

# CONFORMATION INSIGHTS

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illustrations by  
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**In our new series**, readers are invited to share photos of their horses for an ongoing discussion of how bone structure and biomechanics predict a horse's movement style and athletic capability.

A quarter-century ago, the editors of EQUUS asked me to write a "conformation column." Could I do something unique, they asked—something new—in conveying an "eye" for conformation?

My answer was, in a word, "bones." I had seen many halter classes at all kinds of horse shows, and was familiar with what was being said in equine publications worldwide. Much of it seemed to me to be inaccurate, confusing or superficial. The one thing I had not seen was a meaningful discussion of how bone structure predicts movement style and athletic capability in horses. After all, a horse's conformation is founded upon the bone structure within. As a paleontologist—a bone-"digger" if there ever was one—the omission of this factor from the popular wisdom on horsemanship seemed very odd!

Thus it was that we embarked on a unique project, one that over the intervening years has expanded horse owners' knowledge, improved their "eye," and even influenced breed and judging standards. Due to the popularity of the conformation column, by 1986 we began compiling photos, tables and text from various installments, completing by 1989 the three-volume *Principles of Conformation Analysis*. This set of booklets, just shy of 300 pages in total,

encapsulates the best of the original conformation series. For the past 20 years, we have been content to let our readers learn about conformation through this still-popular work.

But times have changed. The economy is moving in new directions. More people than ever own horses, but few of them grew up with large livestock. The diversity of equestrian activities has continued to increase, sometimes without accompanying knowledge of how to select a good horse or properly prepare him for what is expected of him. Fads for color, massiveness or extremes of refinement or muscularity now dominate some sectors of the industry in a way that they could never have done in a day when the main expectations for a horse were honest hard work and continuing soundness.

Yet, when it comes right down to it, having a sound, happy, long-lived horse that performs reliably and well is still what most horse owners want. It's time, we think, to bring back the conformation column.

## Not a "halter competition"

Each month in this space we're going to look at several horses. Comparison often makes seeing some point of conformation easier. The comparative format can also, however, make it look like a competition. It may surprise you

to hear that I think 99 percent of all the horses I've ever seen are just fine. So one of the main things that I am not going to do here is criticize. There's a big difference between analysis and criticism. Our aim is to find something interesting and useful about the horses we choose to analyze. I use photos of horses to teach concepts. My intention is to help you learn the principles that govern wise selection of horses for particular tasks.

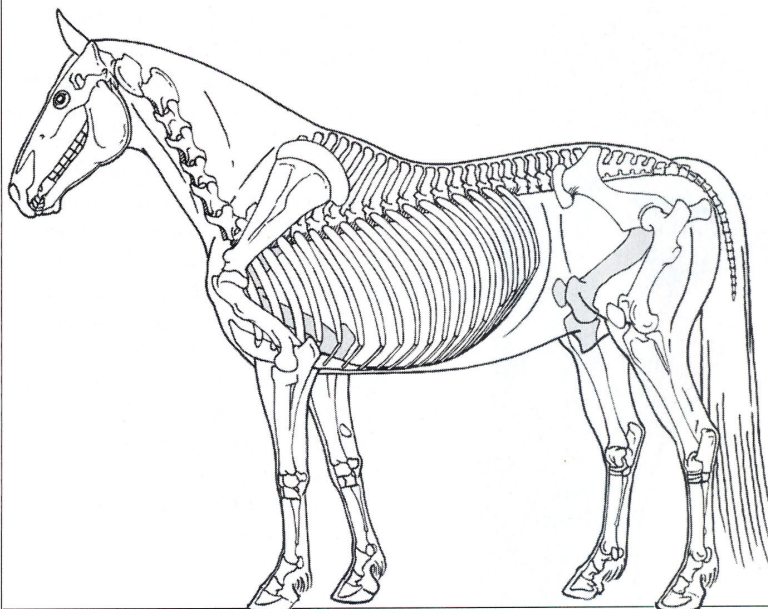
Let me emphasize this by relating a true story. I was invited some years ago to lecture on the subject of "form to function" at a certain university. A member of the audience had brought photos of his stallion that he wanted me to look at. Spreading the images out like a deck of cards, he said, "OK, Dr. Deb, you just tear him apart." When I replied that I had no intention of doing anything of the sort, he became angry. He had secretly been hoping, I think, that I would praise the horse in front of the audience. "Look," I said, "what if I stood here and told you that your horse is an ugly piece of crud. Would you sell him on that basis?"

"No!" he replied.

"Well, I wouldn't expect you to," I said. "You own him. He's part of your family or your business. You have a lot invested in him. Presumably you care about him quite a lot—in fact, so much so that even if an authority were to find fault with him, all that would do is make you want to defend him—right?"

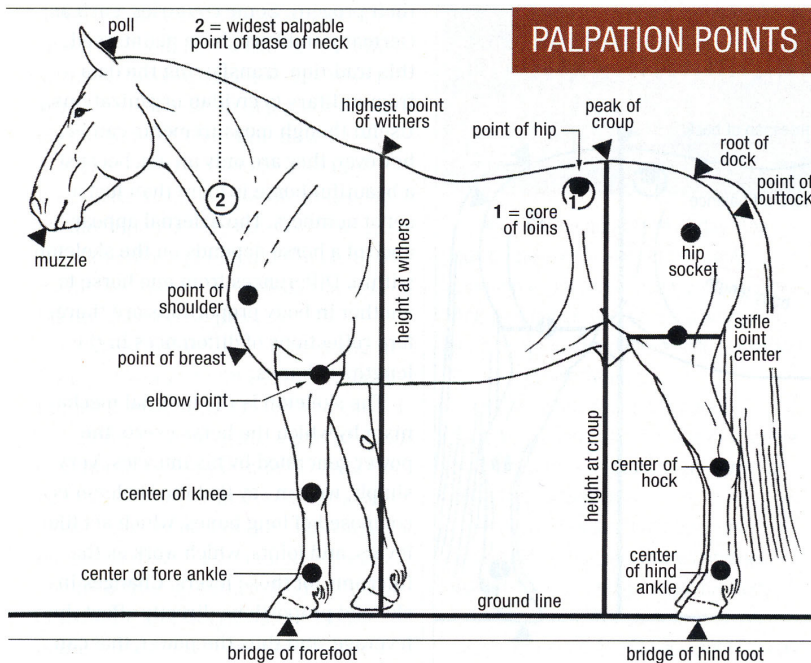
"Right," he admitted.

"OK, then, that's my point. You have nothing to defend, because I refuse to judge your horse. I will neither praise him nor condemn him, because that's not where I want this seminar to go. What we're here to do is find out how he is built, so that we get the information we need in order to choose a good occupation for him—to find out what he's likely to be best at. And that's also going to guide us in designing the best individual training regimen for him.



Oliver's skeleton has been drawn into his body outline (the right hind leg has been moved forward so that the bones within it will show). The skeleton must lie where the palpation points say it does. For example, the point of hip must correspond with the tuber coxae of the ilium of the pelvis; the point of buttock must correspond to the ischium of the pelvis; the poll must correspond to the nuchal crest of the skull, and so forth. If you have the artistic skill, drawing the skeleton into an outline of your horse is an excellent exercise, yielding many insights.





## PALPATION POINTS

This outline of Oliver's body shows the palpation points, which are used to make the measurements in the table below. Heights of withers and croup are taken at 90 degrees to the ground line.

I think this would be a good deal more useful to you than finding out whether I like your horse better than I like your neighbor's horse."

## Teaching from first principles

This conformation column will appear often, because there are lots of points to cover, and I know from many reader letters and comments that you appreciate it when topics are handled in detail. The fine points, however, only make sense when they are presented in context. Conformation expert Dr. Gustav Rau, who developed selection principles back in the 1930s that have influenced modern warmblood breeding, succinctly makes this point when he says, "I have little respect for someone who can pick faults. What I'm interested in is picking horses!"

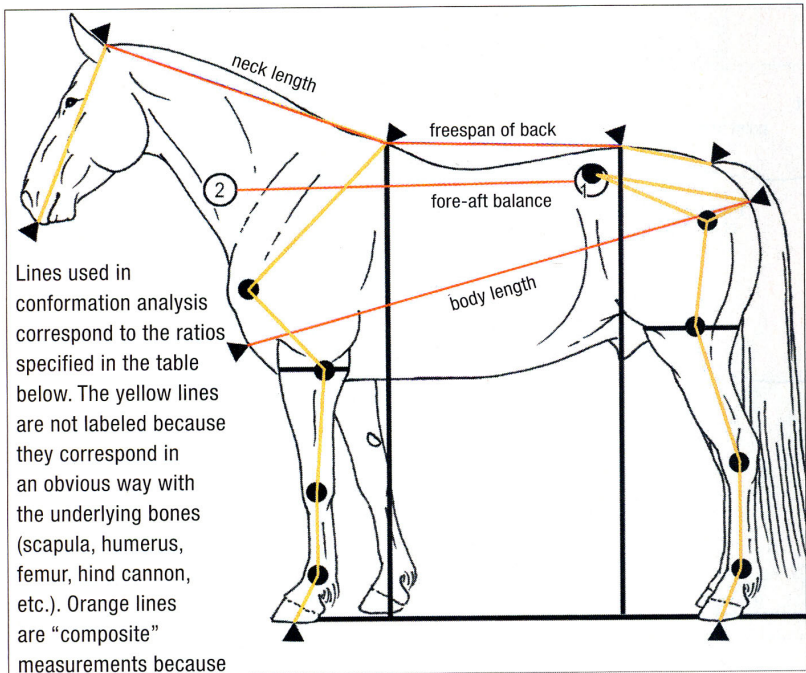
I promise you that every part of the horse's body will be scrutinized in this series. However, the first several installments will cover six principles that I think are crucial to anyone who proposes to work with real, live horses: proportion, type, bone structure vs. blemishes, fore-aft body balance, straightness and scale. These topics emphasize an appreciation for the whole horse. Let's turn immediately to the first essential, which is to realize that to have an eye for conformation means to have an eye for proportion.

Conformation experts do not depend upon measurements. Instead, they use measurements as a way of confirming and improving their "eye." Back in the day when most countries maintained a cavalry, extensive tables of measurements were taken "live" from broodmares, remount stallions and

## OLIVER'S PRIMARY MEASUREMENTS

NAME OF MEASUREMENT	LENGTH IN MILLIMETERS
<b>body length</b> ( <i>point of buttock to point of breast</i> )	151.3
<b>withers height</b> ( <i>top of withers to ground</i> )	139.4
<b>croup height</b> ( <i>peak of croup to ground</i> )	136.8
<b>head length</b> ( <i>poll to muzzle</i> )	55.0
<b>neck length</b> ( <i>poll to top of withers</i> )	81.9
<b>free span of back</b> ( <i>top of withers to peak of croup</i> )	65.3
<b>croup length</b> ( <i>peak of croup to root of dock</i> )	33.0
<b>pelvic length</b> ( <i>point of hip to point of buttock</i> )	40.7
<b>femur length</b> ( <i>hip socket to center of stifle</i> )	33.9
<b>gaskin length</b> ( <i>center of stifle to center of hock</i> )	41.7
<b>hind cannon</b> ( <i>center of hock to center of hind ankle</i> )	29.5
<b>hind pastern and hoof</b> ( <i>center of hind ankle to bridge of hind hoof</i> )	15.5
<b>shoulder length</b> ( <i>top of withers to point of shoulder</i> )	57.5
<b>arm length</b> ( <i>point of shoulder to elbow joint</i> )	28.2
<b>forearm length</b> ( <i>elbow joint to center of knee</i> )	34.0
<b>fore cannon</b> ( <i>center of knee to center of ankle</i> )	23.2
<b>fore pastern and hoof</b> ( <i>center of fore ankle to bridge of forefoot</i> )	16.9
<b>total hind-limb length</b> ( <i>femur length + gaskin length + hind cannon length + hind pastern and hoof</i> )	120.7





Lines used in conformation analysis correspond to the ratios specified in the table below. The yellow lines are not labeled because they correspond in an obvious way with the underlying bones (scapula, humerus, femur, hind cannon, etc.). Orange lines are "composite" measurements because they cross joints. The fore-aft balance line was not measured but simply compared to the ground line (how many degrees does the line slope downward from point 1 to point 2? In Oliver's case, less than one degree).

The primary measurements on page 37 were used to calculate the ratios at right. Ratios are numerical expressions of proportion, and "conformation" means proportionality. With each installment of this series, we will discuss the significance of various ratios in terms of a horse's athletic capabilities.

OLIVER'S RATIOS	
NAME OF RATIO	RATIO PERCENTAGE, rounded to nearest whole number
head/body length	36%
neck/body length	54%
freespan of back/body length	43%
croup/body length	22%
pelvis/body length	27%
femur/body length	23%
gaskin/body length	28%
femur length/gaskin length	81%
hind cannon/body length	20%
total hind limb length/croup height	88%
femur/total hind limb length	28%
shoulder/body length	38%
arm/body length	19%
arm/shoulder	49%
forearm/body length	23%
fore cannon/body length	15%

their progeny. Some countries, such as Germany and Peru, have maintained this tradition, transferring the data from military to civilian organizations. Useful though measurements can be, however, they are only an aid, because a beautiful horse is more than just a set of numbers. The external appearance of a horse depends on the skeleton within. Differences from one horse to another in body proportions are therefore reflections of differences in the lengths of bones.

The skeleton is the internal mechanism by which the horse exerts the power generated by his muscles. Very simply, we can say that the skeleton is composed of long bones, which act like levers, and joints, which work as the fulcrums for those levers. Changes in skeletal proportions directly affect the leverage, and thus the power, that can be generated in movement. The relative lengths of bones also dictate properties such as potential length of step and stride, while angular relationships in the shoulder, arm, and hind limb impact movement style.

## Proportion and measured ratios

Back in the 1970s, I developed a method for analyzing horse conformation utilizing "palpation points" connected by lines drawn upon photographs. The method is similar to standard techniques used in film analysis of human movement, such as a golfer's swing or a pole-vaulter's technique. A means of bringing a "summary picture" of the skeleton into view, the palpation-point technique gives the viewer what amounts to "x-ray vision" for conformation analysis.

Analyzing photographs rather than laying a tape measure on live horses has many advantages—and some disadvantages. The biggest advantage is speed: The images of many horses can be screened in a short period of time. Horse photos that appear in printed



advertisements can be analyzed. Horses that live at a distance can be examined without travel or expense. The disadvantage, of course, is that analyses done on the basis of photographs are less accurate than those done with tape measure on horse. How much less accurate depends very much on the quality of the photograph and the particular way it was taken (see sidebar for tips on taking good horse photos).

To illustrate what I will be doing in future columns, I will begin by analyzing my own gelding, Oliver. You can follow along at home using a photo of your own horse, or send it in for a chance of having your horse analyzed in these pages. Oliver was 14 years old when this photo was taken. He stands 15 hands, one inch from ground to highest point of withers, and weighs about 1,050 pounds. He is of mixed Mustang and American Saddlebred ancestry.

The first step in doing an analysis of conformation from a photograph is to mark the palpation points. Each point has a name; most of the names correspond to standard terminology used in the horse industry (see "Palpation Points," page 37). Many palpation points mark a prominence, created by a protuberance in the underlying bone structure, that is visible (and palpable) on the surface of the body. Some points mark a hollow that can be felt and seen. Such hollows are "soft spots" created by a valley between adjacent bones. All will help us evaluate ratios and proportion in Oliver's conformation.

The next step is to calculate a table of measurements. Using a ruler marked off in millimeters, measure between the specific points and log the findings on a table (see "Oliver's Primary Measurements," page 37). Notice that I do not measure everything. For example, nowhere on the table will you find the distance between the poll and the point of hip; nor the distance between the stifle and the elbow; nor the distance between the point of shoulder

## HOW TO PHOTOGRAPH YOUR HORSE FOR ANALYSIS

- Choose a good time of day. Any quiet time—early evening or early morning especially—usually works well. And remember that it's not always easy for a horse to stand stock-still. Fly spray helps diminish fretting.
- Find a uniform, uncluttered background, such as the side of a stable building, a tall hedge or a fence with an open field behind it.
- Have a helper orient the horse broadside to the sun. This diminishes dark shadows cutting across his body.
- Make sure the camera is in the middle of the horse. Oblique shots taken when the camera is closer either to the front or to the rear of the horse will produce distorted images that cannot be analyzed. Aim the lens at the place where your leg or the girth would go. Take the photo when the horse seems balanced on his feet.
- Don't stand too close or far away. Try to avoid cutting off the tips of the ears, the tip of the nose, or the lower parts of the legs and feet. On the other hand, shots taken from too great a distance are excessively grainy when enlarged. Ideally, the horse's image will fill 75 to 80 percent of the frame. A good rule of thumb is to stand back away from the horse and look at the view screen—you should see a "green margin" around the whole horse.
- Don't worry about getting the horse to put his ears up. I would rather see your horse relaxed and contented than "spooked" into pricking his ears forward.
- Don't over-groom. Make sure your horse is clean but that's all. For evaluation in this column a horse need not have his ears, whiskers or the backs of his legs trimmed.

and point of buttock. The reason is that such measurements do not directly reflect the underlying skeletal structure. Marking out squares or rhomboids that skip over bones and joints, ignoring the internal linkages, yields numbers that have no meaningful relationship to the horse's skeleton.

Finally, we calculate ratios based on the measurements in the table. Only ratios that compare the lengths of bones (or, in the case of the vertebral column, series of bones) yield useful biomechanical information—the kind of information that predicts the horse's specific aptitudes and weaknesses.

In mathematics, proportion means ratio. A ratio in conformation study is a comparison of the lengths of two body parts: for example, the length of the pelvis measured from point of hip to point of buttock vs. the body length measured from point of buttock to point of breast. This particular ratio reveals the size of Oliver's pelvis relative to the length of his body, which is a direct measure of his overall "horsepower."

Ratio proportions reveal basic facts about the structure of a given horse, but as this series unfolds we will see that they can also be interpreted in terms of the laws of physics. In that way, they become useful predictors of a horse's athletic weaknesses and potential talents.

With each installment of this series, I will focus on one or more body areas, look at the relevant ratios, and discuss their significance in terms of your horse's athletic capabilities.

Next month we'll explore the variations in ratio proportions among five basic types of equine conformation. ●

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*To have your horse considered for inclusion in an upcoming column, send images of two megabytes or less to: [drdebphotos@equinestudies.org](mailto:drdebphotos@equinestudies.org). Prints are welcome but cannot be returned. Mail to Conformation Analysis, Equine Studies Institute, P.O. Box 411, Livingston, CA 95334.*