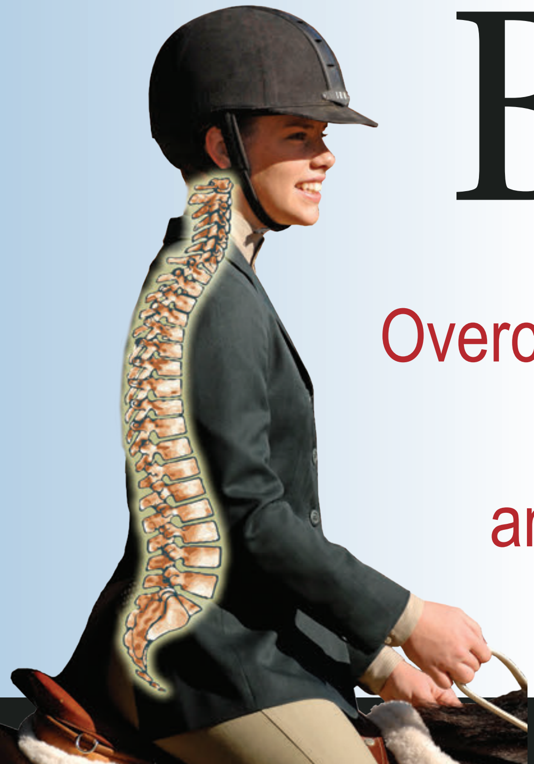
“Essential reading.... No matter which discipline you ride, this book will help you become stronger and more comfortable.”
THE CHRONICLE OF THE HORSE

JAMES WARSON, MD
with Ami Hendrickson

REVISED AND UPDATED

The RIDER’S PAIN-FREE BACK



Overcome **Chronic Soreness**, **Injury,** and **Aging** and Stay in the Saddle for Years to Come

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THE HUMAN BACK JOINS WITH THE HORSE

The Science of Riding

I find it odd that so much of what passes for fact about the mechanics of riders on horses is incidental, anecdotal, or the result of conventional wisdom. Very little information has a scientific basis.

For instance, some people believe that shortening the stirrups a notch or two will give inexperienced riders better leg and body control. In reality, this practice actually puts pressure on the medial menisci of the knees, stretches the lateral collateral ligaments of the knees, and in doing so inverts the heel so contact is decreased and less effectual.

Science is everywhere, however, regardless of whether or not it is acknowledged. The laws of physics are true. They are incontrovertible. They govern how we move through life. They determine how external influences affect us.

The laws of physics dictate what happens to bodies at rest and in motion. Any time the human body comes in contact with a horse's body, a little physical knowledge can be very illuminating (Photos 4.1 A & B).

Newton Revisited

We ride horses because they move us. They move us from place to place, both physically and spiritually. Because they move, they have to follow the laws of motion.

In grade school, we learned about Sir Isaac Newton. Credited with developing a theory of gravity (in an almost certainly apocryphal story about watching an apple fall to the ground), Newton was a seventeenth century mathematics professor who used mathematics to explain the way the world worked.

4.1 A Whether or not we are conversant with them, the laws of the physical world dictate how we can best interact with the horse. For instance, they determine how the horse will use his body to stop his forward movement, how the calf will be affected when it hits the end of the rope, how the tack will react to the various demands placed upon it, and how the rider's body will react when it comes in contact with the ground.

4.1 B Terms like "velocity," "trajectory," "vector," "acceleration," and "torque" may be the farthest things from this rider's mind as she balances in the saddle and pilots her horse over the fence. Regardless of our awareness of them, however, the laws of the physical world determine what is—and is not—possible.

Newton's formulas explained why objects moved in a particular way. In 1687, Newton published the *Principia,* in which he explained what have come to be known as Newton's three Laws of Motion.

Newton's Laws of Motion explain why things move the way they do, how they stop, and what happens when things that are moving come into contact with things that aren't. They are invaluable when trying to understand what happens to your back when you ride.

The First Law: Inertia Happens (The Push-Button Pony Rule)

The first Law of Motion states that an object in motion remains in motion and an object at rest remains at rest unless acted upon by an outside force. This means that an unmoving object won't move unless something makes it. Furthermore, a moving object will continue to move at the same speed, in a straight line, until something interferes with it.

In essence, the first Law says that the physical world is like a push-button pony. Say, "Go," and he goes on autopilot around the ring. Hauling on the reins and saying "Whoa" applies an external force that interferes with the pony's forward motion, causing him to stop. When stopped, he's happy to stand still until application of another external force—such as the rider's legs, voice, or crop—interferes with his nap and causes him to move.

This tendency for objects in motion to remain in motion, and for objects at rest to remain at rest is called *inertia*. It essentially means that things tend to keep on doing whatever they're doing.

The first Law explains why you land in the dirt when your quietly dozing three-year-old spooks at his shadow and jumps forward. You remain at rest while he literally accelerates out from under you. It also explains why your body sails through the air to clear a fence your horse refuses. In this case, you are the object that stays in motion until acted upon by an outside force (the ground).

4.2 Newton's second Law in action: when you fall off a horse, the longer you remain airborne, the faster your body travels and the greater the impact when you hit the ground. Therefore, it hurts more to fall off a 17.3 hand horse traveling downhill than a 13.2 hand pony in a flat arena.

The Second Law: A Force to Be Reckoned With (The Taller the Horse, the Harder You Fall)

The second Law of Motion tells us that force equals mass times acceleration ($F = ma$). In other words, the physical intensity with which something moves is directly related to its weight and how quickly it is speeding up or slowing down (Photo 4.2).

Newton's second Law explains why it hurts more to fall off a tall horse than a short horse. During the fall, you do not remain at a constant velocity (or speed). To a point, the longer you remain in the air, the faster you go; thus, the impact is greater after an unplanned dismount from a 17.3 hand Trakhener than from a 13.2 hand Welsh pony.

The second Law enables us to understand why a kick from a large horse hurts more than a kick from a small pony. Even if both animals can move their hooves with the same speed, the horse has more mass. He will therefore be able to strike with more force.

The Third Law: Resistance Is Inevitable (The Mule Principle)

The third Law of Motion illustrates the adage, "You can lead a horse to water, but you can't make him drink." It states that for every action, there is an equal and opposite reaction. If something is pushed or pulled in one direction, it will push or pull with the same amount of force in the opposite direction.

Lifting a heavy saddle requires you to exert force. The reason the saddle feels heavy is because it is pushing your arms down. That downward force goes through your body, where it encounters the floor pushing up with equal force. (If the floor pushed back with lesser force, it would give way, and you would fall through it as you lifted the weight of the saddle.)

4.3 Some horses are born knowing physics. They instinctively resist pressure. When you pull on them, they pull back. They don't pull back any more than necessary—only enough to remain rooted to the spot. Your actions create an equal, but opposite, reaction.

A lazy mule embodies the third Law. The mule won't exert more energy than absolutely necessary. He won't waste time pulling on you if you leave him alone. If you try to pull him in one direction, however, he will resist and pull against you. He won't overdo it and drag you backward. But the mule will pull enough that he doesn't go anywhere he doesn't want to go (Photo 4.3).

A classic example of the third Law is a small boat in a pond. If you stand in the boat and step toward shore, the amount of force that you use to push your body forward is applied to the boat and pushes it backward.

The third Law is the reason that traction and good footing are essential to horse sports. In order for the horse's hooves to generate forward motion, they must push backward against the ground with a force equal to that required to propel the horse's body forward.

It is important to remember that force does not cause motion. It causes acceleration (Photo 4.4). It is the product of the mass times acceleration.

The Laws at Work

The Laws of Motion affect us every time we ride. Take the trot, for instance. As the horse picks up the trot, he must engage his hindquarters and apply enough pressure to the rear to propel the mass of his body and his rider forward. When this happens, his body changes from being at rest to being in motion.

At the same time the horse's body moves forward, your body, on top of him, must also

4.4 Force causes a change in velocity. Force forward results in acceleration. Once this horse is airborne, he will not be able to exert any more force in order to clear the fence. Therefore, he needs to focus considerable force against the ground in order to accelerate off it. Likewise, he will hit the ground with significant force after clearing the obstacle.

change from being at rest to being in motion. If you are capable and prepared, the two of you will move forward as one. If you are lacking in skill or awareness, however, your hips may move forward with the horse, but your head and shoulders may be momentarily left behind. Newton's Laws of Motion provide an explanation for every time you are "left in the lurch."

The same principles hold true when the horse transitions from a trot to a walk. If your body does not slow down at the exact same rate as the horse, you'll be carried forward.

Riding the trot is a fairly basic horsemanship skill to master, yet it's not difficult to see how the Laws of Motion influence what happens to your body when you ask your horse to trot.

Because of the Laws, any riding discipline that features increased speed, sudden acceleration or deceleration, or quick changes in direction will place both horse and rider under significant physical forces. That's why it's important for a rider to synchronize himself with the horse's movements. The more you and your horse can move as one entity, rather than as two disparate objects, the more the unchangeable Laws of the physical world will work *for* you, rather than *against* you.

Tack Considerations

The whole purpose of riding a horse is to become one with the horse. The Comanche believe that this unity can happen mentally, spiritually, and physically. If you're thinking and reacting equally with the horse, then you will move as one, and you won't become disconnected (which is when the Laws of Motion apply negatively to the rider).

You must use every means available to become completely attuned to the horse. The tack is simply an interface between you and the horse, and if properly fitted, it can allow the two of you to move in unison.

Saddle Fitting

The saddle needs to be as comfortable on the horse's back as it is to your buttocks. You attach your bottom to the saddle. The saddle, then, is

4.5 A A heavy Western saddle on a working horse should fit both horse and rider as perfectly as possible. Long hours in a poorly fitting saddle will take their toll on both backs.

4.5 B This hunter horse and rider have a job to perform. The saddle should not interfere with their ability to work well together while remaining pain-free.

attached to the horse's back. With good fit overall, it will provide a stable foundation for you to move in concert with the horse, rather than fight him and move in opposition to his movements. Only when all three components—you, the tack, and the horse—are secure with each other, can you move as one with your horse.

Remember that the issue of inertia applies to saddles as it does to everything else. A saddle's weight must be taken into consideration when asking a horse to perform. English saddles are generally lightweight. Many weigh only a few pounds. A fully equipped, working Western saddle, on the other hand, can weigh 60 or 70 pounds (Photos 4.5 A & B).

The heavier saddle will have more inertia. It will tend to slide forward on the horse's back as the horse slows down. It will also tend to move backward as the horse picks up speed, unless it fits correctly and is properly secured to the horse.

You, the rider, have to counteract this sliding motion in order to maintain your balance on the horse. This can result in a lot of back pain—particularly if the ride lasts all afternoon.

Yaw involves moving sideways around a vertical axis. A heavy Western saddle that is only cinched in front is prone to yaw. Even if the saddle tree fits the horse correctly, the Laws of Motion dictate that every time the horse moves or changes direction, the back of the saddle will slew from

Aspects of Motion

Yaw, pitch, and *roll* are nautical and aeronautical terms that have to do with a body and its potential movements. An understanding of their meaning can be invaluable when determining correct saddle fit.

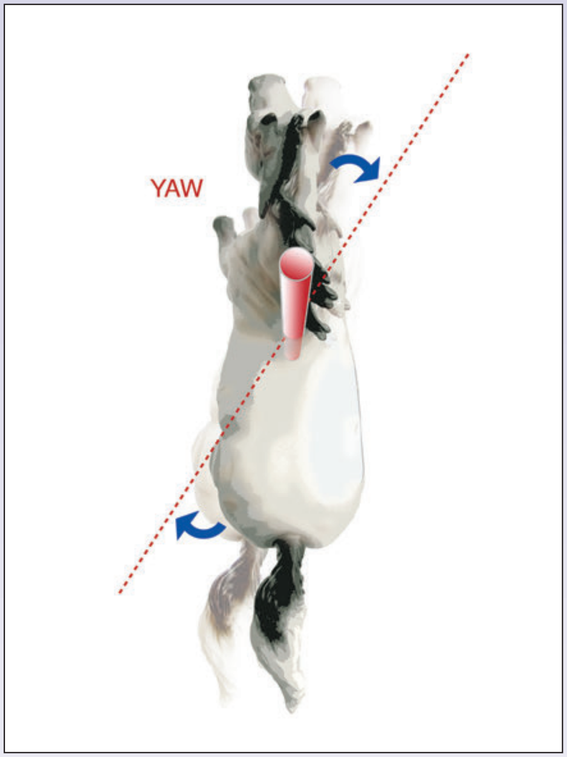


Fig. 4.1 A carousel horse yaws around the axis of the pole.

4.6 A horse performing a rollback yaws around the axis of his hindquarters. Here the horse is rolling back to the right. Because of the Laws of Motion, both saddle and rider will have a natural tendency to counteract the horse's movement and slip to the horse's left. Both saddle and rider must fit the horse perfectly in order to work with the Laws of Motion, rather than succumb to them.

Yaw: Lateral movement around a vertical axis. Think of the horse on the merry-go-round that has a pole through its body going from the ceiling to the floor. If the horse were to rotate side to side around the pole, that would be "yaw" (Fig. 4.1 and Photo 4.6). Yaw affects both rider and tack, and is a factor any time the horse moves laterally.

Aspects of Motion *cont.*

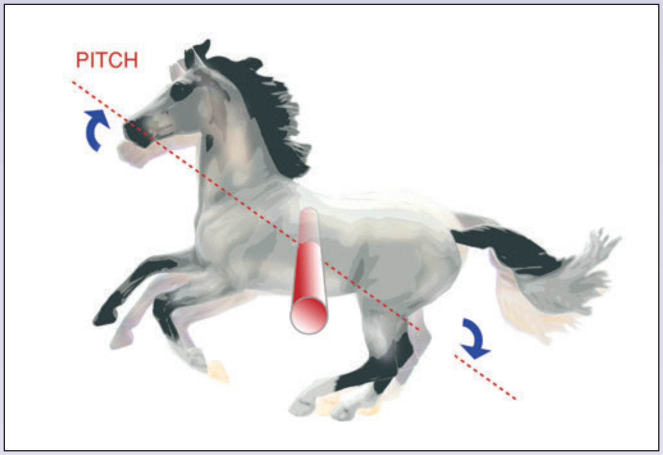


Fig. 4.2 A vertical pole through its body would allow the carousel horse to pitch up and down around the axis.

4.7 Any time the horse's shoulders are higher than his hindquarters, or his hindquarters are higher than his shoulders, the saddle and the rider are encountering pitch. Jumping an obstacle of any size introduces pitch with every takeoff and landing.

Pitch: Rotation forward or backward around a transverse axis. If you were to take the pole out of the merry-go-round horse and insert it side to side across its body, it would allow the horse to "pitch." The horse could rock forward with its head down, and backward with its head up, while rotating around that axis (Fig. 4.2 and Photo 4.7). Bucking and rearing are extreme examples of pitching. The natural "rocking horse" movement of the canter stride, however, is a more common pitching experience.

Aspects of Motion *cont.*

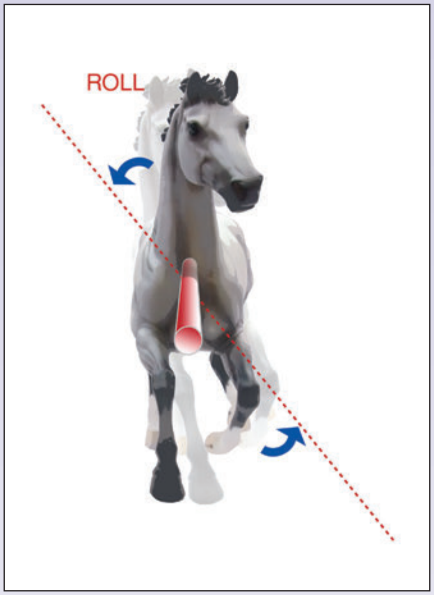


Fig. 4.3 A carousel horse would roll around a horizontal axis.

4.8 A The sudden changes of direction associated with a competent cutting horse continually make roll a factor with regards to how both saddle and rider remain in place.

4.8 B The horse doesn't have to be making a big athletic effort in order for the rider to contend with roll. This hunter is easily clearing a low fence, but the young rider is encountering a significant amount of roll to the left (note the leg and stirrup position). She has instinctively attempted to level her shoulders and upper body to compensate for the roll experienced in her hips and legs.

Roll: Movement around a horizontal axis, running from anterior to posterior. If you took the post out of our carousel horse and inserted it lengthwise through its body (like a spit), the horse's movements around this pole would constitute "roll" (Fig. 4.3).

Barrel racing horses can exhibit roll on tight, fast turns. Some jumpers will roll a bit in the air to avoid hitting a fence. Whenever the horse's shoulders are on a different vertical plane than his legs, roll is a factor in the rider's experience (Photos 4.8 A & B). And, regardless of how well your tack fits your horse, every time you put your foot in the stirrup to mount, you influence the saddle to roll.

4.9 A If the only thing holding a heavy Western saddle on the horse is a front cinch, the saddle will have a tendency to tip down in front—note the pommel and horn in this picture are tipped down while the back of the saddle has popped up. This is uncomfortable for the horse and provides the rider an unstable riding surface.

4.9 B Adding the flank cinch can significantly limit the extent of the saddle's movement, provided the saddle fits the horse correctly to begin with. The more stable the saddle on the horse, the more stable the rider.

4.9 C The "Y" of a well-made drop down cinch exerts pressure more evenly along the whole saddle tree, rather than concentrating the cinch pressure at the front of the saddle.

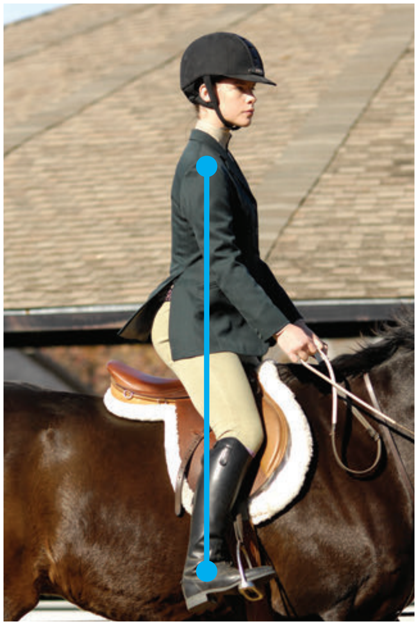
4.9 D The weight distribution of a drop down cinch isn't immediately obvious when the stirrups are down. A flank cinch may be used, but is not as essential in preventing yaw as it is with traditional saddle design.

4.9 E To minimize saddle movement, an English saddle should fit the contours of the horse's back so the girth pulls downward evenly on both pommel and cantle.

4.9 F Buckling the girth evenly on both outer billet straps applies equal pressure toward the front and back of the saddle.

4.9 G When sitting in a "chair" position, with the legs in front of the body, most of the rider's weight is carried toward the back of the saddle. In this case, even a well-fitting saddle can be prone to yaw from side to side, pivoting around the axis of the withers. Notice how riding in this manner also straightens the natural curves of the rider's back (see also Photos 2.9 A & C).

4.9 H A position in which the rider's leg is in front of the rider's body isn't necessarily an exaggerated one. Bringing her leg back somewhat allows her spine to assume more of its natural shape. Though the rider's weight is better balanced in the saddle than in 4.9 G, the saddle and rider are still prone to yaw because most of the weight is carried behind the pivot point of the girth.



4.9 I When the rider's legs are under her body, the shoulders, hips, and heels are in line with each other. Her spine retains its natural curvatures. The rider's weight is balanced over the area affected by the girth, minimizing yaw. The saddle remains in place on the horse's back, even when the rider rises out of the seat during posting.

side to side. A flank cinch or drop down cinch (or "drop front rigging" can help limit the extent of the saddle's lateral movement (Photos 4.9A–D).

English saddles should fit properly and be secured by a girth evenly buckled to the outer billet straps to help limit yaw (Photos 4.9 E & F). In all cases, the rider's position in the saddle can also impact saddle movement (4.9 G–I).

In some instances, the horse's withers can also reduce yaw, to a point. In other cases, the withers may produce an "anchor" effect, and provide the perfect pivot for the cantle of the saddle to swing around.

Though the horse, no doubt, experiences a profound amount of discomfort when the saddle yaws, let's consider the situation strictly from

4.10 A This Western saddle has started to roll—or it may be improperly adjusted so it is cinched off-center on the horse's spine—and can lead to a multitude of riding-related aches and pains. Notice how the rider's left hip is lower than the other, even though his shoulders are fairly even.

4.10 B This rider's English saddle has rolled to the right. Though her back muscles are trying to compensate, the slight imbalance and the resulting uneven tension will be reflected throughout the rider's body in the knees, shoulders, spine, and arms.

the human viewpoint. Any time the saddle slews sideways and starts to slip from its optimum position on the horse's back, the rider's back muscles must try to counteract the movement. As we've seen, our back muscles aren't built very well to compensate for side-to-side movements (see the explanation of "The Spinal Regions," p. 6).

Roll is one aspect of motion familiar to every rider who has neglected to tighten the cinch or girth before mounting. Roll occurs chiefly when the saddle is not secured well enough to the horse and literally rolls off to one side or the other. The horse's withers can help reduce rolling somewhat. As a result, however, they tend to have a lot of pressure put against them.

If you're mounted in the saddle at the time it starts to roll, in all likelihood, you're going to be off the horse soon. The possibilities for back strain in the event of a saddle rolling off to the side of the horse are obvious.

The saddle that is improperly adjusted so that it sits off-center on the horse's spine may not be as obvious a hazard as a saddle that rolls sideways due to a loose girth. The rider may not even be aware of exactly what's wrong. Riding for any length of time in a saddle that has begun to roll can place uneven stresses on the knees, hips, spine, and shoulders, as the body instinctively attempts to right itself (Photos 4.10 A & B).

The Saddle Pad Connection

The saddle pad both separates the saddle from—and connects the saddle to—the horse's back. It is an essential piece of equipment that can help keep the horse more comfortable. But, it should never be mistaken as a saddle-fitting tool.

Correctly used, the saddle pad can minimize the aspects of motion that come into play when we ride. Roll, pitch, and yaw are the essential properties against which any saddle pad must be measured. If the pad is too thick, too thin, or used to mask an ill-fitting saddle, then the motion that comes with normal use will inevitably cause the backs of both horse and rider to work far harder than necessary.

Every saddle has a certain weight, and every saddle pad under it has a certain amount of compressibility. It is quite common for the rider to rock forward and backward in a saddle perched atop a thick pad, even when the horse is moving sedately at the walk or jog. As the saddle pitches back and forth like a rocking chair, it places uneven pressure on the horse's back.

If the horse drops his head and raises his back, the saddle—because of gravity and the rider on top of it—is going to pitch forward. How far forward the saddle goes will depend on how tight the cinch or girth is, and how compressible the saddle pad is. Obviously, a thick, spongy saddle pad would have a lot of compression, so the saddle would pitch forward considerably.

Once the saddle starts pitching, it tends to remain in motion. The rider extends her back in an effort to compensate. This produces some tightening in the paraspinous muscles.

If the withers are elevated, such as when a horse rears or takes off for a jump, and the saddle pitches backward, the rider must move forward in order to maintain her balance. This can stress and strain the ligaments along the spine. Here too, the more compressible the saddle pad, the more unstable the saddle becomes, and the more compensatory adjustments the rider's back must make.

A pitching saddle also makes a very unsure foundation for the rider. In order to stay in the saddle on the horse when he's moving, your back must counteract every micro-motion of the saddle. Prolonged riding using thick saddle pads leads to stiffness, soreness, tension, and muscular strain in both horse and rider.

Thin pads allow much less movement of the saddle and, therefore, the rider. A personal preference are ThinLine pads (www.thinlineglobal.com). ThinLine pads are made of breathable non-compression-based open cell foam, which absorbs shock, concussion, and eliminates pitch, roll, and yaw better than anything else I've seen. I've never known a horse to have a back problem if he had a well-fitting saddle and a ThinLine saddle pad. Through seat-saver technology the foam can even be incorporated into the saddle seat to reduce micromotion and fatigue via a nonslip surface.

We'd like a close contact with the horse. We'd like to be able to feel his motions, anticipate the next movement, and enjoy every moment we spend in the saddle. Only when the saddle stays put on the horse are such things possible.

The Science of Specific Riding Disciplines

In my experience as a practicing neurosurgeon and doctor of neurological medicine, a rider's chosen discipline can contribute in a significant way to his or her particular back problems. While I would stop short of saying that a certain style of riding *causes* back injuries (with the possible exceptions of bronc or bull riding), I would argue that prolonged riding in a particular fashion can certainly aggravate conditions for which riders are already predisposed.

4.11 A To correctly execute the extended trot and other specialized movements, the dressage rider must tuck the pelvis and push it somewhat forward. This straightens the natural curvature of the lumbar lordosis, subjects the coccyx to concussion, and places significant strain on the discs and spinal ligaments.

4.11 B Like the dressage rider, the reining enthusiast also has occasion to tuck his pelvis underneath him, straighten his lower back, and rock back on his tailbone. Furthermore, riding a sliding stop subjects the spine to compression.

Dressage and Reining

Dressage enthusiasts and reining riders are subject to some of the same back problems (Photos 4.11 A & B). Both riding disciplines emphasize correct gaits over the rider's comfort.

To correctly perform many of the required movements, the rider has to tuck the pelvis anteriorly under his body. These riders can end up riding for periods of time with the pelvis thrust forward so their weight is borne on the coccyx, or tailbone, rather than on their seat bones (the *ilium* and *ischium*). Such a position also artificially straightens the lumbar lordosis. It can stretch and strain the muscles and ligaments of the lower back.

Often, dressage riders will use an exaggerated pelvic motion to urge the horse to extend, or when riding the horse at extended gaits. This is not a problem if the rider has developed a set of abdominal muscles strong enough to support the action. If, however, the abdominal muscles haven't been developed and aren't very strong, then they become fatigued. Loss of the rider's anterior stability occurs. When that happens, the back muscles tighten as they try to hold the back in alignment without the aid of the abdominals. As a result, they fatigue much more quickly.

Both dressage and reining involve pressure in moving the pelvis forward against an unmoving object (the pommel or fork of the saddle). As the horse moves, the minor, repetitive impact that occurs between the pelvis and the saddle jars the rider's body. This is a good way to weaken the discs—particularly the bottom disc at L5 / S1, which is between the lumbar spine and the pelvis. The repetitive jarring can easily dislodge the nucleus pulposis and produce a ruptured disc.

4.12 Riders who participate in disciplines that require jumping obstacles are obviously in danger of incurring injury due to a fall, whether because of a refusal, runout, knockdown, or some other error in judgment.

Hunters, Jumpers, and Event Riders

To persons who are not jumping enthusiasts, falls are the most obvious source of injuries in a sport that involves aiming a galloping horse at an immovable fence (Photo 4.12). While it's true that falling, due to a refusal or some other error in judgment, can inflict significant trauma on a rider's back, hunter, jumper, and event riders also tend to suffer a number of injuries as a result of the normal demands of their discipline (Photo 4.13).

4.13 One of the problems inherent in jumping is that the rider's body must retain independent balance while remaining in harmony with the horse's motion. Millions of micro-adjustments are necessary to safely clear a single fence with style. Here, the saddle itself has lifted off the horse's back as the horse is airborne. Regardless of how secure the rider is in the saddle, this will affect his ability to balance.

Because of the huge forces involved in launching a 1,200-pound horse over an obstacle of any size, it is common for hunter, jumper, and event riders to experience the hyperflexion and hyperextension of whiplash, muscle spasms, and disc damage if they misjudge a distance.

As a result of the inevitable concussive forces they experience, hunter, jumper, and event riders

4.14 A Western rider must have a relaxed, supple, strong back. Since the Western rider's seat stays in constant contact with the saddle, having a horse with comfortable gaits is essential for continued back health.

tend to accentuate wear and tear on the facet joints of their spine (see p. 38). Over time, they also gradually stretch, and thereby loosen, the anterior longitudinal ligaments of the spine. Damaged ligaments and weakened discs—most often in the cervical (neck) and lumbar (lower back) regions—are commonly found in hunt seat riders.

Western Pleasure and Horsemanship

Western show riders need to have good seat contact with the saddle at all three gaits.

Since the jog and the lope are very collected gaits in which the horse is not encouraged to extend himself, the Western rider rarely adopts the tucked-under pelvic position that reining competitors tend to favor. Instead, the Western rider often sits straight upright in the saddle, with the seatbones bearing most of the rider's weight.

In Western riding, the horse's movements at the various gaits are filtered through the rider's back. The Western rider must have a strong, supple back that provides bodily support and maintains posture. At the same time, the back must relax enough to allow the rider's hips to follow the horse's movements (Photo 4.14).

If a Western horse's conformation makes any of the gaits particularly troublesome (for example, a vertically shouldered horse with a short cannon and pastern will produce a pronounced jarring sensation at the jog), the concussion will be transmitted to the rider's back (for more on how a horse's conformation can affect the rider's back, see "Conformation and Compatibility," p. 80). The rider will then tighten up the back and abdominal muscles in an effort to protect himself.

A rider who doesn't ride every day, and who doesn't have very well developed back and abdominal muscles, will experience a great deal of muscle fatigue after spending any amount of time jogging or loping in a Western saddle. Furthermore, the repetitive concussion of Western-style riding—even simple trail riding—can damage discs and stretch ligaments.

Cutting

A good cutting horse will "dance"—leaping back and forth in response to a cow's movements. The challenge for the rider is often not to get the horse to do his job, but rather to stay with him while he works (Photos 4.15 A & B).

Inexperienced or novice cutting riders tend to follow the horse rather than move with him. Lagging behind the horse's motion and constantly playing "catch up" will produce a whipping action through the length of the rider's spine. The whipping effect may be somewhat mild at the base of the lumbar spine, where the rider connects with the saddle. As the distance from the saddle increases, however, the intensity of the whiplash will increase as well.

As we know, the human back is not designed to flex laterally to any great degree (see "The Spinal Regions," p. 6). Cutting horse riders can experience a great deal of thoracic pain and neck pain because of the forces involved in remaining in the saddle during the sudden lateral movements of good cutting horses.

4.15 A A good cutting horse knows his job. He singles out a cow and stays with it. He feints from side to side, mirroring the cow's movements as he separates it from the herd.

4.15 B When the horse leaps to the side, the rider's challenge is to stay with him, rather than be whipped along afterward.

Barrel Racing

A good barrel racing horse traces a very small arc around the barrels in order to shave seconds off the running time. The rider must remain in alignment with the horse, or the horse will be unbalanced and unable to make a tight turn. The barrel racing rider requires a great deal of lateral strength in order to maintain her balance on the horse while guiding him around the barrels (Photo 4.16).

Barrel racing is somewhat akin to cutting in that it involves a great deal of lateral movement of the rider's spine. It can put the same stresses and strains on a rider's body.

4.16 Tight turns and sudden changes in velocity are part of the sport of barrel racing. The barrel racer must have strong, supple abdominal and lateral muscles to withstand the physical forces involved in every round.

In addition, barrel horses are extremely fast accelerators. In order to keep the horse from literally accelerating out from underneath them, barrel racing riders often tighten up their muscles to "clamp down" on the horse. This invariably leads to stressed muscles, discs, and ligaments. Herniated discs and facet joint damage are commonly found in long-term barrel riders.

Endurance and Competitive Trail Riding

Endurance and competitive trail riders have remarkably few back problems. This may be because they tend to spend a lot of their riding time standing in their stirrups, with their weight distributed through their legs. For the amount of time that they spend astride, distance riders have much less "butt contact" with their saddles than other disciplines.

Because distance riders use their legs to absorb the inevitable shocks and concussion of riding, it is much more common for them to suffer from hip, knee, and ankle problems rather than back injuries (Photo 4.17).

Competitive riding is physically demanding for both horse and rider. Riding for any period of time without being in good physical shape can result in muscle and ligament strains. In addition, riding for long distances *without* using the legs as shock absorbers can subject the discs and vertebrae to traumatic concussive forces.

Saddle Seat Pleasure and Equitation

Years ago, saddle seat riders often assumed an exaggerated, locked-in "praying mantis" type of posture. The rider's legs, arms, and head were thrust forward, and the body held quite straight. The rider's seat was anything but secure, and the rider was often left behind the horse's motion.

Fortunately, such a riding style has been supplanted by a more natural, more fluid, and more flexible position for saddle seat equitation and English pleasure riding (Photo 4.18). Still, the saddle seat rider is often ramrod straight in the saddle, with a fine line between poise and rigidity.

Saddle seat riders have their seats in contact with the saddle at the walk and at the canter.

4.17 Endurance riders are generally as fit as their horses. They also tend to stand in the stirrups and bear weight in their legs, rather than sitting on their seatbones in the saddle for extended periods of time. Many prefer stirrups with a wider surface area for the foot to support the rider's body weight. The rider's legs, then, and not the back, receive much of the jolting and jarring as the horse moves forward. For this reason, distance riders who are in good physical condition generally experience more hip, knee, and ankle pain than back pain.

They post at the trot. Saddle seat horses often exhibit great animation in their gaits, which can translate to a significant amount of movement beneath the saddle.

Furthermore, saddle seat equitation riders tend to be young girls, who because of their age and physical makeup, have the least amount of muscular development of all riders.