

INTRODUCTION TO EQUINE CONFORMATION

EVALUATION AND ANALYSIS
CONSIDERATIONS

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Introduction

Whether you are a horse enthusiast, owner, or professional in the equine industry; understanding the significance of equine conformation is essential. A desirable build does not ensure a horse will be a champion, and at the same time, we all can name at least one horse with train-wreck conformation that became a shining star. Most serviceably sound horses can work comfortably if the workload does not overtax structure and the training/conditioning program is realistic and fair. Conformation deficits may or may not lead to performance issues in a particular sport or discipline, but they must be taken into account when considering the goals for a horse and rider especially at the higher levels of competition.

When I was a beginning rider, one of my trainers told me my horse would never "make it" as an upper level dressage horse. I set out to prove that trainer wrong and learned the hard way that conformation IS critical to performance! There was nothing overtly wrong with the horse; but his very long back, shorter legs and low set neck made it a longer path for training. While this little horse was not a fancy mover, he could get the job done as a lower level event horse and he ended up teaching loads of riders in his lifetime. Lovely man. He built my confidence, taught me many lessons, and we had a good time. However, eventually we reached a plateau in terms of performance.

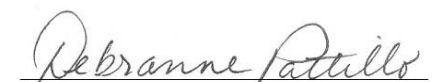
Even though I had an artist's eye, at the time I did not understand what I was supposed to looking for when considering the horse's body. After this experience, I realized it was time to start learning about conformation, symmetry of structure and movement, gait abnormalities... it was only the beginning!

So, this excerpt from the text we use for the Equinology Equine Body Worker Certification Course is my gift to you! Anatomy of Equine Bodywork; The Equinology® Approach is a collaboration between many talented and experienced equine professionals such as Dr. Barb Crabbe, Dr. Peter Flood, Dr. Kalyani Premkumar, Dr. Nicole Rombach, Dr. Carrie Schlachter, Dr. Kerry Ridgway, Dr. Joanna Robson, Ruth Mitchell Golladay and myself. It represents the culmination of over 20 years of work and experience in the field of equine studies.

If you have already been studying conformation, most of what you will read in this conformation introduction section will not be new to you, but the complete text goes into great detail, providing you with most everything you need to know if you are going to work as a professional.

Conformation is also discussed in our 4-day EQ300-600 onsite: Equine Biomechanics, Gait Abnormalities and Lameness Course presented by either Dr. Carrie Schlachter or Dr. Barb Crabbe: [\hfdg.##Yei lbc`c\[m'Vta #dfcXi Vw#Ye' \\$ \\$! * \\$ \\$! Yei lbY! V\]ca YW Ub\]Wg! \[U\]H UVbcfa U'\]hYg! UbX! `Ua YbYgg#](#)

I hope you enjoy!



Debranne Pattillo
Equinology INC, CEO

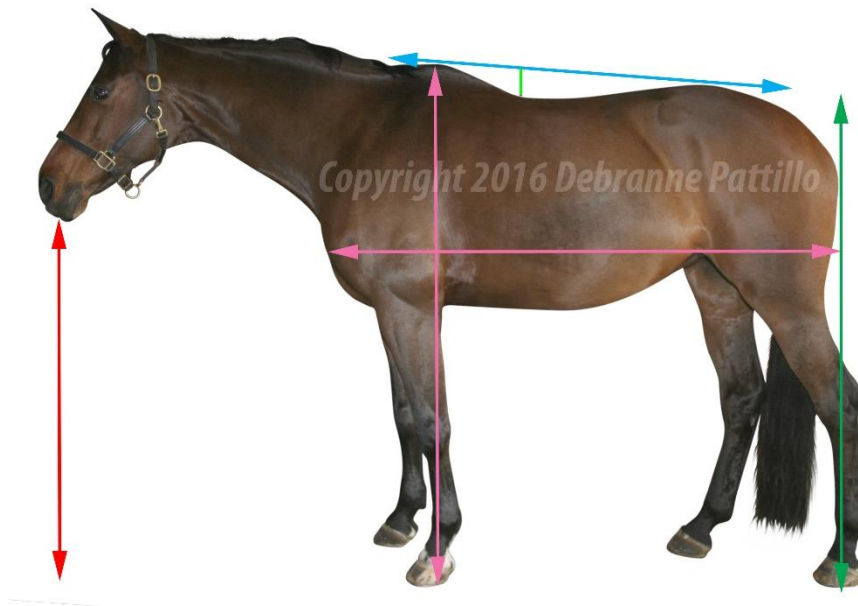
KNOW WHAT IS NORMAL FOR YOUR HORSE

Before we start discussing conformation, it is important that you know what is “normal” for your horse in regards to movement, habits, vital signs, posture, behavior and how their bodies “feel”. Then you need to be aware of the external surface anatomy to continue your assessment. While you are on this path you should consider recording your horse’s movement as part of your assessment.

Let’s concentrate on what constitutes “normal” so you can compare your findings in subsequent sessions. There are many reasons that can cause your horse discomfort or change his posture. Even with the best care, your horse can still run into problems. Add our weight to the ridden horse and an existing issue is compounded. We all agree that horses ridden correctly may have fewer issues than those pounding the surface or traveling upside down. However, with these many variables, many of which we have no control; can stem from emotional, biomechanical or chemical origin. Some horses don’t have the best conformation (the way they are structurally put together), others have tack that doesn’t quite fit, some housing limits normal activity in addition to problems associated with feed imbalances, shoeing or trimming, worming, vaccination, medications as well as vices, emotion, hormones, disease, injury, poor use of training devices, footing, and spinal issues. The variables which contribute to body sensitivity and dysfunction involve a long list and all the “correct riding” in the world cannot undo many of the burdens our companions may have to endure.

RULING OUT COMMON ISSUES and EXPLORING YOUR HORSE

This is a start to a list that can take up an entire chapter. However, these are simple things that you as an owner can do. First you need to be mindful of what is normal for your horse.



Posture: Get your camera out and employ a friend to help. Stand your horse up on firm ground. The horse’s spine should be on a straight line. The photo here has the horse standing with hindlimb further back than desirable. It’s best if you can have the long tendons running on the backside of the cannon bone perpendicular to the ground. A side view (lateral view) can also provide information on the topline by measuring from the highest part of the withers to the highest part of the crop (blue line). You can measure at the deepest part of the

back to see if the topline is improving or not (the apple green line). Make sure you have the muzzle at the same level to the ground for all your pictures which provides a more accurate comparison (red line).

Make a note if the horse prefers to stand with one leg in front of the other or under itself. The pink lines in this photo show how to measure the length of the body (they should be equal). This however is conformation or rather how the horse is put together. It is not necessarily posture.

Look for areas those hollow areas that don't have enough muscle coverage. Remember to compare these areas to the other side to see if they are symmetrical.

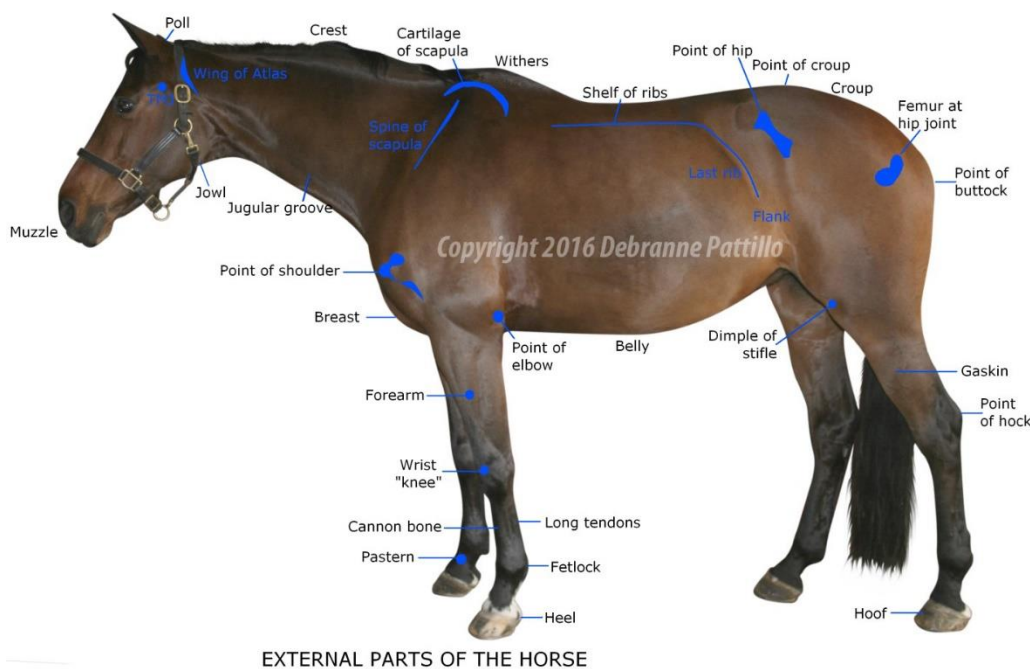
By taking control photos, you have something to compare to from previous shots. Take a picture from the other side, from behind, from the front and over the top (dorsal view). While we are not discussion conformation here, if you do wish to learn more about conformation, here are some links.

<http://extension.uga.edu/publications/detail.cfm?number=B1400>

<http://www.thehorse.com/articles/10115/conformation-in-horses>

Record your horse in hand and under saddle: Even if your eye is not educated to see asymmetry in movement, you can your horse you establish a baseline for your review and to share with your health care professionals for assessment. Professionals appreciate clips of the following patterns in soft ground and hard ground if possible. Safety of the horse is paramount. Record your horse moving in straight lines (filmed from about 15-20+ feet away), moving away from you (rear view), and moving towards you (front view) at the walk and trot. If you have access to a round pen or your horse is good on the lunge line (and sound enough), film your horse in both directions on the circle and include clear with transitions in all three gaits; walk trot and canter. Make notes of haunches in or out, balance on the circle, placement of the neck and shoulders and determine which direction seems easier at the particular gait. Include film of your horses backing up, turning on the forehand, crossing over behind and walking downhill.

Palpate and assess: First you need to learn where the simple external structures lie so you are accurate side to side and your assessments are repeatable.



Use a flat hand to run over your entire horse. Look for differences in temperature, tone, tension and texture. There are certain structures that are firmer than others and this is perfectly normal.

One of the best ways to appreciate what is normal is to pick 4-5 key areas and feel them on 10 horses in a row. For example, the muscle right under the mane (m.

rhomboideus cervicis) is supposed to feel firm compared to the muscles lying below. You would be more concerned if they were under the same tension as the lower muscles.

Investigate the area you've just prepared with a firmer touch using your fingertips, braced thumb or a combination of both. You are looking for a **repeatable reaction** from the horse which should not be confused with **response or release**.

Horses have reflexes which are involuntary and vary depending on the type of horse (including breed or line). These are those "knee jerk" reflexes where the nerve stimulus travels to the spinal cord and then returns. It is normal for horses to have these (as do you) and it is more of a concern if there is no response to an educated hand combined with gait or coordination deficits. If you run your fingertip (or in the case of a horse with slower reflexes, the edge of your fingernail) from the top of rump muscle downward, the horse will tuck and have a **"rounding response"**. However, the horse would move in a smooth manner and then they should return to neutral or to the starting position. If the horse jerks away with the educated touch or if he drops down and stays down, that is more of a pain response which warrants further exploration.

When investigating, you are looking for knots, tight lines of fiber, tissue disruption, difference of texture and tone as well as temperature. When the horse reacts, check a second time to make sure it is truly a reaction. In very mild instances often you will only get the reaction and not feel that physical change especially when first learning. These are the "stress points or pain points" that are shown at the end of this section. Keep a journal of these so you can be aware of patterns.

Repeatable reactions may include:

- Bracing
- Moving Into You or Away From You
- Fidgeting
- Stomping or Kicking
- Stretching
- Shaking
- Snapping
- Change of Breathing
- Jerking Away
- Dropping Downward

Check your saddle: If a saddle restricts proper movement, the horse is going to adapt his way of moving avoiding the discomfort. Slide your hand in between the front of top edge of the saddle flap where it comes in contact with the shoulder. You should be able to slide your flat hand through this area. It will be snug. Try leaving your hand there and have someone move your horse's neck side to side. If you have feel any discomfort, you probably now have a good idea as to why your horse did not want to bend to that direction. With your hand still in place, have someone bring your horse's leg on that side forward. Again, any discomfort felt is contributing to him shortening his stride as he reaches with that limb.

Check for any lower limb problems: If you have a blister on your foot, you will tighten your muscles as you load that leg to minimize the pain you are about to feel. The horse's front legs are analogous to your arms and are intimate in the working relationship to the horse's neck. If the horse has a bruise on the sole, injury to the lower limb, compromised joint, abscess, sore foot, shoeing or trimming problems or any type of lower limb syndrome, he will do whatever he can to avoid loading the limb completely. This is accomplished by bracing the muscles in the neck and continues to the rest of the body.

Have a dental work up: A horse that is uncomfortable in the mouth is going to resist and brace through the neck. This discomfort will not just remain in the neck and will eventually show up in the rest of the horse's body.

Simple checks for the bridle and bit: Check that the brow band is large enough for your horse, especially those double bridles. Some horses object to pressure from the bridle at the base of the ears on the poll piece. This pressure comes from brow bands that are too short or the bridle is not properly fitted to the horse.

Not all horses carry the bit in the same place. Some horses carry it close to the cheek teeth while other like it lower depending on the structure of their mouth. Remember to check the length of the bit and the thickness. A thicker bit in a mouth without a lot of space in-between the skull and lower jaw is actually more uncomfortable than a thinner bit.

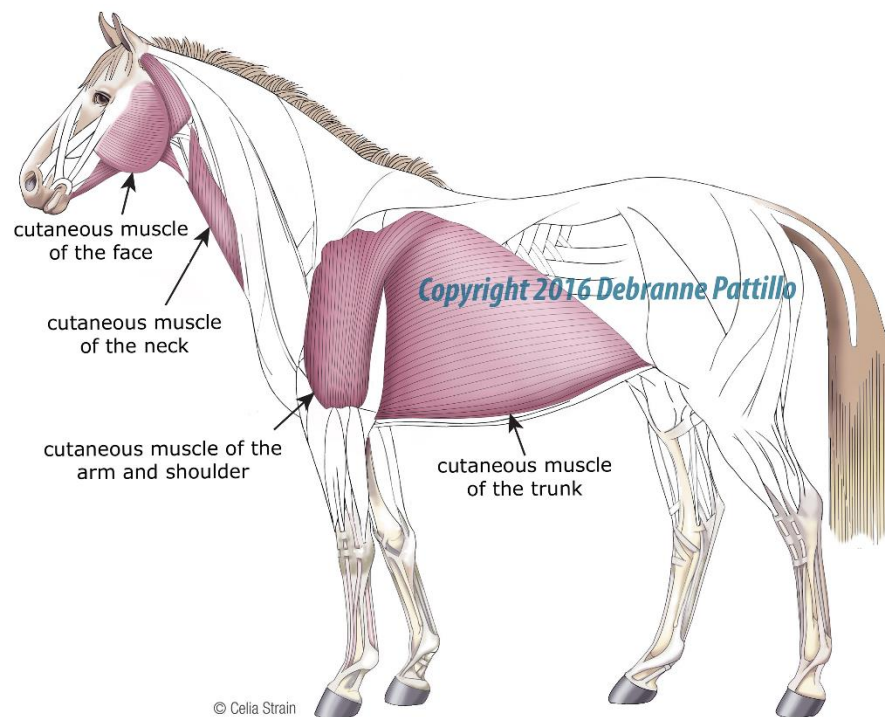
IT'S ALL GREEK (LATIN) TO ME (Muscles Charts)

Another way to sharpen your equine knowledge is to learn the muscle names. It does not matter if you use the Latin format or Anglo version. If you would like more help in learning equine anatomy consider taking a course. Equinology hosts an online EQ50 Equine Anatomy Distance Study course which is a self-paced course offered worldwide. The course covers veterinary vocabulary, terminology, the skeletal system and the muscular system. Details can be found on the Equinology site at: <http://www.equinology.com/equine-anatomy-distance-study-course>

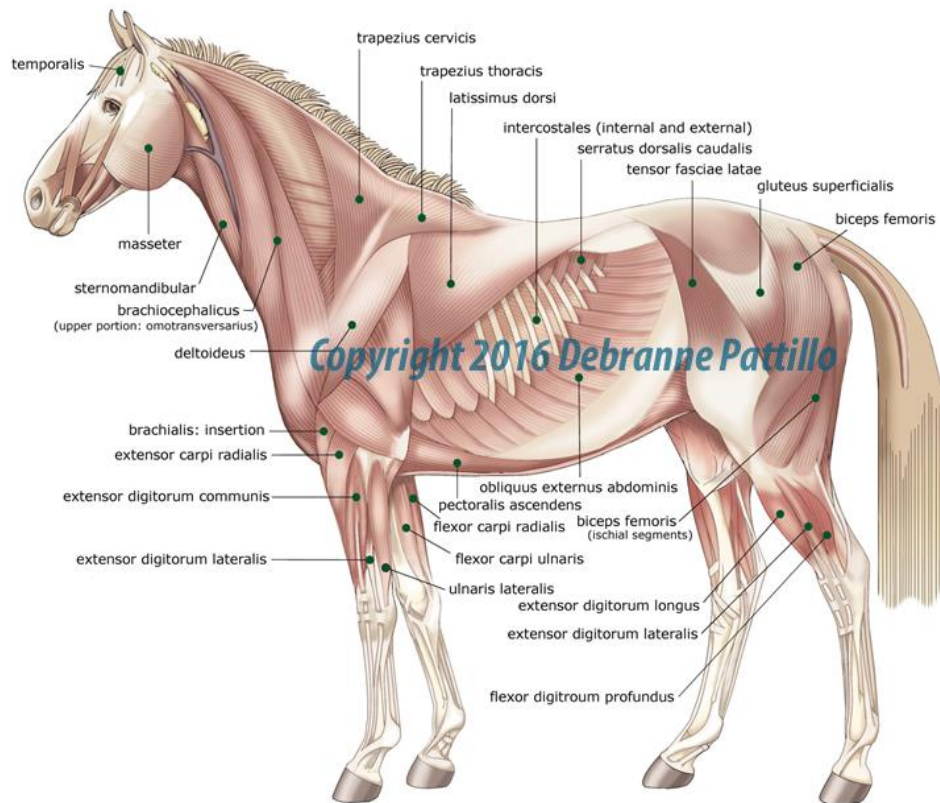
The tuition which includes the final exam is \$95USD. This is the required precourse for our Equinology Equine Body Worker (EEBW) Certification onsite course. The EQ50 is helpful for any direction, course or program you plan to pursue. You can carry your studies further by attending our EQ900: Equine Anatomy Discover Workshop which is the workshop where you build the muscles on the skeleton from the inside out. That course link is:

<http://www.equinology.com/equine-anatomy-discover-workshop>

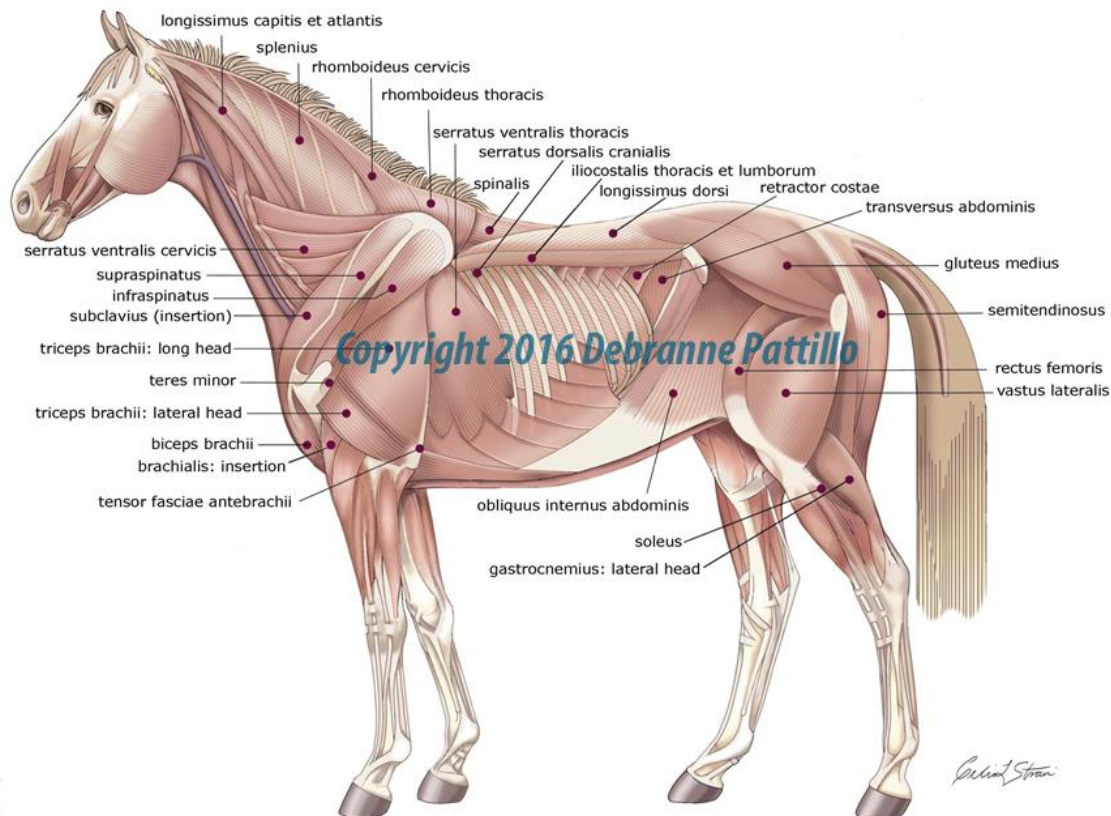
CUTANEOUS MUSCLE LAYER



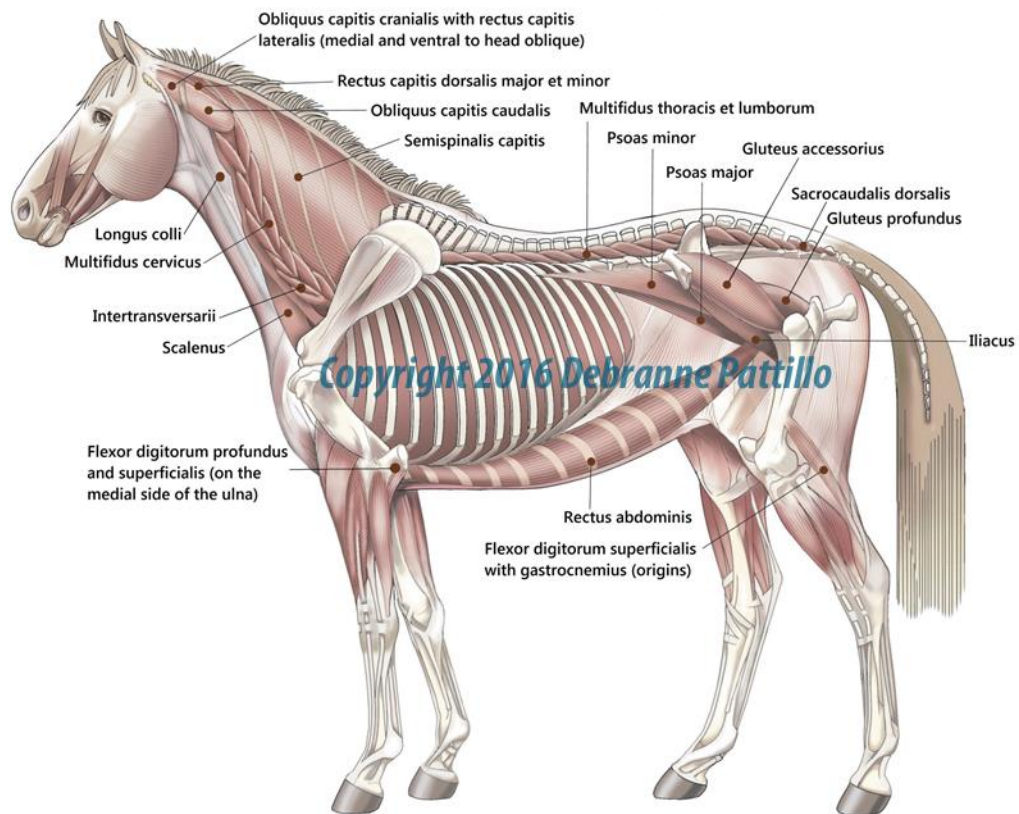
SUPERFICIAL MUSCLE LAYER



MIDDLE MUSCLE LAYER



DEEP MUSCLE LAYER



Evaluation of Conformation by Dr. Barb Crabbe, DVM

Conformation defined

The term conformation is defined as the “structural arrangement” of the body. When we look at a horse, the study of conformation is the evaluation of the proportion of the parts of his body, and how they relate to one another. This evaluation may include factors as simple as the width between his eyes, to a more complicated examination of the relationships between all of the key bones and joints of his hindquarters.

In this chapter, we’re going to examine why conformation is important, will outline methods you should use when evaluating conformation, and will give you a thorough guide to specific ideals and faults you’ll commonly encounter in your equine patients.

Why we look at conformation

Why is conformation so important? Horses play many roles in our society, from objects of beauty to high level athlete to valued friend. In each of these roles, various attributes may be more desirable, and different conformation factors can come into play. In general, how the horse is put together affects his ability to do his job (function), the strength and durability of his body (soundness) and his appearance (beauty).

Function

From jumping to trail riding, horses are required to perform a variety of athletic functions. Just like human athletes, their body structure has a huge impact on their aptitude for different events. For example, a low-to-the-ground, heavily muscled Quarter Horse is perfectly designed to hunker down and make the quick turns required for working cows, yet he’d likely fail miserably on a 100 mile endurance ride. On the other hand, the lightly built Arabian is designed to efficiently travel long distances excels at endurance, but isn’t likely to be competitive in a thoroughbred race.

When evaluating conformation, it’s common to forget that many horses are bred to do a certain job. We all have a type or discipline we may prefer, but as horsemen we should appreciate these differences. Remember to celebrate a horse that’s beautifully conformed to perform the job he’s bred to do—even if he’s not your style.

Soundness

Correct conformation is a key component of musculoskeletal soundness. A horse with straight legs, well conformed feet and natural symmetry is more likely to stay sound in almost every discipline. When we evaluate any horse’s conformation, it’s especially important to look at factors that may contribute to uneven stresses across joints and soft tissue structures—as these even stresses can often lead to injury.

Beauty

Although appearance may not matter when it comes to performing in many athletic disciplines, we all appreciate a beautiful horse. In some instances, features we see as beautiful do contribute to function and soundness. For example, expressive wide set eyes may allow the horse to have a wider visual field or long, well set neck can help him balance. Finally, for some horse endeavors such as breed show halter competition, beauty in and of itself is the ultimate goal.

Preparation for evaluation

When performing conformation evaluation, it's best to follow a consistent protocol. Ideally, the horse should be reasonably clean, with hair clipped from around the legs and face if necessary to allow good visualization of underlying bone structure. He should be outfitted in a bridle or halter, with a handler who can position him properly at your request ideally on firm level ground.

Positioning for evaluation

You'll be examining the horse's conformation from several vantage points—both sides, the front, the rear and, when possible, from above (the dorsal view). In some situations, you may also approach the horse to palpate certain areas.

When viewing from the side, the horse should be positioned loading all four limbs equally, with his legs straight underneath his body. In order to make the most accurate assessment of joint angles, you can standardize his position by asking him to stand with his cannon bones vertical to the ground on the side you are evaluating. Note that this may not be a natural position for some horses—for example a horse with overly angled stifles and hocks behind will often tend to stand with his hind legs further underneath his body. However, by putting him in this standard position with his cannon bones in a vertical position you'll be able to make more accurate comparisons between horses.

From both the front and the rear, the horse should be standing with his feet square and his head and neck straight. You may wish to have a chair or stool available in order to look down on his neck, back and hindquarters for your dorsal view.

Safety

Safety should always come first when working around horses—and evaluating conformation is no exception. Remember that your safety zone is around the shoulder area, and if you must approach the horse to stay within that zone. For conformation evaluation from the front and rear, you're best to stand a distance away, completely out of kicking or striking range. This is particularly important if you intend to stand on a chair or stool for examining from above.

A Few Key Points

As you prepare to begin your evaluation, there are a few things you should keep in mind about the different attributes or faults you are likely to identify. First, it can be difficult to separate true conformation factors arising from posture (how the horse holds his body) and symmetry (uneven development between corresponding sides). In the same vein, keep in mind that while most true conformation issues are inherent to the horse's structure, other physical attributes may be acquired secondary to an injury or chronic unsoundness. In general, it's most important that you simply make note of what you see. As you become more sophisticated in your ability to evaluate a horse's structure you'll learn to recognize situations where underlying issues may exist.

Finally, bear in mind that there is no "perfect horse," and that even a horse with gross conformation faults can excel at his job with the right set of circumstances. In addition, most of the conclusions you will make are based on subjective evaluation of the horse's traits. Be careful, and avoid forming opinions about the quality or abilities of the horses you see.

Analysis of Conformation

With the clean horse standing in a correct position, you'll begin a systematic evaluation of the horse's conformation. In this first section, we'll outline a step-by-step approach you can follow to analyze basic characteristics of the horse's structure. Next, we'll identify common conformation faults you're likely to encounter.

From the side

Overall Balance

The overall balance of the horse takes into account the general body shape, proportions, and horizontal (uphill/downhill) orientation. The ideal body shape and balance will depend on the horse's job. However, for most disciplines, a well-proportioned horse can be divided into three sections, consisting of the head/neck/shoulder, back/loin, and hindquarters. There are three common visual aids that can be used to evaluate overall balance: Three equal circles drawn around each section should overlap by approximately one-third (**Fig. 1**). One can use vertical lines drawn just behind the elbow and just in front of the stifle joint should seem to divide the horse into equal thirds (**Fig. 2**). Good body proportion can also be demonstrated by drawing a line from the top of the withers (in line with the topline) shown as line A in **Fig. 3** and drawing a second line for the body axis (B) where it intersects the plumb line dropped from the point of buttock. Line B should be equal or slightly longer than line A.

Horizontal balance refers to the height of the hind quarters relative to the height of the withers. A quick evaluation of horizontal balance can be made by comparing the height of the highest point of the croup (typically the tuber sacrale) with the highest point of the withers. The line of the back should also be taken into account in some horses with very prominent withers. If the line of the back slopes extremely downhill, a horse with prominent withers may really have a more downhill balance.

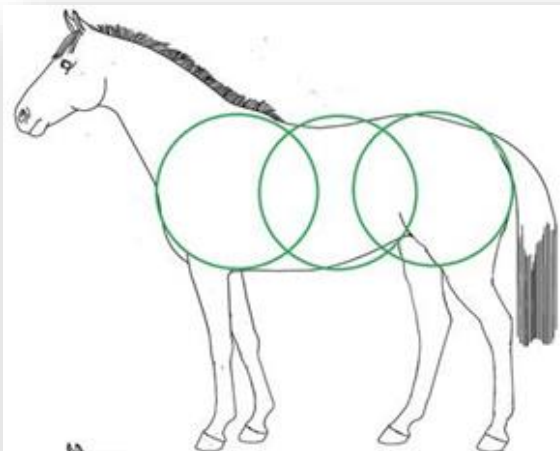


Fig. 1: Three overlapping circles

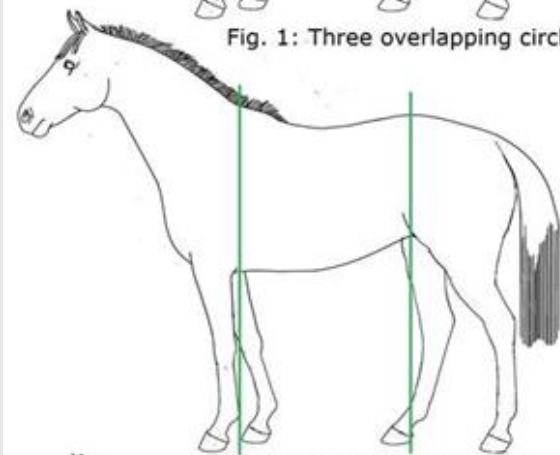


Fig. 2: Dividing into thirds

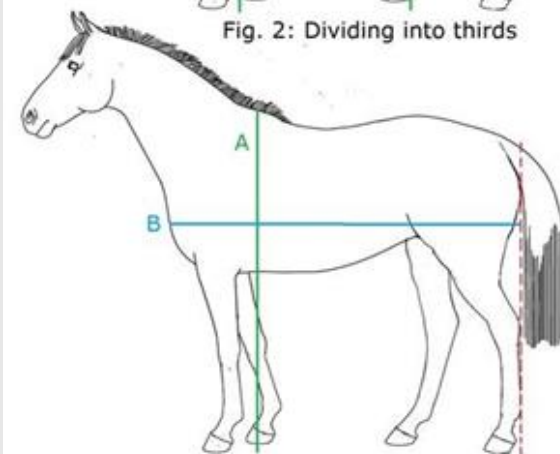


Fig. 3: Withers (A) equals body axis (B)

Head

There are a number of key factors to consider when evaluating the horse's head. The eyes should be widely set and prominent enough to allow for a wider visual range. Narrow, deep-set eyes may make it more difficult to see behind him.

The width between the two sides of the mandibles should be wide—as a rule of thumb a fist or more should fit in this space (**Fig. 4**). A narrow space between the mandibles may predispose the horse to upper airway restriction that could limit his breathing ability, and also may make it more difficult for the horse to flex at the poll into the “on-the-bit” position. The ease of poll flexion can also be affected by the connection at the throatlatch area.

Ideally there will be a wide gap between the rami of the mandibles and the wings of the atlas that is clear of excessive soft tissue structures (**Fig. 5**).

In addition, a balanced head and neck ratio will be 1:1.5. (**Fig.6**).



Fig. 4: Checking space



Fig. 5: Checking the space between mandible and wing

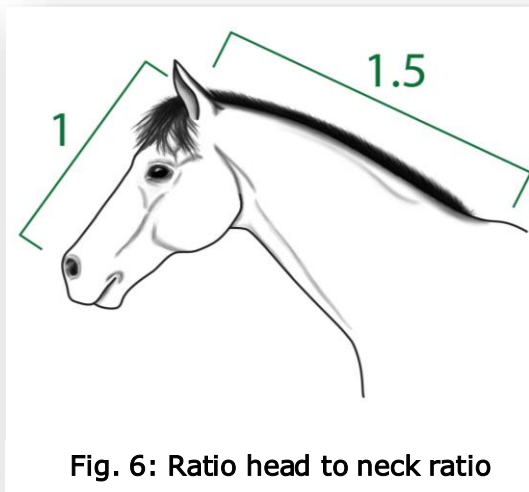


Fig. 6: Ratio head to neck ratio

Neck

The length, relationship to the shoulder (set) and balance between the top and bottom lines of the neck are all factors to consider when evaluating the horse's neck structure.

Neck length can be a controversial topic among horsemen, and the ideal neck length should be neither too long nor too short. Whereas a long neck is often seen and elegant and beautiful, too much length is often weak, and may put the horse's balance more on the forehead.

However, too short a neck means a shorter lever for attachment of the nuchal ligament that assists in lifting the back. It has been theorized that a longer neck may be beneficial for jumping disciplines because it can help with balancing the horse over the jump.

The set of the neck should be evaluated both at the top and the bottom. A good neck will come straight out of the withers (no visible dip at the front of the withers) and will tie into the chest high enough well above the point of the chest. *(The blue arrow in Fig. 7 indicates the junction).* A deep set neck makes it more difficult for the horse to raise the neck and stretch the back.

The ideal neck should have a 2:1 ratio between the top line of the neck (poll to withers) and the bottom line of the neck (throat latch to chest) (Fig. 8). A horse with a very steep shoulder is more likely to have an undesirable ratio (approaching 1:1) between the top and bottom line of the neck. The length of the topline can increase with proper muscling, and is one feature of conformation that can be improved with proper work.

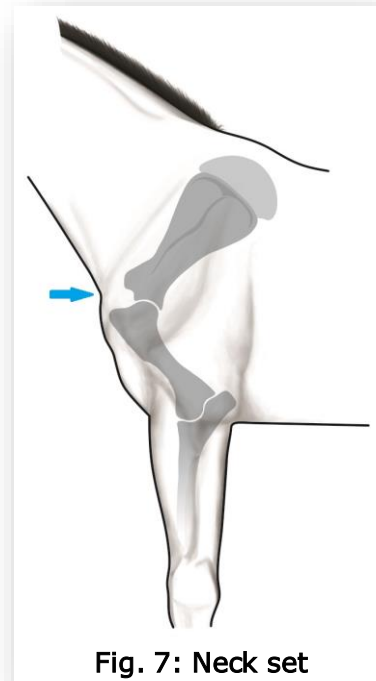


Fig. 7: Neck set

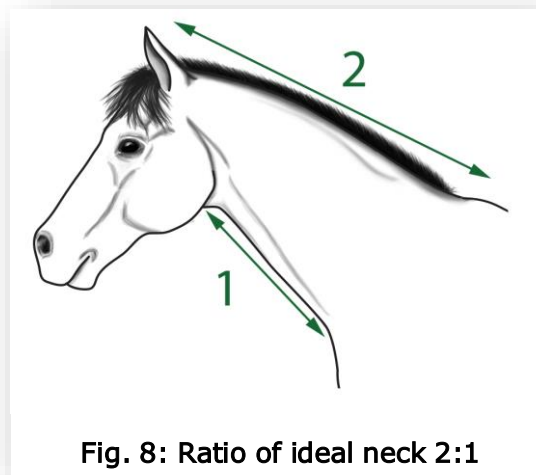


Fig. 8: Ratio of ideal neck 2:1

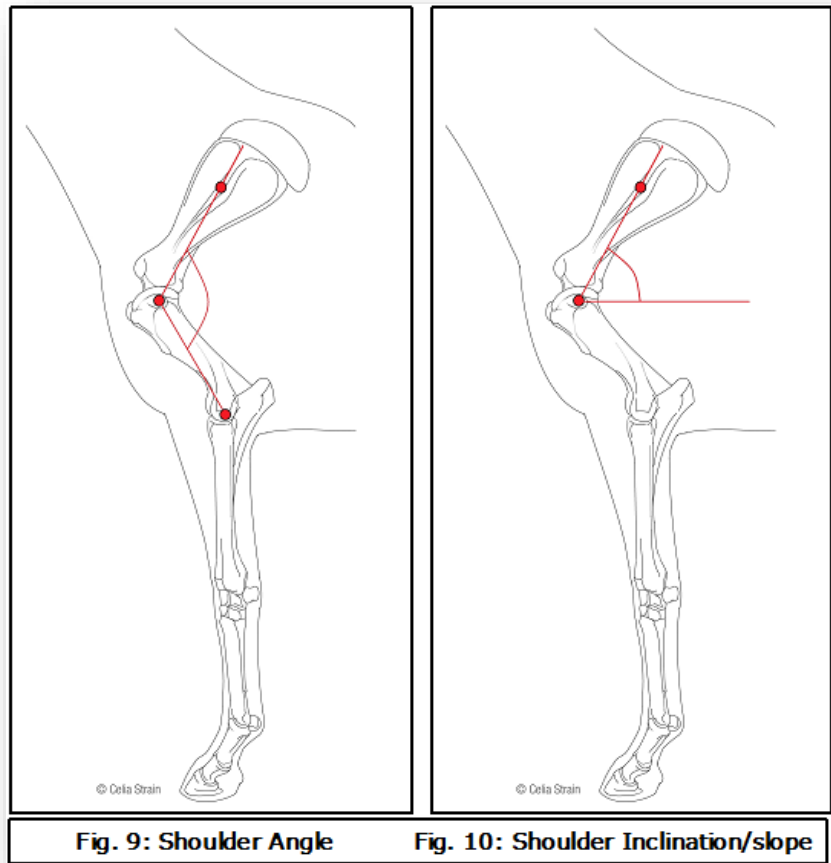
Shoulder/Forelimbs

The orientation and size of the shoulder is a key factor when evaluating conformation. The orientation of the shoulder should be evaluated both relative to the horizontal (**Fig. 10: shoulder inclination**) and relative to the humerus (**Fig. 9: shoulder angle**).

For most riding disciplines, a long, sloping shoulder is considered desirable—and length and slope typically go hand in hand. A longer, larger scapula may provide a wider range of motion (greater length of stride) and more area for muscle attachment (greater strength). It may help facilitate forward/upward movement at the end of protraction of the forelimb.

The ideal slope to the shoulder typically correlates

with the slope of the pastern which together help improve overall shock absorption of the forelimbs. The slope of the shoulder can also affect saddle position, as a more sloped shoulder will place the saddle further back; thus helping to shift weight from the forehead toward the hindquarters.



The shoulder angle (relationship of the scapula to the humerus) can affect both overall balance and freedom of movement by its impact on range of motion of the elbow joint. An open shoulder joint will be present with an upright scapula and more vertically oriented humerus. This conformation not only places the forelimb more in front of the horse's body to shift balance to the forehand, but also leads to restricted forelimb movement due to decreased range of motion. A more closed shoulder joint will be present with a more sloping shoulder and horizontally oriented humerus. This would shift the balance back, provide greater range of motion and lead to more freedom of forelimb movement.

There should be plenty of space between the elbows and the rib cage to allow the forelimbs to move freely, and to prevent interference with the girth or cinch. A horse with tight elbows may have restricted forelimb movement. To check elbow placement, slide your hand between the elbow and the chest while the horse is standing square. Elbow placement, and therefore freedom, can also be affected by the length and orientation of the scapula and humerus. If the elbow is placed high against the thorax, it may be more restricted. If it is low, it will have more freedom to move.

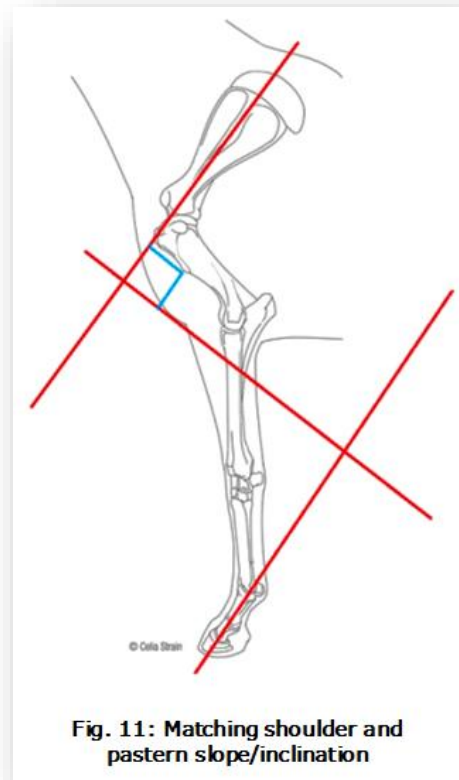


Fig. 11: Matching shoulder and pastern slope/inclination

Below the elbow, the carpus should be straight "like a pillar" to support the horse's weight. Ideally, the pastern inclination will match that of the shoulder (**Fig. 11**) with pasterns that are neither too long or weak, not too short and lacking shock absorption capabilities. The pastern/hoof axis, visualized by a line drawn through the middle of the pastern and the hoof, should be straight (180 degrees).

Saddle position

Saddle position takes into account the shape and size of the withers, orientation of the shoulder and underline of the trunk at the level of the elbows. It should be considered separately because of its impact on performance in every riding horse.

Withers should be prominent enough to prevent the saddle from slipping side-to-side, yet not so prominent that they interfere with the front of the saddle. As discussed above, a more sloping shoulder will help position the saddle further back to help shift balance away from the forelimbs.

To evaluate overall saddle position, begin by looking at the point in the horse's back where the withers join into the flat portion of the back, and imagine where the saddle would sit flat and balanced. With that in mind, look at the underline of the trunk in the area just behind the elbows. You'll see a point where the chest muscles slope upwards into the abdomen. Just behind that is another line where the muscles slope downward to the lowest part of the abdomen. In some horses, this slight dip is V-shaped, in others it will be flatter and longer.

This marks the natural girth line, and is the point where the girth or cinch will naturally want to come to rest.

In an ideal situation, the saddle should sit flat, with the girth naturally placed in a vertical position well behind her elbows. If the natural girth line is very close to the elbows, comes to a very sharp "V", or sits in a position where it causes the girth to slip forward relative to the natural position of the saddle, it can make saddle fitting challenging, and chronic girth sores can occur.

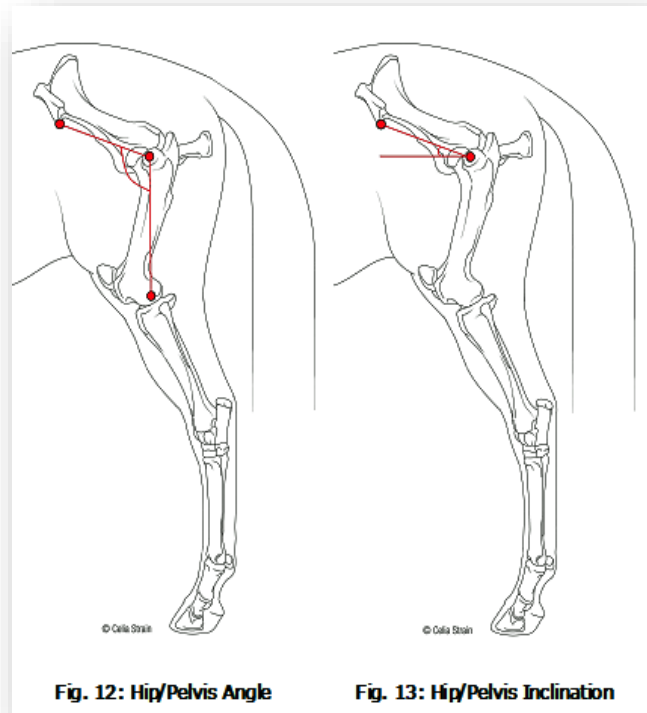
Back/Loin

The length of the back is a very subjective evaluation that is as much a function of overall balance (the mid-section of the horse appears longer than the front and rear) as an actual measure of the back, which extends from behind the withers to the top of the croup (tuber ischii). Ideally the back should be moderate in length, and strong—with flat muscles that run on either side of the spine. A poorly conditioned long back will predispose the horse to back pain. A short back is strong, but may predispose to interference problems such as forging. It is also theorized that a horse with a short back may be more likely to develop interference between the dorsal processes of the vertebrae (a condition known as "kissing spines").

The loin is the section of the back between the last rib and the sacrum, along the lumbar vertebrae. The length of the loin is usually fairly consistent among horses. When it subjectively appears "long" it is likely to be more a function of strength. The muscling along the top of the loin area should be flat, rather than dipped (weak) or bulging (tight). Whereas a tight or overly muscled loin connection is strong, it may have a lack of flexibility. A horse with a weak loin may be predisposed to back pain. The loin connection is referred to as "coupling" in horsemen's terms.

Hindquarters

The horse's hindquarters include his pelvis and hind legs. The length and slope of the pelvis is an important area to evaluate, as this segment of the body functions as the horse's "motor" to propel the body forward. You can visualize the functional length of the pelvis as the segment between the tuber coxae (commonly called the "point of the hip") and the location of the hip joint itself. This should not be confused with the croup, a term that refers to the topline of the hindquarters to the top of the tail. It is possible for a horse to have a long pelvis with a short croup or short pelvis with a long croup depending on the orientation of the sacrum, and the set of the tail.



For most riding disciplines, a long, flat pelvis is considered optimal. This type of conformation provides a large area for muscle attachment as well as a wide range of motion to provide maximum power to the hindquarters. Measurement of the pelvis angle is also considered and compared for left to right symmetry (**Fig. 12**). The angle will influence performance and can be altered by different bone segment lengths and inclination, orientation, injury and the hooves.

The length and orientation of the femur (extending from the hip joint to the stifle joint) is another factor in the hindquarters that may play an important role in determining how the horse moves. A longer, more forward sloping femur will give the horse maximum power, while placing the hindlimb more underneath the horse's center of gravity for balance and optimal efficiency. A shorter femur means less power because of a smaller area for muscular attachment. It also results in the hindlimb being placed further back towards the horse's hindquarters. An upright femur may predispose the horse to recurrent back problems. In a well-placed hindlimb the hock will lie directly below the point of the buttock (tuber ischii) and the stifle will lie directly below the point of the hip (tuber coxae).

The stifle and hock angles are generally considered together, and a slightly more open angle is generally preferred because it provides more resistance during stance and therefore greater strength. If the stifle angle is too large (straight) however, the horse may experience upward fixation of the patella or "locking stifles." Small hock angles may predispose the horse to soundness problems including arthritis of the hocks and injuries to the ligaments at the back of the hock (curb).

Finally, the hind pastern should be sloping, but not overly so. Too straight a pastern will lack shock absorption, whereas too sloping a pastern may predispose the horse to hind limb lameness. As in front, the pastern/hoof angle should be closely matched.

From the front

When viewing the horse from the front, he should be standing square with the front feet equally loaded. Ideally, his head and neck will be held straight out in front of his body.

Chest

The width of the chest should correspond to the size of the horse and width of his body (**Fig.14**). A very narrow chest may be seen in a horse with tight elbows and can correspond to restricted forelimb movement. An inverted "V" shape to the chest is generally thought to be ideal and corresponds not only to muscling through the pectoral area, but also to the placement of the horse's thorax relative to the shoulders. If the thorax is relatively high (a more pronounced "V"), there will be better freedom of the elbows, allowing for a larger range of motion and better forelimb freedom.

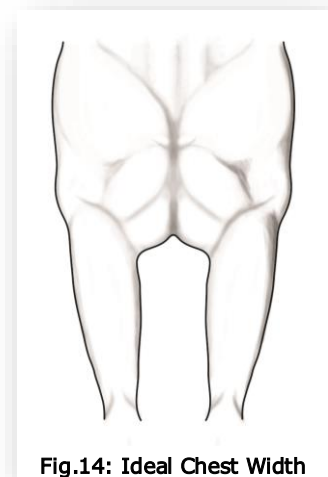
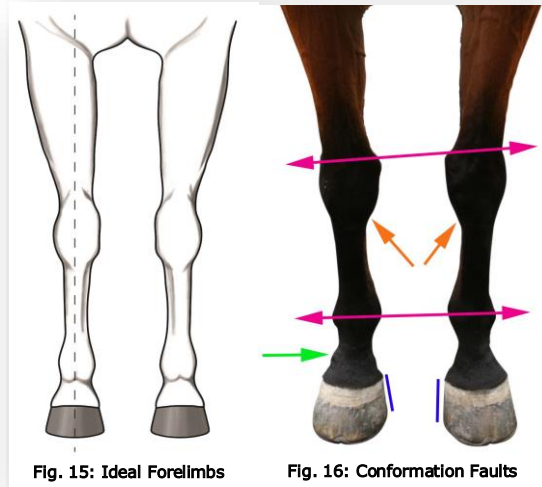


Fig.14: Ideal Chest Width

Forelimbs

From the elbows down, the forelimbs should extend straight down to the ground so that a plumb line can be drawn through the center of the radius, carpus (knee), metacarpus (cannon bone) and hoof (**Fig. 15**). Observe for displacements (bench knees or offset cannon bones), deviations (carpus varus or carpus valgus) and rotations (toe-in, toe-out). These specific conformation faults are described in detail in the next section. Be aware that any alteration from "straight" or "correct" may result in unbalanced stress to joints or soft tissue structures that can predispose the horse to injury. However, bear in mind that many sound and successful performance horses will have conformation defects.



Viewed from the front, the limbs should exhibit symmetry between the right and left sides. Draw an imaginary sagittal line down the middle of each limb in order to compare muscle development, as well as to detect any visible bony enlargements or other abnormalities. The feet should also be symmetrical in size and shape. A smaller, more upright foot may be an indication of chronic unsoundness. Contraction of the foot occurs over time due to unequal weight-bearing.

From the rear

As with the front, when viewing the horse from the rear he should be standing square with the hind feet and have his weight equally loaded on both hind legs. If possible, you should observe the horse standing on the ground behind him, as well as from a higher vantage point such as a chair or stool.

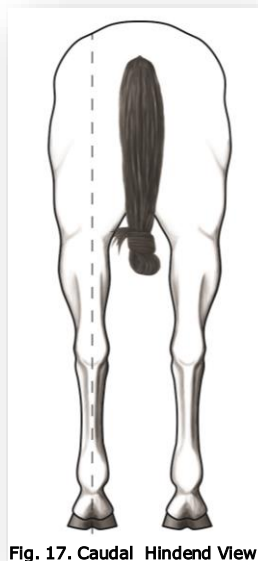


Fig. 17. Caudal Hindend View

As from the front, the rear and dorsal views are essential for evaluating symmetry between the right and left sides. Take note of the size and shape of the shoulders, barrel and hindquarters. Bear in mind that there may be some natural asymmetry of the barrel due to the placement of the intestines in the abdomen. Finally, from above you can evaluate the straightness of the spine as it extends from the withers to the top of the tail.

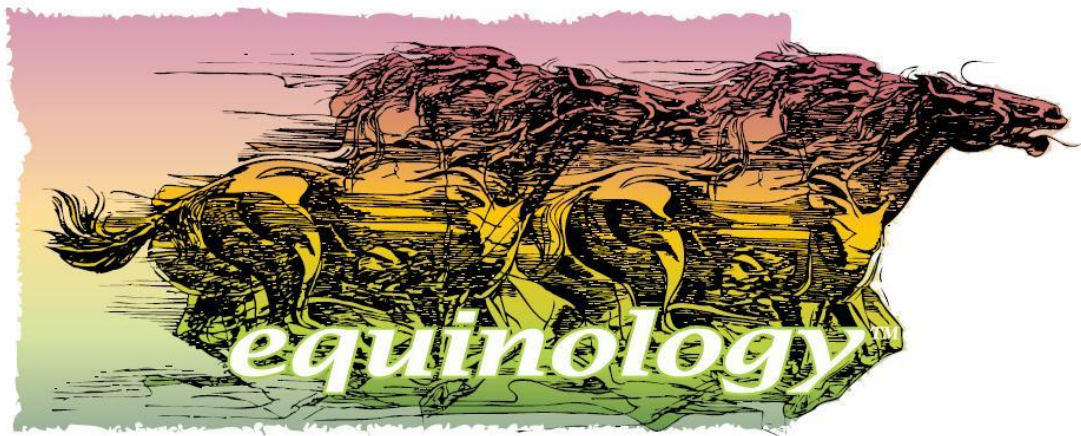
Pelvis

Pelvic symmetry is evaluated from behind. Ideally, the position of the horse's tuber sacrale, tuber coxae and tuber ischii should match. Additionally, muscling through the gluteal region should be symmetrical. Asymmetries can develop from a wide variety of causes, ranging from pelvic fractures and ligament injuries to lack of muscle development. Asymmetries may be either structural or acquired, and can have a wide range of effects on the horse's function. In some cases, uneven muscle development can be an indicator of chronic, low-grade lameness.

Hindlimbs

The hindlimbs should rotate outward slightly (stifles pointed out, hocks pointed in, with a slight toe out). This allows the stifles to clear the abdomen when the horse is moving. When viewed from directly behind each hock, the tibia and hind cannon bone (metatarsus) should line up, with no deviation or bend at the hock. The cannon bone should be placed squarely at the middle of the hock.

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