The Great Pyrenees epitomizes the working dog values and ethics for which they were originally bred over 5000 years ago. Whether protecting flocks, caring for family or working in therapy settings they give us 100+% and we owe them no less. These Great dogs are totally dedicated to the many tasks we ask of them and as they loose youth, their life long tasks cause low back issues over time.

Lumbosacral Dysfunction: A Misunderstood Syndrome

Often referred to as lumbosacral disease, this condition is not really a disease but more accurately, it is a multifaceted syndrome most often referred to as lumbosacral stenosis or sometimes discospondylosis. Its presentation can also mimic symptoms of degenerative mylopathy.

Lumbosacral disorders are common among any of the large breed dogs including the Great Pyrenees but is most common in German Shepard Dogs (GSD). In order to understand this process and what happens to our beloved Pyrs, one must understand this syndrome and its predilection within the breed.

Lumbosacral stenosis is a frequent neurologic disorder in any male, working, large breed dog between the ages of 6-7 years. It is reported to occur less frequently in females. Since dogs are quadrupeds (walking on 4 legs) and move in a position that is horizontal to the ground, over time the gravitational forces pull on the lower core abdomen and lower back. Most of the older, large-breed dogs suffer from the difficulty of position transitions, most obvious from sit to stand and the eventual inability to stand is a primary cause of euthanasia.

According to textbooks on the subject of lumbosacral stenosis, the German Shepard Dog is most commonly affected, possibly because of the conformation of the lumbosacral angle, followed by the Dalamation, Great Dane, Spaniel, Boxer, Labrador and Golden Retriever. However, in our canine rehabilitation experience, we believe this syndrome is vastly under reported and under studied in the large working breed dogs such as the Great Pyrenees, Newfoundland and Bernese Mountain dog. In my opinion, these large working breeds have proportionately as high or higher incidence than those breeds commonly associated with the syndrome. Perhaps the lack of record keeping for the large working breeds is related more to their lack of popularity (AKC ranking) than actual percentage of large breed dogs that exhibit the syndrome in senior years. Hence, there are fewer reported cases. Almost all of our beloved Pyrs will demonstrate symptoms of this syndrome in old age.

Degenerative lumbosacral stenosis occurs when soft tissue and boney changes, combine with abnormal motion of the lumbosacral joint and impinge on the distal nerve roots of the spine -
Lumbar 7 (L7) and Sacral 1 (S1) vertebrae. Rather than a single disease, lumbosacral stenosis is a multifaceted syndrome because the symptoms are due to several components.

**First**, degenerative disk disease is present at L7 through S1. The disc serves as a cushion or elastic bumper between each vertebrae. When this disk bumper deteriorates, the cushioning effect is lost causing pain and/or allowing herniation of disc material into the spinal cord that can result in hind limb weakness with eventual paralysis. At initial presentation, weakness can occur in one or both hind legs. Eventually, as progression occurs both hind legs will be affected.

**Second**, there is weakness of the spinal ligaments that serve like glue to stabilize the L7-S1 vertebrae. The loss of stability allows ‘spinal slippage’ or laxity and contributes significantly to degenerative osteoarthritis of these and surrounding vertebrae.

**Third**, boney spurs form on the facets, which are like small bone hinges that connect each vertebrae together allowing for spinal mobility. The boney spurs are referred to as spondylosis and can press on the large peripheral nerves as these nerves leave the spinal cord. Initially, spondylosis may cause slight ‘knuckling’ of the hind paws because the dogs lack proprioception or a sense where the paw is ‘in time and space’. The knuckling worsens as the syndrome advances and eventually leads to ataxia or a ‘drunken sailor’ gait in the hind limbs.

**Signs and Symptoms**

The most common *early* sign of lumbosacral stenosis is discomfort in the area of the low back immediately on, in front of and over the upper pelvis bones. This pain is manifested when you try and pet, stroke or massage your Pyrs low back and the dog sags slightly down and away from the petting.

In addition, the low back may also feel slightly less muscled and vertebrae appear to protrude more than when the dog was younger. The reduced muscle in the back is due to atrophy (muscle wasting) of the muscles adjacent to the spine (paraspinal muscles). The protuberant vertebrae is caused by lack of supporting muscle but also arthritic changes cause ‘bridging’ with reduced spinal flexibility.

The area may also feel slightly warm to touch.

Functionally, the pain may exhibit with reluctance for: working, running, jumping, or climbing stairs. Also they might begin to trip with a hind leg when stepping into the car or need a slight boost! They may demonstrate slowness while changing position from sit to stand. Since Great Pyrenees are a stoic breed, they often do not show outward signs of pain but performance and daily function is affected.

Dogs with lumbosacral stenosis move with the very characteristic posture of keeping the lumbosacral spine and hind limbs flexed or ‘down’ in the hind to decrease nerve root compression. While affected Pyrs do not exhibit as much the classic tucked-under posture as the German Shepard Dog, they do move with a newly noticed hind stiffness. In addition, prolonged standing causes the Pyr to be slightly more “down in the hind” than when younger. In contrast, the German Shepard Dog with this syndrome exhibits the *classic* lumbosacral stenosis posture of being *extremely* tucked (flexed) in the hind limbs and low back.
The slowly progressive symptoms include: hind limb weakness that can progress to total bilateral hind limb paralysis, knuckling with paw abrasion and gait sequence issues, tail weakness with eventual inability to lift tail, urinary and bowel incontinence. These are described in detail as follows:

**Hind leg muscle weakness** of the thighs, lower legs and buttocks is always initially noted. The reduction in motor or muscle strength contributes greatly to poor performance and inability to ‘drive’ forward utilizing the hind legs. The stride may be slightly choppy and shortened. Both hind legs are affected but one leg may be more affected with a one-inch or more reduction in measured circumference than the other leg. Initially, the subtle weakness is intermittent. They may hold one hind leg off the ground at times or suddenly bite/chew at their lower back or tail base (root signature). The weakness progresses to exercise intolerance with inability to walk or run as far and difficulty walking on slippery surfaces. Eventually, progression to ‘drunken sailor’ type walk (ataxia) with periodic falling is experienced. Finally, paralysis can occur.

**Knuckling** is inappropriate paw placement such that the top of the paw is placed on the ground at the late swing or strike phase of gait. Although the dog may maintain sensation, they are unaware of standing on the top of the paw rather than on the paw pad. This loss is called proprioception; essentially the dog does not know where the paw is ‘in time and space’. Early onset performance issues may be a manifestation of insecurity with paw placement and lack of confidence to perform the required task.

**Tail weakness** occurs as lumbosacral stenosis progresses and the muscles of the tail are weakened. The dog may also lack proprioception and sensation in the tail. These problems contribute to the dog not being able to lift the tail during urination and defecation.

**Bladder and bowel incontinence** is a late stage symptom and occurs when the pelvic muscles controlling urination and defecation are not properly innervated. The dog lacks the sensation to void or defecate until it is “too late” or may not have any sensation at all. Defecation may occur while the dog is sleeping or lying down. The problem is often complicated by inability, secondary to hind leg weakness, to posture appropriately to defecate or urinate.

**What Are My Treatment Options**

*Treatment & Veterinary Care*

The most common traditional treatment modalities for lumbosacral stenosis include: exercise reduction, use of non-steroidal anti-inflammatory (NSAIDs) medicines and glucosamine/chondroitin products (nutraceuticals). There are many NSAIDS and the veterinarian will help the owner make the best choice of medication with fewest side effects.

If symptoms are more advanced, the veterinarian will begin the medication prednisone, *short term*. Prednisone short term aggressively reduces inflammation and swelling in the lumbosacral area so symptoms often improve rapidly. One problem with *long-term* use of prednisone for dogs with lumbosacral stenosis is the muscle weakness and wasting that occurs over time. Since the hind legs, trunk/back and abdominal muscles are already compromised due to lumbosacral stenosis, prednisone can potentiate more weakness.
Prednisone also increases urinary frequency while on the medication. In the case of a dog with occasional incontinence related to the Syndrome, prednisone can increase the episodes of urinary incontinence with resulting urine scald. Fortunately this resolves when the medication is discontinued. The veterinarian and owner often feel “caught between a rock and a hard place” in making the best medication treatment decisions.

Middle-aged dogs that have severe neurological deficits, severe pain and progressive functional loss may be offered surgical options. X-rays and MRI precede surgery. Unfortunately, despite these advanced imaging techniques and procedures the clinical signs displayed do not always correlate with imaging findings.

The surgery is best described in detail by your veterinarian but most commonly involves removal of a portion of the L7 vertebrae (dorsal laminectomy) and stabilization with bone screws along with removal disc material (diskectomy). There is wide variation in reported success with the surgery; the range is between 64%-94%. In a recent study the overall success rate of military dogs returning to normal function was 41%-78%. Risk factors following surgery include: permanent hind limb paralysis and incontinence (bowel and bladder)

Additional commonly suggested veterinary treatments include chiropractic adjustments and acupuncture as well as Adequan injections.

Furthermore, although the success is controversial, many holistic vets suggest using gold bead implants that work on acupuncture sites when the dog is moving and also when you are doing massage.

Rehabilitation

Physical Rehabilitation is extremely beneficial and augments medical and postoperative management of lumbosacral stenosis. Many dogs, especially seniors, do not have spinal surgery (laminectomy) and are treated conservatively with short-term NSAID medication, nutraceuticals and rehabilitation with hydrotherapy. Most dogs demonstrate loss of gluteal, quadriceps and hamstrings muscles with one hind limb more affected. Initially; the thigh girth may be 1-3 inches smaller than the opposite side. All rigorous activity such as running, jumping and intense obedience work is stopped and dogs are started on a slow, graduated exercise program.

Therapy goals include: increasing hind limb strength and flexibility; increasing spinal flexibility with minimizing episodes of lumbosacral hyperextension; trunk and abdominal/core strengthening; improved proprioceptive awareness and weight control.

Dogs begin a slow gradual progression of exercises at a walk on flat surfaces and when strength/comfort improved he began mild, moderate hill walking as well as irregular surfaces and terrain (i.e. sand or taller grass). Sit to stand exercises and circles are added for hind leg strengthening. Gentle Theraball exercises are added for hind limb strength, abdominal (core) strengthening and trunk strengthening. Diet and any weight loss requirements are reviewed while working in conjunction with the veterinarian.

Proprioceptive and gait sequencing exercises include stepping over ground poles at the walk. This entails stepping over objects at various heights with equal spacing and also varied mixed
spacing of poles. Plank walking on the ground assists both balance/coordination and paw placement awareness.

Back flexibility is improved with low-grade lateral bending exercises such as figure 8 and serpentine walking. “Cookie exercises” are taught to increase all aspects of spinal flexibility. In these exercises, the dog tracks a cookie above their head, to their chest and eventually to the ribs and hips. Low-grade vertebral joint mobilizations are done during rehabilitation clinic visits to reduce pain and owners are taught to do these home as part of a home program. In addition, owners are trained to offer heat, back massage and PROM exercises at home.

Therapeutic Ultrasound (sound waves) to the paraspinal muscles and low back area is often utilized by a certified canine therapist. TENS (Trans-Electrical Nerve Stimulation) has been utilized for humans with low back pain and this treatment modality is gaining popularity with canine therapists also. Dogs tolerate these treatments well and often demonstrate improvement.

Swimming (Hydrotherapy) is initiated starting with low current and over time progresses to extremely high current. The designed swimming program works to develop abdominal core and trunk strengthening with high and low resistance work and serpentine patterns for spinal flexibility in the water with a hydro therapist. Massage, grade 1 and 2 joint mobilization and passive range of motion are performed with whirlpool in a warm water environment. Swimming offers no concussive forces to joints, including the vertebrae, so is an excellent form of strengthening and conditioning for dogs with this syndrome.

Swimming also greatly helps increase endurance, overall cardiovascular fitness and weight management.

With early medical and rehabilitative interventions, dogs can return to most normal functions and regain several inches of thigh muscle. Posturing improves such that dogs are much less “down in the hind” and move more easily from a lie to stand. They often resume stair walking and stepping up into the vehicles when transported. They enjoy running and playing again. Dogs presenting with advanced symptoms can also be treated and function improved but measures of improvement are smaller and the Syndrome stabilizes for shorter periods of time.

However, in all cases, lumbosacral stenosis is slowly progressive and despite medication and rehab treatments, the symptoms will eventually reoccur and worsen.

If dogs are maximally conditioned in a rehab program, the supporting muscles will retard disease progression better than in less conditioned dogs.

Therefore, with proper comprehensive care: veterinary, rehabilitation, home exercises, hydrotherapy and routine swimming, the progression may take several years. Many canine clients live for 5 years or more with the diagnosis and have full lives. often dying from another illness rather than hind limb paralysis.

**What Can I Do?**

**Prevention**

Most authorities believe that all large breed dogs will develop Lumbosacral Dysfunction (aka Stenosis) if they live long enough. Although that thought is daunting, there are some things you can do to prevent problems:
1. When selecting a puppy try to select the pup at 8 weeks when some experts believe conformation is close to what it will be as an adult. Select a puppy that has a straight top line and not a long back. The area to watch is the "loin" or distance on the back from the last rib to the front of the pelvic bone.

2. When selecting a breeder, ask about longevity of parents/ grandparents and the incidence of this problem in their line. If told "they died of old age" ask what the age was and what they died from (i.e. cardiac vs. hind end weakness). Also, ask to see some of the older dogs, ask their age and watch to see if they knuckle. Seeing this in a 6-7 year old Pyr is much more alarming than a 12 year old Pyr.

3. Begin back (trunk) and abdominal (core) exercises from the time Pyrs are puppies or young dogs. The best exercises for these youthful Pyrs are:
   
   A.) Sit and beg (rock back on haunches like a bear), hold the beg for several seconds and gradually increase this to 15-35 seconds> repeat 3-5 times.
   
   B.) Beg to stand on hind legs> reps 3-5 times. Most people think their Pyrs cant do this…nonsense! If a polar bear that weights 1000 pounds can do this why cant your Pyr! You are only limited by your ability to motivate your dog! Be creative. If they wont do more than one repetition, do one several times a day!
   
   C.) Roll over, teach to roll side to side. Puppies and young Pyrs do this easily and with joy. Add challenge by having them do a few rolls going up hill!
   
   D.) Teach your young Pyr to swim. Many Pyrs love water and with the right opportunities can be great swimmers. You might start with a life vest so they feel safe and walk in the water on the shoreline. Allow your Pyr to explore the water grasses, rocks etc. They will be swimmers in no time! Swimming uses trunk and core muscles not used on land.

   "If you don’t use it you lose it!” ALL Pyrs, regardless of age, should have at least 35 minutes of sustained exercise per day. This is best done by walking with them. If your aging Pyr cannot walk this far begin with 5-minute walks 2-3 times per day and slowly add 5 minutes per week, to one of the walks, until you reach their maximum potential.

4. From the first time you bring a Pyr into your life, Begin walking/hiking everyday. Walk-up as many hills as you can tolerate because this is the best exercise to gain hind strength! Hill walking is also good for core and trunk strength.

5. Consider periodic chiropractic adjustments for your Pyr’s lifetime by a person trained to work on dogs> either a veterinarian or chiropractor. Ask for credentials so no harm is done to your dog. Since this is a Syndrome related to abnormal movement of the lumbosacral joint, intuitively, Chiropractic care may improve alignment and reduce risk factors for developing Stenosis.
6. All Pyrs over age 4 should be on nutraceuticals—glucosamine and chondroitin to slow the progression of arthritis to joints including the spinal vertebrae.

7. Learn canine massage and treat your Pyr to routine massages and joint stretching. This will make your Pyr more flexible but also let you know if there are problems early on.

8. Watch the cookies!! Maintain a healthy weight and keep your Pyr slightly lean throughout their lifetime. This healthy weight is especially important as your Pyr ages. Studies show that obese dogs, on average, die at least 2 years sooner than normal weight dogs! Two years for a dog is really more like 14 years since they age at 7 to 1 compared to humans! Also, for the large breed dogs that commonly live shorter lives than small breed dogs, two years is a significant portion of their over-all life expectancy!

Any increase in abdominal fat weights the abdomen down in the direction of gravity, thereby adding significant low back strain.

9. If your Pyr demonstrates any symptoms of Lumbosacral Dysfunction or Stenosis seek medical and rehabilitative/hydrotherapy care immediately. Early treatment offers the best results!

For rehabilitation facilities near you, go to the web. look for: canine rehabilitation facilities and add your area. Be certain to check credentials and that practitioners are certified in the field of canine rehabilitation.

Most importantly, love and care for your Pyr everyday...we never know how long they will be with us. Hopefully, with this new information, you can give your Pyr a long, full, happy and healthy life well into their senior years!