



Weaving: A Veterinarian's Perspective

By Patti Schaefer, D.V.M.

Whether it's fast and furious or slow and rhythmical, perfect execution of weave poles is something agility competitors strive for. Did you ever stop to think about why it is the hardest obstacle to learn, what stresses and challenges the dog's body endures during performance, or how the dog's conformation and weaving style may create risk factors for injury?

The Dog's Size, Speed, and Style Affect the Stresses of Weaving

Let's start with the little dog. He makes an entry into the poles and then flexes the neck to start the weaving motion pattern. Depending on speed, the arcs through the body may be minimal (for example, the small trotting dog with both forelimbs on the same side of a pole at the same time, and the hind limbs following through together). There's not much stress here, unless this little dog has risk factors of a long or inflexible spine and/or straight angulation. Now assume the dog is moving along at a much faster speed, and closer to the poles. The hind limbs are either moving together with joints flexed, or each leg may be in an individual step or slight slide (like a skating action).

Next, picture a medium size dog whose body makes an "S" curve to move quickly and efficiently through the poles. The neck flexes around the poles, and the forelimbs are moving in either a one- or two-sided action while the center of the body arcs in the opposite direction. The hind limbs again perform a more exaggerated version of the little dog's movement. The dog holds its head low and drives forward, keeping the body as close to the poles as possible.

As the speed increases, stresses on the body escalate, especially in the one-sided movement. The forelimbs now move laterally (sideways) from the body, and muscles that normally don't reach this range of motion are asked to stretch while moving quickly. In one-sided movement, the loads on the individual forelegs are increasing. The leg has to quickly absorb the impact of landing and push off to the next stride. Elbows twist and toes jam. As the hind limbs slalom from side to side, they create a whipping action through the mid to lower back. The dog uses his tail as a balance during this motion. The adrenaline rush is on.

As the size and speed of the dog increases, so do physical challenges. A larger dog, especially one with a longer back, often spans three poles while weaving. Coordinating front and rear movement becomes more challenging and often these larger dogs perform a "hula" type motion in the lower

back and hindquarters. This motion is not ideal for keeping a spine healthy.

Spinal Anatomy

To understand how weaving can affect a dog's spine, consider the anatomy of the vertebral column. The spine is divided into four regions: cervical, thoracic, lumbar, and sacral. There are seven cervical, thirteen thoracic, seven lumbar, and three sacral vertebrae in the dog. The transition zones are called the cervicothoracic, thoracolumbar, and lumbosacral regions and these are the areas of greater motion. It is in these regions that most of the spinal problems occur in dogs that weave. (Jumping dogs are also prone to problems in these areas). The spine is the basic frame for supporting the body. It protects the central nervous system and provides a place for major trunk muscles and ligaments of movement and flexibility to attach.

Alongside the spinal column are several muscles. One of these, the longissimus, is the major extensor of the spine. Injury and fatigue occur rapidly in this region with lack of conditioning. Another important muscle to note is the psoas, which runs to the side and a little under the lumbar spine. The psoas flexes the lumbar vertebrae and helps advance the hind limbs (lower back weaving motion).

Discomfort, Injury, and Lameness

New patterns of discomfort and injury are being recognized in the agility dog as this sport becomes more popular and competitive. Repetitive stress and overuse syndromes are on the rise. Chronic back pain and lameness, unfortunately, has become a part of many agility dogs' lives. Failure to perform a certain obstacle may be the first indication of a problem (that is, a dog quits weaving or pops out of the poles). A thorough physical examination including range of motion and gait analysis should be performed. Radiographing the area of pain will aid in diagnosing whether this is a hard tissue (bone) or soft tissue (muscle, tendon, or ligament) problem. Dogs also compensate for pain and may create a secondary area of concern.

The most common bony problems seen in the spine are spondylosis close to the transition zones and disc disease. Spondylosis is the bridging that occurs between two vertebrae from calcification in the ligament under the spine. It is often called "arthritis of the spine" and is the body's way of trying to stabilize excess motion. Common disc diseases include either disc herniation or mineralization in the disc space. Herniated discs require immediate attention. The decision to



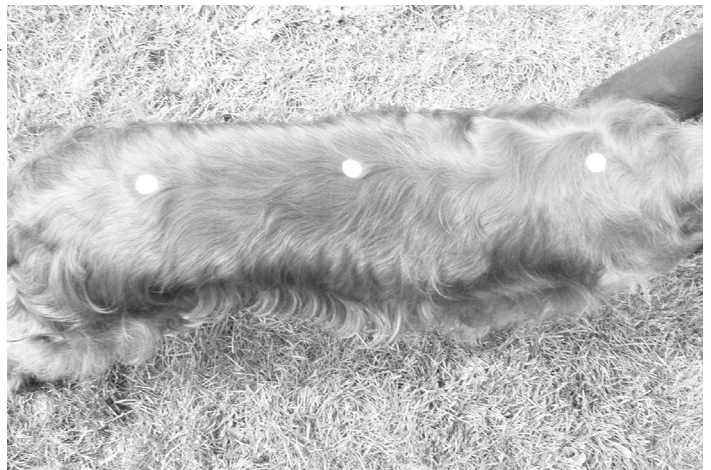
The small dog that must trot through the poles will have both forelimbs on the same side of a pole at the same time, and the hind limbs will follow through together.



Coordinating front and rear movement is more challenging the larger the dog. Often, larger dogs perform a "hula" type motion in the lower back and hindquarters.



Notice the flexion of the spine as the dog is weaving. A larger dog, especially one with a longer back, often spans three poles while weaving.



The white dots indicate the transition zones which are the areas of the most movement in the spine and more prone to injury.

continue competing with chronic back problems depends on degree of pain or discomfort. There are dogs competing with spondylosis. When this condition progresses to an inflexible spine or the development of proprioceptive deficits (as with lumbosacral spondylosis), retirement is inevitable. Weaving requires the dog's back to be flexible and that the dog knows where his hind feet are. Remember: spinal problems may manifest as lameness and are often mistaken for a leg problem. The most common bony problem in the extremities (legs) of the canine athlete is osteoarthritis, which can occur in any joint.

Soft Tissue Problems

Locating soft tissue problems is a little bit more challenging. A thorough lameness evaluation will locate the region of primary pain and help determine compensation areas. The exaggerated motions performed while weaving create soft tissue problems previously considered uncommon. Remember those ligaments around the vertebrae mentioned earlier? I think that

excess stress (and stretch) to the ligaments is adding to back discomfort and pain. The veterinary neurologist in my area agrees. Let's not forget those muscles surrounding the spinal column since these are all areas for potential problems. Psoas muscle pain should be considered in lower back problems.

The most common extremity soft tissue problem seen in the agility dog is biceps tendinitis. The biceps muscle extends the shoulder and flexes the elbow. Picture the stretch this one gets during a fast one-sided weave motion pattern.

Two recently identified areas of muscular pain are in the pectoral muscles and the teres. The "pecs" are chest muscles that help move the front leg and keep it in the correct position. Those get a workout in lateral foreleg movement. The teres rotates and flexes the shoulder. Check under the forelimb in the "armpit" for soreness, especially in obscure lamenesses.

The most common hind limb soft tissue problem is in the stifle and involves the cranial cruciate ligament. This can be partially or completely torn, or just strained.



Conformational weaknesses in the hindquarters (including hip) and hind limbs (including stifles and hocks) predispose the dog to injuries during the weaving motion since the limbs are held in flexion for long periods of time.

It can be difficult to determine whether the pain is in the muscles, tendons, or ligaments without using thermography, ultrasound, or MRI. These aids are not always available. Therapy is generally directed at symptom relief and return to function.

How to Keep Your Canine Athlete In the Game

What can you do to keep your canine athlete in the ring and prevent chronic back pain and lameness?

A good conditioning program, consisting of aerobic and anaerobic exercise, stretching, and strengthening is a necessity. Stretching is important to prepare the body for the exaggeration of movement created in the weave poles. If the limb muscles have been stretched through different planes, they are less apt to be injured when put through rapid-fire motion, especially if there is an extra slip or slide. Spinal stretches (like the cookie to shoulder, ribs, and hips) help prepare the spine for the lateroflexion needed to weave quickly. Various muscle strengthening exercises, like cavalettis, swimming, hills, and specific body part exercises need to be part of the conditioning program, in addition to training on equipment.

Evaluate your dog's weight and take the necessary steps to make it as optimal as possible. Keep toenails short. Make sure hair is not blocking vision.

Other therapeutic modalities to consider are acupuncture, chiropractic care, trigger point therapy, massage, and the use of supplements.

Weave pole construction varies. Being aware of the particular equipment you are working on is essential. There are potential problems that can lead to injury. Dogs can injure and bruise shoulders on poles that are too rigid or get hit by poles that are too flexible. Toes can stub and jam on bases or hit nails that may be protruding. Hair can get caught in springs. Look at the surface the poles are on also: too much traction and a foot can jam—too little traction and the dog can pull a muscle.

Overtraining overworks tissues that may need to rest and heal. Frustration causes the release of stress hormones and can lead to illness. To have many years of fun with your canine companions, treat them as elite athletes and best friends.

Editors' Note: For a further perspective on dog anatomy and weaving, see CR V9, #7 "Case Study: Teaching Weaving Footwork." This article offers more about the challenges of weaving from the point of view of both dog and handler. 🐾

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In this photo series, you can see that the dog's body is making an "S" curve. The neck flexes around the poles, and the forelimbs are moving in a one-sided action while the center of the body arcs in the opposite direction. As the forelimbs move laterally from the body, muscles that normally don't reach this range of motion are asked to stretch while moving quickly. The hind limbs slalom from side to side, creating a whipping action through the mid to lower back. In one-sided movement, the leg has to quickly absorb the impact of landing and push off to the next stride.