Equine Motion, a discussion of shape and movement.

Hastilow Competition Saddles USA

1684 Hendershot Rd, Warfordsburg, PA 17267

717-294-6757

717-294-6547

11/4/2009

All English Tack

A discussion of conformation , breed and body type in relation to the fitting of saddles.

Equine motion , as it relates to saddle fit.

Why are we interested in the movement , structure and development of our horses when we saddle fit?

Because saddle fit is determined by the conformation of the horse, and the way that conformation allows a horse to stand (static) and also move (dynamic).

Conformation is the relationship between the horse's skeletal angles and bone placement, it's superficial shape, which is made up of muscle development through both type and work, and skin with connective tissue related to type and bulk.

Different breeds of horse have different requirements bred into them through the years of selection. Since the Second World War our use for these breeds has changed from transportation and work to pleasure and sport, with this has gone the mixing and changing of our requirements so that we now see many different crossbred horses in our yards. This interchange of body type in our horses provides an especially difficult job for saddle fitters and designers because we use horses to Hunt, Jump, Event and Dressage that have got the genetic and physical propensity to pull carriages , chase cows or plough fields which are jobs we do rarely with them now.

So what conformation types do we see saddle fitting? And why are they like that? The Shoulder, Spinal column and Ribs including the spineous processes, are the skeletal aspect of saddle fitting, a horse has 18 ribs set from the spineous processes at very different shapes and angles depending on breed and the job they were intended to do. Arabs , Morgans , Cobs and some types (the more old fashioned) of Quarter Horse have ribs that come out of the spinal column at a much flatter or horizontal angle than a Thoroughbred or Irish, but Arabs and Quarter Horses can still have a defined wither with this type of Conformation causing a problem in the fit. Arabs have short flat backs so can only accommodate limited length on their back and with a flatter pelvic angle which tends to a weaker Lumbar area, are particularly prone to have problems if the seat is over long. Thoroughbreds, Irish and some ponies (not the driving breeds) tend to have a more sloping angle to the rib and therefore are easier to fit. However, slab sided horses, those with a rib angle that is very vertical are also problematic. Well sprung ribs or too rounder rib can often limit the girth area, so drawing the girth and therefore the saddle forward on to the shoulder.

The Shoulder, the Scapular and its attachment to the Humerous is another area of concern for the saddle fitter, with Draught and Driving breeds the shoulder is much straighter in angle than

in ridden breeds, horses of mixed type, and that includes all Warmbloods, can have very different angles at the shoulder even in the same genetic family. The upright shoulder was designed to allow a better pressure as the horse pushes into a collar or harness. Any trainer of Warmbloods, Draught crosses or Cobs will tell you of the “hoppy” front canter these horses naturally do when ridden, which rotates the saddle both to one side and back and forth at the same time. Speed horses, the Arabs and Thoroughbred types, generally have a more sloping shoulder angle to develop acceleration over the pivot point of the shoulder and produce a longer stride, so upright shoulders mean shorter rounder muscles in this area with fatter bellies, while sloping shoulders mean longer sleeker muscles with less belly. A trait seen in ponies also is the flat, narrow shoulder, this is a problem in the New Forest breed especially and will allow a saddle even if it is a good static fit to travel over the shoulder and run up the neck when ridden, but fortunately for horses they do not possess a collar bone so shoulder development with correct riding can correct this problem.

Wither development is also dependant on the angle at which the cervical column leaves the shoulder girdle. Low set necks and prominent withers usually mean a “U” shaped development and poor back connection, higher neck sets allow for better use of the back muscles, but too high is again counterproductive as the muscles of the back then fall away from the centre of the saddle.

Muscular development in the horse; A muscle either shortens or relaxes the tension to let go of the bone or joint it is influencing. A muscle does this by moving fibre against fibre in the muscle body, fibres can only contract or relax they cannot stretch, so there is always a limit to the range a muscle can give without pulling the fibres apart. Muscles do not work without the extension or contraction of their tendons at the end of each muscle body, these tendons can get stretched and loose or scared and inelastic due to poor use or injury. Muscle development is dependent on genetics, good conformation and good riding. Horses that were bred to pull have a larger preponderance of slow twitch muscle fibres than those bred to run who possess more fast twitch fibres, while cross breeding can offer a mix of different muscle makeups for the rider, the actual percentage you will get is a roll of the dice and so may be a hindrance in your training plan if you do not allow for the deficits. The muscular structures of the back and shoulder are the foundation of our fit for saddles. This area consists of the back muscles, Longissimus dorsi and Spinalis Dorsi in the deep structures and Trapezius Thoracic, Latissimus Dorsi and the Intercostal muscles of the ribs in the outer structures. In the shoulder we are aware of the superficial muscles, Trapezius Cervical, Deltoids and Brachial triceps, but the muscles that convey locomotion, the deep shoulder and chest muscles of the shoulder sling Supraspinalis, the deep pectorals and Serratus Ventralis are not so obvious but more important as they move and absorb concussion in the area. Any restriction of movement by the static or dynamic fit of a saddle in this area will lessen range of motion through the shoulder and

therefore cause greater concussive injury or at the very least reduce the shoulder movement and back efficiency. Unfortunately for saddle fitters the horse is extremely adaptable in its use of muscle groups and can raise the Trapezius Cervical whilst dropping the Trapezius Thoracic whilst in motion so altering the fit of a saddle from its static state to the dynamic. Also muscles are an evolving tissue so changes in work, injury or turnout will affect the shape of the horse beneath its saddle, these altered uses of muscle can be a result of poor saddle fit, bad pads, poor conformation, pain in other areas of the horse eg feet, hocks, mouth, or rider problems.

Movement relating to saddle fit; The area of saddle fit comprises the thoracic region from T6 to T18, the vertebral column and the ribs in this area are not the most mobile, there is about between 7 degrees to 12 degrees of flexion (up and down movement) through the area with the least being at the T18 end going up to the most at T6. Lateral bend is organized with axial bend (the rotation of the ribcage) and there is between 2 and 5 degrees of bend laterally with T10 having the greatest movement. Axial rotation for this area is between 7 and 8 degrees the highest again at T10. The ability to flex or rotate this area means that the fit of a saddle can change dramatically once a horse has begun to move.

“The vertebral column is the axis upon which the limbs act to produce motion. The push back of the right hindleg exerts an oblique force on the spine (in left bend). This force may be resolved in two components; forward movement and sidewise movement. This holds, of course, for the left foreleg. The musculature of the vertebral column, particularly the epaxial, resists or absorbs the sidewise forces in order to promote forward movement” James R Rooney

In this Rooney is explaining that movement related to saddle fit is directed through the changes in shape of the spinal column and the horses ability to control those changes whilst still producing the movement required. This is training in its basic form, the repetition of exercises to perfect the core strength that allows such work. The problem arises when the horse or rider does not perform the series of exercises correctly with the correct back engagement, thus learning to produce a wrong learned response. This may be through poor training methods, through poor riding position, through conformational difficulties within the horse or pain, the development then of the back and the carrying capacity whilst moving is changed and saddle fitting issues result.

“The reflex contractions of the spinal column muscles compensate for the bending of the spinal column (or lack of in the horse). This is a characteristic behavior of the spine stabilizing system during human movement (and in the horse). As a result, even small compensatory differences between the right and left sides cause permanent asymmetric, dynamic overloadings on the soft tissue. These overloadings are cumulative and after some time result in the partial loss of elasticity in the soft tissues on one side of the spine. This loss results in modification of the

previously neutral position of the vertebral linkage and scoliosis appears" (JK Ober: 1974. A dynamic concept for the diagnosis of idiopathic scoliosis).

Good saddle fit is then primarily the result of good development in the horse, and accommodating a less than perfect or constantly changing back means use of the correct tree, rail angle and then possibly the use of therapeutic pads to alleviate pressure.