

Differential Diagnostics for the Canine Lumbo-Pelvic Hip Region

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<ul style="list-style-type: none"> • Lumbar Spine Classifications: <ul style="list-style-type: none"> • Manipulation • Stabilization • Centralization • Stenosis • Neurodynamics 	<ul style="list-style-type: none"> • Pelvic Region / Sacroiliac Joints <ul style="list-style-type: none"> • Form Closure • Force Closure • Motor Control & Timing 	<ul style="list-style-type: none"> • Hip Pathology Classifications <ul style="list-style-type: none"> • Soft tissue • Joint • Osseous • Fractures / Dislocations • Nerve entrapment syndrome • Paediatric disorders
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Table 3. Differential Diagnoses for Lumbar Spine Lesions

Lesion	Clinical Signs	Test
Facet Joint Dysfunction	<ul style="list-style-type: none"> • Reduced athletic performance or postural adaptations • Human symptoms include referral of pain to the back, buttock, lower abdomen, groin, or legs.... so animals may display and exaggerated kyphosis (roach), excessive lordosis, spinal curvature or favouring a limb • Animal may groan to move, be slow to rise, avoid certain movements / activities (i.e. jumping into the car) • Human studies show a high correlation with lower limb sporting injuries (i.e. hamstring tears, ligament injuries, tendonopathies) 	<ul style="list-style-type: none"> • Unilateral epaxial muscle hypertrophy in an acute lesion or atrophy in a chronic lesion • Discomfort to direct dorso-ventral pressure over the spinous process • Discomfort to lateralized pressure to the side of the spinous process (often more painful in one direction than the other) • Discomfort to flexion testing • Hypomobility/Stiffness to mobility testing (i.e the ability of the joint to fully open or close properly)

Disc Lesion <ul style="list-style-type: none"> • In the region of Cord Segments 	<ul style="list-style-type: none"> • Antalgic posture • Avoidance behaviours • Slow to rise, displays of discomfort with certain activities • Neurological signs (if present) <ul style="list-style-type: none"> • Reduced coordination and/or balance on displacement • Scuffing • UMN bowel/bladder is more likely if lesion is cranial to L4 	<ul style="list-style-type: none"> • Very reactive on palpation of the spinous processes or adjacent soft tissues (L1 – L4/5) • Muscle spasms impede mobility testing (i.e. for facet joint stiffness) • Bilateral epaxial muscle spasms • Possibly poor balance on displacement • Possibly sluggish, slow, or diminished placing reflex • Possibility of a crossed extensor reflex (if lesion is cranial to L4) • Possibility of hyper-reflexia of
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	<ul style="list-style-type: none"> • LMN bowel and bladder is more likely if lesion is caudal to L4 	tendon/muscle reflexes
Disc Lesion <ul style="list-style-type: none"> • In the region of the Cauda Equina 	<ul style="list-style-type: none"> • Antalgic posture • Avoidance behaviours • Slow to rise, displays of discomfort with certain activities • Neurological signs (if present) <ul style="list-style-type: none"> • Reduced coordination and/or balance on displacement • Scuffing ➤ LMN bowel and bladder is more likely if lesion is caudal to L4 ➤ Depending upon severity of the damage and location caudal to L4, may presumably have paraesthesia (manifesting as off-loading of a limb, and/or licking and chewing, or a lick granuloma) ➤ Depending upon severity of damage and location caudal to L4, may have a root signature stance 	<ul style="list-style-type: none"> • Very reactive on palpation of the spinous processes or adjacent soft tissues (L5/L6 – L7/S1) • Muscle spasms impede mobility testing (i.e. for facet joint stiffness) • Bilateral epaxial muscle spasms • Possibly poor balance on displacement • Possibly sluggish, slow, or diminished placing reflex • Possibility of hypo-reflexia of tendon / muscle reflexes
Disc Degeneration	<ul style="list-style-type: none"> • Signs and symptoms are likely to look similar to a disc lesion affecting cord segments or the cauda equina 	<ul style="list-style-type: none"> • Discomfort to direct dorso-ventral pressure over the spinous process • Discomfort to lateralized pressure to the side of the spinous process (symmetrically affected) • Bilateral epaxial muscle atrophy • Depending upon severity and location, may show UMNL signs on testing if disc degeneration is cranial to L4 or LMNL signs if lesion caudal to L5
Muscle <ul style="list-style-type: none"> • Weakness of the abdominals • Atrophy of multifidus and epaxials 	Are muscle issues in the lumbar spine every primary? Not likely. <ul style="list-style-type: none"> • Weakness of the abdominals is often seen in association with a chronic lumbar spine dysfunction, sacroiliac joint 	<ul style="list-style-type: none"> • Abdominal weakness may display as an inability to hold the trunk and pelvis in a level position when one rear leg is slowly taken off the ground (which improves when the abdominal muscles are stimulated)

<ul style="list-style-type: none"> • Adaptive shortening of abdominals, psoas muscles and/or latissimus • Myofascial trigger points in iliocostalis, quadratus lumborum or iliopsoas • Facilitated muscle segments (affecting iliocostalis, & iliopsoas) 	<p>lesion, or in juvenile or adult dogs with poor body awareness and conditioning</p> <ul style="list-style-type: none"> • Adaptive shortening is more often associated with postural compensations for other pain or injuries (i.e. off-loading of a limb) • Myofascial trigger points are <u>primarily</u> activated by acute overload, overwork fatigue, direct impact trauma and by radiculopathy or <u>secondarily</u> by existing trigger points, visceral disease, arthritic joints, joint dysfunctions and by emotional distress. (Quadratus lumborum facilitation is found with suspected L/S instability) • Facilitated muscle segments may be the result of irritation to the nerve root at a particular vertebral level, causing excitation and a reactive spasm in the adjacent muscle or those peripheral muscles supplied primarily by the affected nerve root (Iliopsoas facilitation is often found with any form or lumbar spinal pain) 	<p>to contract)</p> <ul style="list-style-type: none"> • Adaptive shortening may be detected by stretching the associated muscles and comparing from side to side and to other muscle groups • Trigger points can be manually palpated and are felt to be tight, reactive, fibrous bands within a muscle • Facilitated muscle segments are often bilateral, and found to be hypertonic and painful on palpation. • Manual stimulation (i.e. massage) may increase the tone in the 'facilitated' muscle
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<p>Nerve</p> <ul style="list-style-type: none"> • Nerve root inflammation • Mechanical deformation &/or damaged nerve root • Irritation of dural sleeve • Movement impairment or adverse mechanical tension 	<ul style="list-style-type: none"> • Antalgic posture • Active movement dysfunction (i.e. poor cranial swing of the rear limb with sciatic nerve involvement) • Root signature stance or simple off-loading of a limb • Possible lick granuloma and/or licking or chewing at a limb 	<ul style="list-style-type: none"> • Adverse responses to neural tissue provocation tests which relate specifically and anatomically to the suspected nerve / nerve root. • Passive movement dysfunction (i.e. poor mobility or resistance throughout range to 'stretch hamstrings' for a sciatic nerve issue) • Pain on palpation of specific nerve trunks which relates specifically and anatomically to the suspected nerve/nerve root. • Evidence of a local cause for the neural tissue mechanosensitization disorder • Abnormal tendon reflexes (hyper or hypo-reflexes)
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<p>Bone</p> <ul style="list-style-type: none"> • Spondylosis • Osteophytes • Facet arthrosis 	<ul style="list-style-type: none"> • Spondylosis may manifest with no signs and symptoms or may appear just as a degenerative disc (with the symptomatic lesion being at a mobile site adjacent to the spondylosis) • Osteophytes are likely to present as a nerve lesion 	<ul style="list-style-type: none"> • Spondylosis will yield no movement (with a boney end feel) to any manual movement tests. • Osteophytes may be detected by placing the facet joints on the suspected side into full extension/compression (which might recreate the signs and symptoms of a nerve root impingement)
<p>Ligamentous</p> <ul style="list-style-type: none"> • Instability (i.e. spondylolisthesis and lumbosacral disc disease) • Poor dynamic muscle control (and excessive lordosis) • Ligamentous ‘creep phenomenon’ from prolonged postural positioning • Ligamentum flavum hypertrophy 	<ul style="list-style-type: none"> • Spondylolisthesis and L-S disc disease can demonstrate LMN lesion signs (described above in the cauda equina section) • Spondylolisthesis animals may be excessively lordotic or hold themselves in a kyphotic position to reduce discomfort associated with extension postures • Animals with poor muscle control may just appear clumsy and lacking in coordination, with or without exaggerated lordosis • While it is possible to experience ligamentous creep in a human, it may not be a causal factor in canine back pain. • Ligamentum flavum hypertrophy is likely to present just as a degenerative disc disease 	<ul style="list-style-type: none"> • Pain on palpation of the suspected vertebra, worsened with increasing pressure that creates extension • A chronic spondylolisthesis lesion will result in hypotonicity of the adjacent epaxial muscles • Exaggerated tail extension or hip extension (beyond the physiologic range of pure hip extension) may result in pain • Poor muscle control can be tested by challenging balance in stance and ambulation. • See degenerative disc disease for testing when suspecting ligamentum flavum hypertrophy

Table 5. Differential Diagnosis for a Sacroiliac Joint Lesion

Lesion	Clinical Signs	Tests
<p>Sacroiliac Joint Dysfunction</p>	<p>Not all of these signs may be present in all dogs with suspected SIJ dysfunction:</p> <ul style="list-style-type: none"> • Reduced athletic performance • ‘Crooked’ sitting • Slowness on walks • Exaggerated kyphosis / ‘tucking under’ of rear end 	<p>Human studies for SIJ dysfunction validate the use of a 3/5 rule for testing the SIJ. Proposed tests are as follows:</p> <ul style="list-style-type: none"> • Pain on palpation of the piriformis muscle • Pain on palpation of the dorsal SIJ ligaments • Presence of gluteal atrophy (if chronic) • Pelvic asymmetry • Asymmetric stiffness or hypermobility on translation tests (joint glides) or rotational

	<ul style="list-style-type: none"> • Yelp when getting up from lying • Gait alterations, mild off-loading of a limb, lameness, or root signature stance • May lick or chew at a limb or present with a lick granuloma 	<p>tests at the SIJs</p> <ul style="list-style-type: none"> • Specifics Tests <ul style="list-style-type: none"> ➢ Thigh thrust technique ➢ SIJ Distraction technique ➢ FABER test (flex, abd, ext rotation) of the hip • Trendelenburg sign (dropping of the pelvis/torso during a 3-leg stand)
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Table 6. Differential Diagnoses of the Canine Hip

Lesion	Clinical Signs	Tests
<p>Joint</p> <ul style="list-style-type: none"> • Hip Dysplasia 	<ul style="list-style-type: none"> • Juvenile dog • Reduced exercise tolerance • Slow to rise / lie down • Preference for sitting compared to prolonged standing • Bunny hopping gait • Poor coordination • Lameness after exercise • Audible click in hip with walking 	<ul style="list-style-type: none"> • Positive Barlow, Barden, & Ortolani test • Hips may click with balance on displacement • May have gluteal weakness & a Trendelenberg sign (see description above) • If painful: atrophied gluteals • If painful: pain on deep palpation of pectineus or deep gluteal muscles • If painful: pain to compress the joint (craniodorsally and/or medially) • If painful: pain on isolated hip extension and/or medial rotation
<p>Joint</p> <ul style="list-style-type: none"> • Osteoarthritis 	<ul style="list-style-type: none"> • May occur following trauma or developmental disease at any stage of life • Lame after resting, resolution after warm up, & lame again with too much exercise 	<ul style="list-style-type: none"> • May have gluteal weakness & Trendelenberg sign(see description above) • If painful: atrophied gluteals • If painful: pain on deep palpation of pectineus or deep gluteal muscles • If painful: pain to compress the joint (craniodorsally and/or medially) • If painful: pain on isolated hip extension and/or medial rotation
<p>Joint</p> <ul style="list-style-type: none"> • Legg-Calve-Perthes 	<ul style="list-style-type: none"> • Juvenile dog • Small or toy breed, Terrier, or Australian Shepherd • Gait alterations or lameness 	<ul style="list-style-type: none"> • Pain with hip ROM • Pain on hip joint compression • May have gluteal weakness and a Trendelenberg sign (see description above)

Table 6. Differential Diagnoses of the Canine Hip

Lesion	Clinical Signs	Tests
Muscle strain or tendonopathy	<ul style="list-style-type: none">• Lameness after resting, resolution after warm up, & lameness again with too much exercise• Gait alterations• In rare cases, LMNL neurologic signs	<ul style="list-style-type: none">• Pain on palpation• Pain to stretch (see table 7)• Pain to resist a muscle contraction or movement that uses the affected muscle• If neurologic involvement, LMNL reflexes• If neurologic involvement, adverse responses to neural tissue provocation tests which relate specifically and anatomically to the suspected nerve / nerve root.
Muscle imbalances <ul style="list-style-type: none">• Adaptive shortening• Myofascial trigger points• Weakness	<ul style="list-style-type: none">• Gait alterations• Adaptive postures• Distal limb injuries	<ul style="list-style-type: none">• Adaptive shortening may be detected by stretching the associated muscles and comparing from side to side and to other muscle groups• Trigger points can be manually palpated and are felt to be tight, reactive, fibrous bands within a muscle• Gluteal weakness may display as an inability to hold the trunk and pelvis in a level position when one rear leg is slowly taken off the ground (which improves when the gluteal muscles are stimulated to contract) = Trendelenberg sign