secondary complications as a result of a horse forced to move in this frame; ligament and tendon problems, hock and stifle problems, tightness in the poll and jaw, or damage to the back, sacrum and even kidney failure.

A horse that is constantly lumbar sore can exhibit some great discomfort. They may appear to be girthy, unable to bridle, bolt, buck, bite, and even kick when you try to saddle them. Simply put, riding hurts them, and they are only reacting to the pain they have when being ridden. Even after a saddle has been correctly adjusted, or a better fitting saddle is used, there often will be residual feelings about having a saddle on their back. Only time will reverse that trust.

What can be done to correct this problem? Most saddles made in Europe, are made from either a wooden or synthetic trees supported by a steel gullet plate, as shown in the above picture. Most saddle-fitters have, or should have a press that can correctly adjust the plate to make the saddle fit correctly. However, there are a lot of saddles that have either weak steel, or use spring steel that makes adjusting these plates almost impossible.

**SADDLE PROBLEM – Tipping Forward**

The saddle to the right is sitting on the horse’s back, pommel low. The red line indicates where the balance of this saddle is, the green line is where it should be.

**What does this do to the rider’s position?**

For a male, this may cause groin pain. For women riders this may cause groin pain, and it some cases make the rising trot almost impossible.

**What effect does this have on the horse?**

The saddle that is too wide at the pommel, will almost always rock. This means that there is more saddle panel pressure in the middle of the horse’s back, than at either the pommel or the cantle. The pressure at this point will prevent the horse from using their abdominal muscles, which in turn will prevent the horse from building the much needed back muscles required for any of the equine disciplines.
In addition, to the rocking action the saddle can cause, as the horse is moving in the downward motion of their gaits, the rider will be tipped forward placing all their weight on the horse’s wither of thoracic trapezes muscle. This muscle group is a protective muscle versus a muscle group of strength. In many mammals, it is this muscle group that the mother’s gently bite as they carry their young. These small animals will curl up motionless until their mother’s release their grip. This act of submission, can also take place in the horse that has a saddle pinching too hard on this muscle. The submissive horse usually moves with a shorter stride and usually requires a whip or spurs to encourage the horse to move ‘forward’.

The opposite motion of the rocking saddle, places the weight of the rider in the lower back or lumbar area of the horse. Horses are not meant to carry weight there, and in doing so can lead to some secondary lameness problems.

The picture to the right is a synthetic dressage tree. In this case, the tree is too wide, as indicated by the red line. At the top of the gullet plate, where both of these lines are intersecting, is where all the pressure would be. If this were the actual saddle, in order for it to fit this particular horse, this tree would need to be narrowed or, adjusted to the position of the green line.

If a horse is being worked correctly; tightening of the abdominal muscles, back is up, haunches engaged, correct stifle & hock movement, articulation of the pelvis, the horse will narrow at the wither. This seldom recognized muscular-skeletal development is extremely important to understand if you want to advance in any of the equine disciplines, but more importantly in dressage. Correct work, develops correct muscle. In this case, the development of the latissimus dorsa (back muscle), is responsible for the positioning of the humorous. The position of the humorous, dictates the position of the shoulder. As the shoulder is drawn back, or as Dr. Deb Bennett refers to “coming up in the wither”, the position of the shoulders will actually be repositioned to an area that is narrower than it was prior to that correct muscular development. Therefore, a horse that once required an extra wide tree for a saddle, if worked correctly, will often require a much narrower saddle.

**What can be done to correct this problem?**

Most saddles made in Europe are constructed with either a wooden or synthetic trees supported by a steel gullet plate. These gullet plates are formed to create the various widths of trees. Also, most saddles have panels that are filled with wool, foam, felt, or other synthetic materials.
With the proper equipment, and the knowledge of the saddles that have strong enough gullet plates, a saddle can be reconfigured to the changes a horse goes through when being worked correctly. Saddles that have trees that are made out of plastic and fiberglass usually cannot be readjusted unless sent back to the manufacturer. In horses that make subtle changes in their conformation, it is sometimes possible, on wool and felt filled panel saddles, to reflock them enough to compensate for those muscular-skeletal changes. With foam panels, that have no adjustability, we have replaced the foam with wool.

**FALLING TO THE WEAKER SIDE**

Where to start??? This simple illustration is perhaps the greatest problem that many dressage riders face. It is also the least understood, even by accomplished riders, trainers, or even veterinarians.

The picture of the horse above is right-sided. Meaning that, it has a lot more muscular development on the right side; latissimus dorsa, longissimus dorsi (top-line), and perhaps thoracic trapezes muscle groups. What this means, is that this horse has less resistance moving to the right, and prefers to carry the weight of the rider on their right side. To further complicate this horse’s compensating frame, the rider that is forced to sit on the right side of this horse, will usually collapse to the left. In turn, the horse will hang on the riders right rein for support of the rider’s cantilevered position, which further develops unequal muscular development.

This particular saddle was built with a narrow channel (the distance between the two panels that make contact with the horse’s back). In doing so, the weight of the rider is sitting on two ligaments that run along the skeletal processes of the spine. (Supraspinoeus ligaments are attached to the pelvis, and also attached to the poll of the skull. It is these 2 ligaments that are responsible for supporting the horse’s head. In other words, the neck and head of a horse is positioned by the position of the pelvis. The stress detachment of these ligaments at the pelvis, in jumping horses, is often referred to as the “hunter’s bump”. A saddle should have a channel wide enough that the panels allow the ligaments to move freely with the motion of the hip. With a saddle that has panels sitting on these horse’s ligaments, a horse is usually very reluctant to lift his back, will not use their abdominal muscles, usually works out behind, and eventually will be lumbar sore and have hock problems.
What can be done to correct these problems?

The panels on most saddles can be widened, allowing the panels to be placed on the back muscles instead of these ligaments. As for the rider sitting to one side, the saddle can simply be reflocked asymmetrically to allow the rider to sit centered in the saddle. (Covered later under ‘Saddle Fitting for the asymmetrical horse’)

SADDLE PROBLEM – Billeting system

The saddle to the right has an incorrect billeting system. The two billets, shown in red, are connected to the tree in the middle of the saddle. Not only will this billeting system prevent the horse from using their abdominal muscles, it will also be collapsing the ribcage of the horse restricting lung capacity. The green lines indicate a “V” billeting system. Here a saddle will be secured to the horse on the sternum and keep the saddle from moving over the shoulder, and keep the cantle of the saddle from bouncing on the horse’s back.

The saddle to the right was made for a short woman with lordosis (inward curvature of the spine), a tipped pelvis, with her upper leg much longer than her lower leg. Her horse has a long shoulder, very narrow wither, and over-developed deltoids and triceps. He also lacked muscle over his back (longissimus dorsa); he was lumbar sore, stiff to the left and had arthritic hocks. The rider, couldn’t make contact with her left seat bone, couldn’t get a left lead depart, had position problems on her downward transitions, and also suffered from lower back pain after her ride.

We made the saddle with a shorter flap, to allow the rider more leg contact, the stirrup bars are extended to get her leg under her, the pommel was lowered to allow her to sit forward, the saddle has air panels to allow the deep shoulder holes to develop, a “V” billet system was installed, and the channel was widened to allow movement of the supraspinal ligaments.

This horse no longer has hock problems, or a sore lumbar. Correct muscle is being built and the horse’s disposition has changed dramatically. The rider now sits centered, communication of her aids has become easier, and she no longer has a sore back after riding.

This is what a correctly designed and fitted saddle should look like – it should look and feel like it is part of the horse.
PART IV – WHAT THE HORSE IS BEING ASKED TO DO

Even when the saddle has been designed correctly for horse and rider, and the saddle has been fitted correctly, an injury/lameness issue is still a probability. As an example, I recently made a follow-up visit to a stable, to readjust a client’s saddle that supposedly needed attention. I found the horse looking stressed, flattened out on the ilium and having overly-developed brachiocephalic muscles – this was the same horse that just weeks earlier was bright-eyed and in the process of building a strong top-line. When I asked her, “what are you working on”? I got the reply, with an almost gleeful comeback, “the sitting trot, in fact a lot of sitting trot because the trainer is getting us ready for 2nd level”...

The reason for those injury/lameness issues may be very apparent to us, but to maintain our political correctness, we often have to work on the result of the injury/lameness, rather than suggest something that seems quite obvious from our experience; ‘the probable cause’. Do we say something that is completely contradictory to what they are being instructed to do? I for one, have had a problem with that in the past, and have said things that I later regretted. I have also found that the wrath of a trainer can have far reaching negative consequences; there aren’t a lot of trainers out there that are open to education – they already seem to know it all.

So, what I have had to do is come up with an alternative plan. Fortunately, I have had the opportunity to work with some of the best trainers in the world, and with that opportunity, I have been able to make some training articles and videos with those trainers, on exercises they incorporate in their training of young, or out of shape horses that require developing the correct musculature. With those recommendations, I have been able to convince those misinformed riders the correct path to training their horse, and hopefully the trainer will also learn from that experience. The following is one of those exercises - this one deals with developing the passive hock.

SADDLE FITTING FOR THE ASYMMETRICAL HORSE
by George Gullikson & Tom Noone

This is very controversial; a huge issue in the way we train horses in America versus Europe, is that instead of building the correct musculature of a horse to carry the weight of the rider on the lunge and long-lines, is that we try to ride them into that frame. However, unless that rider is experienced and knows how to slowly bring the horse along (which is very rare), building correct muscle is very difficult – hence the reason you are so busy these days.

Perhaps my biggest challenge I have as a saddle-fitter, has been how I adjust a saddle for a horse that has asymmetrical lateral musculature. This is not only frustrating for me, but the explanation to a client or even their trainer, has become frustrating as well. Hopefully the visualization of the following sketches will help describe the problem, and find a solution to correct that problem.
All horses have a certain degree of lateral asymmetry some more than others; the thoroughbreds for an example, are all extremely left-sided, a reason that so many trainers don't like working with them. In Europe, it is expected that a young horse's training, is started by correct lunging and the use of long-lines. The ability to train a horse symmetrically from the ground is much easier when the horse is not subjected to the weight of the rider. As Americans we simply lack the patience to work the horse from the ground, and if we do lunge the horse, often times it becomes counter-productive.

On the sketch to the left, is the top view depiction of a symmetrically built horse; equal amount of musculature on both sides of center, and cervical and thoracic vertebra are relatively straight. The sketch to the right is how a rider would sit in the saddle on this symmetrically built depiction. Note that the hind-quarters are equally built, and as the horse tracks, the foot-falls would be equal and in-line on all four quarters. The rider would be able to put equal weight on their ischial tuberosity’s (sitting-bones), and the ability to communicate their aids equally, would be very easy - no compensations in horse or rider. Although this would be considered the balanced frame, I truly believe that a balanced frame is almost impossibility.

What really happens?

While standing, we balance off our feet, while sitting in a saddle, the pelvis becomes our base of balance. The area of the pelvis we sit on is called the ischium. The male rider’s skeletal area that comes in contact with the seat of the saddle is called the ischia tuberosity, or sitting bones: two boney protrusions, about the size of a half-dollar and approximately 3 inches apart. Notably, a woman’s boney protrusions can be as far as 7 inches apart. That anatomical difference, between men and women, is why men, or women with narrow pelvises, can laterally balance on the back of an asymmetrically built horse much easier, while most other women will find themselves falling into the weaker side of their horse.

The illustration to the left is how a man’s pelvis is built. The illustration to the right is how a woman’s pelvis is built.
When a symmetrical saddle is placed on an asymmetrically build horse, the saddle is going to fall into the weaker side. For the male, whose base is close together, green arrows, he may move slightly to the stronger side, or what he perceives is the center of the back. However, in that same scenario, a woman, red arrows, will have to move considerably further to the stronger side to feel that same security due to the width of her sitting bones. Often when I take a woman’s saddle apart, I can see a deep indentation where their sitting bone, ischial tuberosity, is making more contact on the side of the saddle that represents the strength of the horse, and a much smaller indentation on the weaker side.

On the picture to the left, is the top view depiction of how I find 95% of the horses; more musculature development on the stronger side, in this case left side, gluteus, hamstrings, longissimus dorsa (back muscles), and a very tell-tale muscle group, the ilocostalis, as shown in red. This muscle group can be found by running your hand down from the spine on the middle of the back. This ridge of muscles, will always be more developed on the stronger side of the horse, and will almost give the illusion that there is a shelf for the saddle to sit, whereas the weaker side of the horse, that muscle group will be either nonexistent, or have a lot less development. Interestingly, this musculature is more prominent on horses ridden by women, and also wide-backed horses; Arabs, Baroque breeds, Friesians, and Morgans.

The more the ilocostalis muscle group is developed on the stronger side, the stiffer the horse will be to that side. In fact, just as the rider in the illustration to the left, has developed corrective scoliosis in order to balance, and the horse will also have that same spinal conformation.

The degree of development of this musculature, can tell an entire story of how this horse is moving, but more importantly how they are compensating their frame to carry the weight of the rider.

In this instance, because the left hind quarter is doing all the work, not only to carry the weight of the rider, but also its disproportional left side musculature, its left hock will be the most active. Unfortunately, it will also become the stiffer hock because of the weight being placed on that left hind quarter. The biggest problem with the travel of the stiffer left hock, besides requiring injections for its longevity, is that the left side of the pelvis seldom closes- and here lies the problem.
In that same picture, because this horse has less musculature on the right side, the saddle is going to fall into that weaker side, plus the fact that the right side of the horse is not carrying the weight of the rider, the motion of the right-hind can be a lot more expressive, which will cause an inward rotation of the right hock, an outward rotation of the right stifile, but more importantly, allow the weaker right pelvis to close, or sit-down, something the stronger-side left pelvis is incapable of doing. With that ‘sitting down’, the rider, will have a sense of always falling into the weaker side of the horse, this becomes the catch 22; the more the rider sits to the stronger left side, the stronger the active left side becomes, and the weaker the passive right side becomes. With that, the more that the rider sits to the left, the more the rider will fall into the weaker side - it gets worse.

As shown with that inward rotation of the right hock (A), there will have to be an outward motion of the right stifile (B). Basically, this horse is making this adjustment (compensation) because of the cantilevered position of the rider. Now we have two joints that were designed to move forward and back, but are now moving laterally which is going to cause stress on ligaments and tendons that are meant to support those joints, and create an unnatural movement in the skeletal joint. There simply won’t be enough synovial fluids to correctly lubricate those joints, which can cause an array of compensating soreness/lameness issues.

**SO WHAT CAN YOU DO?**

The first priority is the comfort to the horse, and the ability for you to build a balanced horse. You have to stop this compensation of making the horse’s stronger side, stronger, and the weaker side, weaker. This not only creates an eventually lame horse, but is the major reason that so many riders are stuck at the lower levels of dressage - once you can get a horse to track evenly and load on all fours equally, you will have a much easier ability to advance in this discipline.
Because the channel of this saddle is narrower, it has to be impeding the motion of the supraspineous ligaments, making it painful for the horse to raise their back into the saddle, which will prevent the horse from using their abdominal muscles and building the strength of the longissimus dorsi, or a strong top-line.

The uneven musculature will continue to develop on the stronger side, and atrophy the weaker side. The rider, although they appear to be sitting vertical, in the saddle, will still encounter the same weakness, on the weak side hind quarter, and the horse will still brace on the strong side rein for balance.

The biggest problem here is that no matter what we do to that saddle, we will not be able to get that horse up in the back, and although the horse may appear to have the correct stifle/hock action, the horse will lack the ability to close their pelvis; this lack of reciprocal action of the pelvis, is what we are now seeing in the upper-level dressage competition - a leg mover, versus a back mover, which defies what dressage was meant to be...

**WHAT WE DO**

No matter what we say, nobody is going to back up their training to get their horse laterally balanced through correct lunging and long-lining. So, what we have to do, is convince not only the rider, but also their trainer, who often times doesn’t have a clue
why their client is falling into the weaker side, to stop the dressage training, and start building an athlete. It is only when the horse develops the correct musculature that dressage can be done correctly. NASCAR has a term that is very fitting here “Slow up to go fast”.

We purposely balance a saddle, to force the rider to sit centered in the saddle. Although this will make the rider sit on the weaker side of the horse, and force the horse to use muscles that it isn’t accustomed to using, during that transition, the rider can’t help but fall further into the weaker side of their horse. Unable to find the sanctuary of sitting on the stronger side of the horse, they will not only feel very insecure, but their trainers are going to be screaming at the top of their lungs about that cantilevered position. Is it the fault of the saddle? No, it is the asymmetric horse that is having difficulty carrying the weight of the rider on the weaker side, but if that horse is going to be given the opportunity to develop that correct musculature; this is a necessary step that will ultimately develop a stronger balanced horse that can live a healthier and productive life.

I have asked Dr. Mike Bushkohl, a chiropractor practicing in the Midwest, and World Cup representative and trainer, Tom Noone, to help me not only identify this problem, but also provide the exercises to build the weaker side of the horse through riding. A video of us will soon be available.

These exercises that Tom has provided, have now been used by him and his students for the past 3 years, and have created some very strong symmetrically built horses. In addition to making a more balanced dressage horse, the need for injecting hocks and stifles is greatly reduced, as are the chance of injuries that asymmetrically built horses encounter while working in a compensating frame.

You might be on your own. I have had the good fortune to work with some of the best trainers in the World, and find that those that excel with training of their students to do correct dressage work, are very active during a lesson. They are found working in the ring with their student, walking behind the horse to see how the horse is tracking and observe if the rider has lateral balance. They demand that every stride the horse is taking is correctly developing positive muscle development. Tom Noone has this saying, “practice does not make perfect, perfect practice makes perfect”. I have found that there are very few trainers that are going to help you with these exercises, and quite frankly I can’t blame them; their specialty is teaching you dressage. However, a trainer is not really necessary to perform these muscle balancing exercises, this is something you can do on your own; a majority of my clients that have worked with these exercises, have done it alone, and often comment afterwards, that it not only made their horses much stronger, it gave them a lot more confidence in their riding, and all had a much better ‘feel’ for how their horse was moving.

To start, I have made an adjustment to the saddle to force you to sit centered in the seat of the saddle, where hopefully your horse will be forced to use the weaker side of
its frame, stop the bracing on a rein(s) for compensation, take the pressure off the poll and jaw for relaxation, but more importantly, make the horse honest by forcing your horse to load all fours equally - at first, this will be difficult not only for your horse, but it may not be much fun for you. Tom will tell you that you need to go slow at first; after all, you will be asking your horse to work in a frame that although correct, will not be doing what they are accustomed to.

For clarification of these exercises, this horse is left-sided (more musculature on the left side), the saddle will fall to the weaker right side, the right hock is passive and more likely, the horse may be bracing on the left rein for support.

The area that you are going to work these exercises in is an imaginary 15 x 30 meter rectangular circle. Don’t use the rail as a boundary - rather use the center of the arena. The 6 meter volte may have to be larger in the beginning, until your horse becomes more supple across their back.

This is the walk exercise - The rectangular circle is achieved by using the 3 step corner, by doing a shoulder-in, and a simultaneous haunches-out. The volte within that rectangular circle depends when you feel that the horse is lifting your weak side, or in this case the right sitting bone on that clock-wise movement. Start by doing a shoulder-in volte in the clockwise direction - what you are looking for, is activity, or the ability of the horse to pick you up with the weaker right hock. Once you feel that engagement, praise and reward by immediately going straight, but always staying on that imaginary rectangular circle. The reward is only to go in the counter-clockwise volte for one revolution, then go straight and do haunches in to the left, which also activates the right hind, for no more than 3 strides. Continue to the opposite corner, pick up the clockwise volte, repeat the exercise until you feel that right hind once again picking up your right sitting bone, then praise and reward again. The secret is that every time you feel the horse give you that right hind, immediately praise and reward by going straight. With time, the horse will understand what you are asking for, knowing that the reward will mean easier work. Important Tom often speaks about ‘behavior modification’ - “Do more correct repetitions, versus extended work”. Just as you would work out at a gym, you will be instructed to do weight training in ‘sets’ rather than extended work that can cause serious muscular, ligament, and tendon injuries. Please go at this slowly...

At first, don’t do any shoulder-in to the left, and haunches, in to the right - the reward is to only rest the right hind in the counterclockwise direction (in this scenario), and at first, do a minimal lateral work in that direction. Within weeks, or the time it takes to
activate the right hind, will be reduced from 90% of your ride, to 50% of your ride, at which time, the right side of your horse will become more muscled, and a resultant balanced horse. At first, only work your horse for 15 minutes a day; add 5 minutes each week, until you have achieved your normal work day. These exercises can also be done at the canter, but requires a larger area, but should only be done, once the walk work balance is achieved. The trot work is never used to balance a horse - the two beat trot is a very difficult gait to build the correct musculature of the compensating frame. However, once your horse has equal musculature on both sides of the back (longissimus dorsi), the stifle-hock action, and reciprocal rotation of the pelvis is equal on both hindquarters; the trot work will become extremely easy.

So for the 4-6 weeks that it will take you to work your horse correctly and build even lateral musculature, the ability for your horse to do dressage correctly is greatly enhanced. More importantly, that feeling of always sitting on the stronger side of the horse, and not having the ability to get your weaker side aid, will disappear. The ability to sit into your horse will cause you to lower your center of gravity, as with a more balanced back and hindquarters, your horse will be able to raise their center of gravity.