

Leg Set: Its Effect on Action and Soundness of Horses

Melvin Bradley

Department of Animal Sciences, University of Missouri-Columbia

It is difficult to over-emphasize underpinning (feet and legs) when appraising the worth of a horse. Except for breeding stock, horses are useful only when in motion. In a very real sense, the horse is an athlete. Any physical handicap that causes it to be clumsy, use excessive energy to perform a task, be hard riding, lack strength or speed, or wear excessively, decreases its potential usefulness.

Good action is determined largely by set of the feet and legs, slope of the shoulders and pasterns, and shortness of back and coupling relative to length of underline or belly.

Good performance reflects structural straightness, physical fitness and confidence gained from systematic training.

Breeders or prospective buyers can save much time by avoiding horses whose potential is limited by physical handicaps, such as crooked legs, if they become proficient in identifying handicaps and allocating their resources accordingly.

Some physical handicaps are "acquired" through faulty diet or injury, but probably far more of these are claimed than actually exist. In most cases the condition is genetic and must be charged to the sire and/or dam. For this reason, breeding animals, especially stallions, should be free of major conformation defects.

Correct and incorrect leg set

Correct leg set implies "a leg under each corner of the body," accompanied by adequate, straight bone with short cannons; long, correctly sloped pasterns and medium-sized, balanced feet.

A horse that stands correctly will almost always move correctly. Conversely, one that stands crooked must move likewise.

Front legs

A plumb line dropped from the point of the shoulder should bisect the knee, cannon, ankle and foot (Figure 1A). One dropped from the arm should bisect the forearm, knee, cannon, and fetlock, and pass behind the heel (Figure 2A). The pasterns should be compatible in length with breed requirements, slope at an angle of 45 degrees, and join the foot without changing this angle.

Figures 1B through 1F and 2B through 2F show common defects of front leg set that affect action.

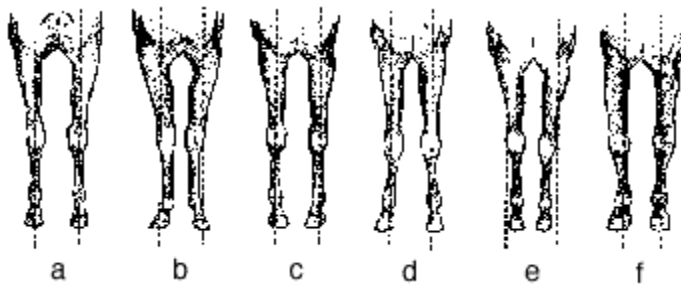


Figure 1A. Straight legs, good front.

Figure 1B. Splay-footed.

Figure 1C. Pigeon-toed.

Figure 1D. Knock-kneed, narrow front, base wide.

Figure 1E. Base-narrow.

Figure 1F. Bow-kneed.

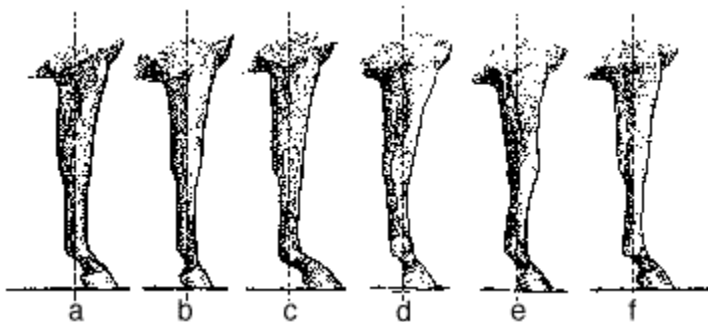


Figure 2A. Correct, good bone.

Figure 2B. Pastern too straight.

Figure 2C. Pastern too long and flat, angle different than foot, "coon-footed."

Figure 2D. Calf-kneed, short, straight pastern.

Figure 2E. Buck-kneed or over on the knee.

Figure 2F. "Tied in" or fine bone below the knee.

Splayed feet and pigeon toes are quite common and affect action in proportion to their degree. Knock knees, bowed knees and base-narrow defects are less common but affect action and predispose to unsoundnesses.

Short, straight pasterns increase concussion to the horse and rider, which seriously predispose the horse to unsoundnesses and induce fatigue to horse and rider.

Long, weak pasterns ride easily but affect action and are undesirable for good stops with roping horses.

Calf knees are common and detract from appearance, whereas buck knees are uncommon except with jumpers.

"Tied-in" below the knee or hock indicates inadequate tendon and ligament development for long, trouble-free service.

Hind legs

Bone structure of the hind leg determines, to a large degree, the set of the feet and legs, and to a lesser degree arrangement and shape of muscling in the hind quarters (Figure 4A). Correct leg set can't be achieved with crooked bones. Bone structure is genetically determined.

A plumb line dropped from the point of the buttock should bisect the thigh, gaskin, hock, cannon, fetlock, pastern and foot (Figure 3A). Viewed from the side, it should contact the back of the hock, cannon, and fetlock (Figure 4B).

Figures 3B through F and 4C through F show common faults of hind leg set.

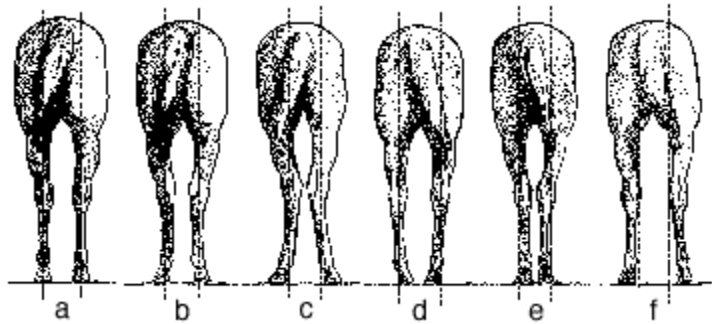


Figure 3A. Straight legs.

Figure 3B. Slightly cow-hocked.

Figure 3C. Extremely cow-hocked, splay-footed.

Figure 3D. Bow-legged or bandy-legged or "too wide," pigeon toed.

Figure 3E. Base-narrow or stands close.

Figure 3F. Base-wide or stands wide.

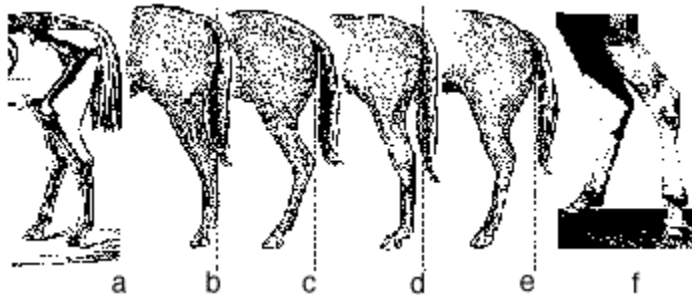


Figure 4A. Correct skeletal structure.

Figure 4B. Correct leg set.

Figure 4C. Sickle-hocked or too much set.

Figure 4D. Post-legged or too straight, "coon-footed."

Figure 4E. Camped under or stands under.

Figure 4F. Defects of this magnitude should not be propagated.

Almost all horses display cow hocks to a degree. Some horse owners prefer that hocks point slightly toward each other with the feet pointing slightly outward. This is insurance against wide hocks or bandy legs.

Noticeable cow hocks are undesirable both from the standpoint of action and appearance. Bandy legs or wide hocks seriously deter collected action and predispose to unsoundness. Sickle hocks are quite common and are serious because of the stress placed on the hocks in performance and the many unsoundnesses that are associated with them. View a stallion with sickle hocks with concern. Boggy hocks usually are seen with post-legs.

Correct and incorrect action

Correct action. The feet and legs of a horse at the walk or trot should move straight ahead parallel to an imaginary center line in the direction of travel. The feet should rock upward from the heel and break over squarely at the toe and should rise with a snap. They should be carried forward in a straight arc with the highest point of the arc occurring at the center of travel or when the supporting leg is passed. They should be set solidly and squarely on the ground with toes pointing straight ahead. Any deviation from this procedure is a defect of action. See Figures 5 and 6. This is not to say that all good horses must have perfect action. Many compensate by intelligence, willingness, and practice; however, correct action would make them better horses.



Figure 5. Straight, true action.

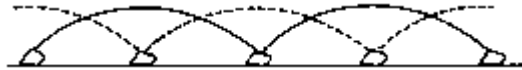


Figure 6. Correct, true arc, balanced feet.

Some common incorrect actions:

- Winding or rope walking. A tendency to swing the striding leg around and place it in front of the supporting leg (Figure 7).



Figure 7. Winding or rope walking.

- Dishing or winging in. The striding foot swings inward in motion, then outward again at completion of stride (Figure 8). Interfering. Striking the supporting leg, usually near the fetlock with the foot of the striding leg (Figure 8).



Figure 8. Interfering or dishing or winging in.

- Paddling. An outward deviation in the fore foot and lower leg at flexion (Figure 9).



Figure 9. Paddling or winging.

- Winging. Exaggerated paddling, most noticeable in high-going horses.
- Forging. Striking the heel or undersurface of the shoe of a forefoot with the toe of a hind foot.
- Rolling. Excessive lateral shoulder motion as with wide-fronted horses.
- Pointing. A low, long stride.
- Dwelling. A perceptible pause in the flight of the foot before it reaches the ground.
- Trappy. A quick, high, short, jolting stride.
- Pounding. Heavy contact, sometimes resulting from a heavy stride.

Specific effect of leg set on action and unsoundnesses

- Pigeon toes tend to cause paddling or winging.
- Splayed feet encourage dishing or winging in and may result in severe interfering and permanent injury.
- Long, weak pasterns and shallow heels cause an irregular stride and may predispose to ringbone (Figure 10).



Figure 10. Incorrect arc, long toes, flat heels.

- Short, straight pasterns and shoulders and deep heels are accompanied by a stilted, trappy stride and a tendency toward stiffness and sidebones (Figure 11).



Figure 11. Incorrect arc, short toes, high heels.

- Long forearms, short cannons and sloping pasterns are conducive to long, springy, true strides and limbs that wear well (Figures 5 and 6).
- Calf knees increase concussion and encourage a pounding gait.
- Buck knees cause unsteadiness. When accompanied by long toes, they tend to cause stumbling.
- Knock knees predispose to interfering.
- Bow knees usually cause undue weight on the outside of the front feet, which tends to hasten sidebones.
- Sickie hocks seldom accompany balanced conformation and motion. They must bear a disproportionate share of weight; therefore, spavins and curbs tend to develop.
- Post legs are less common than sickie hocks but are equally serious. They seldom ride easy, are prone to crampy, boggy hocks and tend to cause low, skimming strides.
- Bandy legs usually are unsteady or "limber hocked" and predispose to most unsoundnesses of the hock.

Straight underpinning does not guarantee a good performing horse, but it increases the probability of good performance.

Copyright 2000 University of Missouri. Published by [University Extension](#), University of Missouri-Columbia.

For permission to reprint, copy, or post, contact: Publications Coordinator, Extension and Agricultural Information, 1-98 Agriculture Bldg. Columbia, MO 65211; Email: XPLOR@missouri.edu XPLOR website: <http://muextension.missouri.edu/xplor>