A cute low back pain is one of the most common conditions that presents to the primary-care physician’s office, perhaps only less often than the common cold in my experience. Estimates are that low back pain affects 80% of the population at some time in their lives.¹ This article will attempt to use classical vignettes to deal with the most common conditions related to the lumbar spine and sacroiliac that present to the primary-care physician’s office. The secondary intent of this article is to develop a systematic approach to history and physical examination of the lumbar spine and sacroiliac as we did for the hip to the toes.²⁻⁵ This will not be a comprehensive approach to all possible conditions inflicted on the lumbar spine and sacroiliac.

Anatomy Review

The lumbar spine is composed of five bones between the thoracic and sacral spine. These bones do not have the same support as their adjacent counterparts, for example the rib cage or pelvis. They do have multiple muscular and ligamentous supports like the paraspinal...
muscles and supraspinous/interspinous ligaments, which are prone to injury. The paraspinal muscles are actually composed of a multitude of muscles, which include the spinalis, the longissimus, the iliocostalis, the quadratus lumborum, the psoas major, and the iliacus (see Case 1). Intervertebral facet joints provide support for lumbar rotation and flexion/extension (see Case 2). These facets are found in the pars interarticularis; the bridge between the vertebral body and the posterior housing of the dorsal and lateral spines (see Case 3). Between each vertebrae lies the intervertebral discs, the “shock-absorbers” of the lumbar spine (see Case 4). The spinal cord and its neural tail, the cauda equina, are found within the spinal canal (see Case 5).6-9

The sacroiliac joint is the connection between the sacrum and the iliac of the pelvis (see Cases 6 and 7).6-9 The best analogy of this is an inverted lamp and shade, respectively. There are a few bony landmarks that are important for the lumbar spine and sacroiliac, as follows: the iliac crest, the posterior superior iliac spine (PSIS), the ischial tuberosity and the greater trochanter. Between the latter two lies the sciatic nerve.6-9

**History**

A detailed history is tantamount to accurate diagnosis. Ask for the main complaint (acute or chronic condition), time of onset, method, location, and description of injury, and severity of symptoms. Ask about the ability to weight bear immediately post injury and in the hours afterwards, and the effect on functional activities and gait. Ask about tingling, numbness, swelling, weakness, stiffness, skin or temperature changes. Ask about aggravating and alleviating factors. It is important to ask what the patient has tried for treatment and about effectiveness, especially chiropractic therapy, massage therapy, or herbal remedies. Ask about previous injuries or similar conditions and their respective treatments. As well, it is important to know about pre-existing musculoskeletal abnormalities, especially about distal joints including cervical and thoracic spine/ribs, and distally like the hip, pelvis, thigh, knee, leg, ankle, and foot. Finally, other medical conditions (like infectious, inflammatory, or congenital), medications, and family history are part of the complete evaluation.2-9 You
Physical Examination

Inspection

My approach to examination of the lumbar spine is similar to my examination of all of the lower extremity and starts with inspection while the patient is standing with shoes. Some patients with lumbar spine injuries come in with an unusual gait or a cane. The patient is instructed to remove socks and shoes and to stand facing me, then away. This allows evaluation of their balance, alignment, weight distribution, pedal arches, and observation for swelling, masses, joint effusions, bruising, and any changes in the skin. Deformities of bone or soft tissue are also noted. Remember to inspect all of the spine, from hips to feet and to compare both sides.

Range of Motion

The range of motion is evaluated with the patient standing facing me. Forward flexion, backward extension, lateral bending both to the right and left, and finally, rotation are evaluated. A quick test, whereby the patient is instructed to squat down and bounce two or three times if capable, demonstrates that the ankles, knees, and hips are free from pathology either associated with the back or of the lower extremity per se. The range of the motion can be further evaluated by getting the patient to toe raise, heel raise, hop and to bring each knee to the chest.

Palpation

The manual palpation starts with the patient standing and facing away from me. I start on both iliac crests and determine for balance or obliquity. This is an attempt to get my bearings, because the superior edges of the iliac crests line up horizontally with the L4-5 interspace. I then locate the dorsal spines of the lumbar spine and palpate each, moving superiorly from the thoracic/lumbar junction to the sacrum, inferiorly. The supraspinous and interspinous ligaments run midline and the paraspinal muscles lie just laterally. I go back to the iliac crests, and then move posteriorly to the PSIS, medially to
the sacroiliac joint and centrally to the spine of the sacrum and inferiorly to the coccyx. The greater femoral trochanters are both palpated and their respective heights compared. With the knee flexed forward, the sciatic nerve lies between the ischial tuberosity and the greater femoral trochanter.

The patient is then examined lying supine. I like to examine the anterior abdomen, the inguinal area and, if relevant, a rectal examination and/or anal wink (pinching the glans of the penis will produce a reflex anal sphincter contraction). The greater femoral trochanter and its associated bursa are palpated.

**Neurovascular**

The anterior thigh (L1-3/anterior femoral cutaneous), the lateral thigh (L2-3/lateral femoral cutaneous), medial knee to the medial malleolus (L4/saphenous), the lateral knee to the first toe medial edge(L5/superficial peroneal), and the posterior thigh (S2/posterior femoral cutaneous) are tested for pinprick. As well, specific neurologic level muscle strength involvement follows the following pattern: L4 — tibialis anterior (ankle inversion), L5 — extensor hallucis longus (big toe dorsiflexion), and S1 — peroneus (ankle eversion). The peroneal region around the anus involves dermatomal regions S3 to S5. Back extension, flexion, lateral flexion, and rotation are tested for muscle strength. The knee reflex (L4), the Achilles’ reflex (S1), and Babinski (upper motor nerve) are tested.6-10

**Special Tests**

The special tests include, if indicated, the following:

**Valsalva** — The patient is instructed to bear down as if going for a bowel movement. If this illicits radiating pain, then the test is positive for interthecal pressure and associated neural radiculopathy.6-10

**Straight Leg Raising Test** — The patient lies supine with the legs extended. The examiner places one hand under the heel of the affected leg and slowly flexes the thigh on the pelvis. If this maneuver is markedly limited due to radiating pain then the test is positive for stretching the sciatic nerve/spinal cord.6-10 A further refinement to this test is the Bowstring, in which the affected leg is slightly lowered and then the ankle dorsiflexed to recreate radicular pain of stretching the sciatic nerve/spinal cord.6-10

**Lasègue Test** — The patient lies supine with legs extended. The examiner places one hand under the heel of the affected leg and the other hand on the knee, and flexes the thigh on the pelvis while the knee is flexed. The examiner slowly extends the knee, while the leg is elevated. If this maneuver is markedly limited due to pain, the test is positive for stretching the sciatic nerve/spinal cord.6-10
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Knee to Shoulder Test — While the patient is in the supine position, the examiner fully flexes the patient’s knee and hip and then adducts the hip. The knee is moved toward the patient’s opposite shoulder. Pain in the sacroiliac joint indicates a positive test.6-10

Hibb’s Test — While the patient is in the prone position, the examiner stabilizes the pelvis on the nearest side by placing one hand firmly on the dorsum of the iliac bone. With the other hand around the patient’s ankle, the opposite knee is flexed to a right angle. The knee is flexed to its maximum without elevating the thigh from the table. From this position, the examiner slowly pushes the leg laterally, causing strong internal rotation of the femoral head. The test is positive if there is pelvic pain signifying sacroiliac disease.6-10

Yeoman’s Test — The patient is lying prone. With one hand the examiner applies firm pressure over the suspected sacroiliac joint, fixing the pelvis to the table. With the other hand, the examiner flexes the patient’s leg on the affected side and hyperextends the thigh by lifting the knee off the table. If the pain is increased in the sacroiliac area, this indicates a sacroiliac lesion.6-10

Trendelenberg and Leg Length Discrepancy — While standing behind the patient, the physician asks him/her to stand on one leg. Normally, the gluteus medius on the supported side contracts and prevents the unsupported side from dropping below level. If the unsupported side drops, the patient is Trendelenburg positive.

Case 1
Muscular low back pain
A 38-year-old plumber presented with persistent, localized back pain from an acute injury at work the previous day. His mobility was restricted in all planes secondary to pain. His symptoms were reduced with lying down, but upon waking he was so stiff and in pain that he dared not move. He had no symptoms of numbness, tingling, or weakness, just pain. On examination, he had a stooped posture with bent knees, significant paraspinal muscle tenderness and spasm, reduced active range of motion, and normal neurologic findings. There was no bony tenderness. There were no indications for X-ray. It was recommended he use ice on the low back area tid, anti-inflammatories and a few simple stretching exercises. Chiropractic management provided some pain relief and reduced muscular spasm.11 Finally, given the recurrent rate of muscular low back pain to be as high as 50% an appropriate daily conditioning and strengthening program was prescribed.12 It took him almost eight weeks to recover fully.
Case 3

**Spondylolysis and spondylolisthesis**

A 13-year-old Division 1 gymnast complained of left lower back pain over many months of training. She would take a few days off and then return to her extensive training program. Her specialty was tumbling and the balance beam. Many people commented on her incredible hyperextension ability and height of her jumps. This time, her low back pain seemed to radiate into her left buttock. On examination, she presented with a short stride and wider than normal-based gait. Her hamstrings on the left side seemed to be tighter than her right side. She was tender to palpation on the left lateral edge of her L5. She had an equivocal straight leg and Lasègue's on the left side with slightly reduced pinprick on the left lateral leg. The X-ray was fortunately obvious for spondylolysis of the left pars interarticularis and a grade 2 (less than 50% forward displacement of the L5 on S1) spondylolisthesis so we did not have to do a bone scan or CT scan. She required heat, massage, anti-inflammatories, bracing, cessation of all active sports participation for three weeks and active rehabilitation over the next two months. She missed the nationals that year but recovered enough to return the next. The critical point is to remember that persistent back pain in an active adolescent is a pars defect until proven otherwise.

Case 2

**Facet joint syndrome**

A 23-year-old weightlifter presented with an acute onset lower back pain that was worse with standing and better with rest. He had never had back trouble and prided himself in his intensive back and abdominal workouts. On examination, he had tenderness with extension of his back, tenderness lateral to midline at L4 not along the dorsal spine, and normal neurological findings. X-rays were not necessary. The treatment plan involved chiropractic manipulation, ice, and anti-inflammatories, and an awareness of repetitive hyperextension as a precipitant to this condition. He rebounded within weeks.
**Case 4**

**Herniated lumbar discs**

A 42-year-old RCMP officer presented with a three-day history of numbness in the lateral aspect of her right leg, accompanied by a burning pain and weakness that began after struggling with a very heavy man. Her symptoms were worse with coughing and/or sneezing, and when standing or sitting for longer than 15 minutes. Her best position was lying on her left side in the fetal position. On examination, she had tenderness of her right calf muscle and in the sciatic nerve region of the right buttock, weakness of her right peroneus muscle, decreased sensation on the lateral right leg, increased right ankle reflex, and positive straight leg raise, Bowstring, Valsalva, and Lasègue’s on the right. The AP, lateral, and oblique views were all normal. She was recommended to spend only 48 hours in bed (to prevent long-term muscular deconditioning), use ice therapy, anti-inflammatories, and gentle extension and flexion exercises, according to the McKenzie and Williams’ approach. She responded favourably over two months.

**Case 5**

**Cauda equina syndrome**

A 20-year-old varsity football defensive lineman presented with an acute onset of progressive right leg pain, difficulty voiding, and perineal numbness. On examination, he had right lower extremity weakness and numbness, hyperreflexia of his right ankle jerks, and an absent anal wink reflex. He was in so much discomfort that we could not proceed any further with the exam. This is a medical emergency that requires urgent decompression. A computer tomography (CT) scan confirmed the diagnosis.
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Case 6

Sacroileitis
A 16-year-old fencer presented with a nagging right buttock and lower back ache for over three months. He had tried everything he could to help his problem, as follows: chiropractic adjustments, massage, stretching exercises, physiotherapy, anti-inflammatories and ice. These all seemed to help temporarily. On examination, he was right leg dominant and had very tight hamstrings (the right was worse than the left) and increased lumbar lardosis. There was obvious tenderness of the right sacroiliac joint with associated paraspinal muscle spasm. Both Hibb’s, knee to shoulder and Yeoman’s were positive. As well, there was a true leg length discrepancy of 1 cm shortening of his right leg. The last finding is what prevented him from recovering fully — the precipitating factor was not solved. Once an orthotic with an appropriate lift was prescribed along with hamstring stretches, the case resolved completely.

Case 7

Ankylosing spondylitis
Upon doing a pre-participation evaluation at a local high school, I came across a 17-year-old male who complained of a chronic vague lower back ache and stiffness in the morning. On examination, he had a limited back flexion and extension. There was mild tenderness at both sacroiliac joints. He had only a positive Yeoman’s test bilaterally. On suspicion, I sent him for X-rays which confirmed the diagnosis. The main course of therapy was awareness, education, anti-inflammatories prn, and back extension exercises.
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Summary

Lumbar spine and sacroiliac injuries are very commonplace, but require the same attention to diagnosis and management to ensure adequate long-term healing. The above classical vignettes were used to illustrate the common conditions that present to the primary physician's office. In an effort to simplify and not confuse, the terminology and nomenclature was maintained throughout article. All possible conditions were not included. The second intention of this article and series is to develop a systematic approach to history and physical examination of musculoskeletal conditions which will assist in focusing the reader’s differential diagnosis.

References