

## DEFINITION

- Pain between the costal angles and gluteal folds that may radiate down one or both legs (sciatica).
- Back structures that can be a source of pain are muscles, ligaments, vertebral bones, facet joints, intervertebral disks, nerve roots, and muscles.
- Acute low back pain (LBP) is often nonspecific and therefore cannot be attributed to a definite cause. However, possible causes of acute LBP (e.g., infection, tumour, osteoporosis, fracture, inflammatory arthritis) need to be considered based on the client's history and physical examination.

## IMMEDIATE CONSULTATION REQUIRED IN THE FOLLOWING SITUATIONS

- Possible fracture
  - Major trauma
  - Minor trauma in older clients, clients who may have osteoporosis, and/or those who are on chronic corticosteroids
- Possible cauda equina syndrome (surgical emergency)
  - Usually due to a tumour or a large disk herniation
  - Saddle anesthesia (e.g., loss of sensation in perineal area)
  - Bladder dysfunction, bowel dysfunction
  - Severe or progressive neurologic dysfunction in the legs
  - Laxity of anal sphincter
  - Major motor weakness in quadriceps (knee extensors), ankle plantar flexors, evertors and dorsiflexors (foot drop)
  - Bilateral sciatica
- Possible tumour or infection
  - Client < 18 or > 50 years of age
  - History of cancer (known or unknown) - check breasts, prostate, and lymph nodes
  - Constitutional symptoms such as fever, chills, and/or unexplained weight loss
  - Risk factors for spinal infection (e.g., recent bacterial infection, injection drug use, indwelling catheter, or immunosuppression)
  - Pain that is worse in the supine position or severe night time pain
  - Pain not better after one month of treatment

**LOW BACK PAIN ADULT & PEDIATRIC**

- Acute neurologic deficits (potentially spinal cord compression) that progress or are severe
- Possible herniated nucleus pulposus
  - Straight leg raise positive at < 60 degrees (shooting leg pain must be elicited)
  - Weak dorsiflexion of ankle or great toe
  - Decreased ankle reflex
  - Decreased light touch in dermatomes of foot/leg (L4, L5, S1)
- Possible referred pain
  - Abdominal aortic aneurysm
    - Abdominal discomfort, pulsatile abdominal mass

**CAUSES**

- Contusions
- Ligamentous strain
- Muscular strain
- Muscular tension related to mechanical stress
- Osteoarthritis of spine
- Protruding intervertebral disk

**PREDISPOSING AND RISK FACTORS**

- Aging
- Prolonged periods of standing or sitting
- Poor posture
- Pregnancy
- Smoking
- Obesity
- Female gender
- Improper lifting techniques
- Family history
- Osteoporosis
- Past trauma
- Psychologically or physically strenuous work
- Limited education
- Job dissatisfaction

**LOW BACK PAIN ADULT & PEDIATRIC**

- Psychological conditions (e.g., anxiety)
- Repetitive activities involving the low back (e.g., snow shovelling)

**HISTORY**

- Obtain a detailed history, with a precise description of the pain (e.g., location, duration, severity, radiation) and events surrounding its onset (e.g., activity at the time).
- Enquire:
  - if pain is:
    - back dominant
    - leg dominant
  - if pain is constant or intermittent
  - about sensory changes (numbness, tingling, pins and needles)
  - about changes to/or loss of bladder or bowel function
  - about aggravating and relieving factors
  - about previous back treatments or surgery
  - about the level of disability:
    - no limitations
    - mild limitations - able to do most activities with minor modifications
    - moderate limitations - able to do most activities with modification
    - severe limitations - unable to perform most activities
  - about other underlying spinal, disk, bone, or joint disease (e.g., spinal stenosis, osteoarthritis)
- Perform a brief psychosocial assessment to determine chronicity risk factors include depression, passive coping strategies, job dissatisfaction, higher disability levels, disputed compensation claims, somatization, and catastrophization.
- Enquire about symptoms consistent with those identified in the Immediate Consultation Required in the Following Situations section.

**PHYSICAL FINDINGS**

- Client appears in mild to severe distress.
- Refer to Appendix A for sequencing of exam for client presenting with LBP and additional information on physical exam findings.

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LOW BACK PAIN ADULT & PEDIATRIC

- Evaluate for symptoms consistent with those identified in the Immediate Consultation Required in the Following Situations section.
- Movement:
  - Range of motion to determine if pain elicited and with which movement, flexion, or extension
- Irritative test:
  - Bilateral straight leg raise
    - Test for radicular pain arising from nerve root irritation (L4-S2) and is positive only in clients with leg-dominant pain (the test is only positive if it recreates the leg pain)
  - Bilateral femoral stretch test
    - Extension of the hip in the prone client; anterior thigh (L2–3) or medial leg (L4) pain indicates disc herniation at the levels indicated
- Low motor function
  - Saddle sensation
  - Rectal exam (if saddle sensation abnormal or loss of bladder/bowel control)
    - Abnormal result suggests possible cauda equina syndrome.
- Plantar response
  - Flexor
    - Normal response
  - Extensor (positive Babinski reflex)
    - Abnormal
      - This upper motor finding demands a more detailed neurological workup as it negates the diagnosis of mechanical LBP and is incompatible with any of the four patterns of pain.
- Reflex (conductive) Tests (Deep Tendon Reflexes)
  - Patella reflex (L4)
  - Achilles reflex (S1)
- Motor (conductive) Tests
  - Ankle dorsiflexion (L5)
  - Hip Abductor (L5)
  - Extensor Hallucis Longus (L5)
  - Flexor Hallucis Longus (S1)
  - Gluteus Maximus (S1)

**LOW BACK PAIN ADULT & PEDIATRIC**

- Additional information on how to perform the motor conductive tests is found in Appendix B.

**DIFFERENTIAL DIAGNOSIS**

**Mechanical LBP**

- More than 90% of back pain clients have benign mechanical problems and their pain can be classified into 4 distinct patterns: 2 back-dominant patterns and 2 leg-dominant patterns.
  - Pattern 1: Back dominant pain aggravated by flexion
    - Pain may be constant or intermittent, felt most intensely in the back, buttock, over the trochanter, or in the groin.
    - Pain is always present during anteflexion (Pattern 1) and may be present during dorsiflexion (Pattern 1 or resistant).
    - Neurological exam is normal or non-contributory.
  - Pattern 2: Back dominant pain aggravated by extension
    - Pain is always intermittent, felt most intensely in the back, buttock, over the trochanter, or in the groin.
    - Pain is never intensified with flexion.
    - Neurological exam is normal or non-contributory.
  - Pattern 3: Constant leg dominant pain
    - Pain is always constant and felt most intensely below the gluteal fold above or below the knee.
    - Neurological exam must be positive for either an irritative test or a newly acquired focal conduction deficit.
  - Pattern 4: Intermittent leg dominant pain aggravated by activity
    - Pain is always intermittent and felt most intensely below the gluteal fold above or below the knee.
    - Pain is brought on by activity and relieved by rest in flexion.
    - Neurological exam negative with client at rest.
    - Generally found in clients > 50 years of age, often associated with degenerative changes of the spine.
- Pain disorder
  - Pattern 5: Pain Disorder

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Intrinsic to spine

- Compression fracture
  - History of trauma (unless osteoporotic), point tenderness at spine level, pain worsens with flexion and while pulling up from a supine to sitting position, and from a sitting to standing position
- Herniated nucleus pulposus
  - Leg pain is greater than back pain and worsens when sitting; pain from L1-L3 nerve roots radiates to hip and/or anterior thigh, pain from L4-S1 nerve roots radiates to below the knee
- Spinal stenosis
  - Leg pain is greater than back pain; pain worsens with standing and walking, and improves with rest or when the spine is flexed; pain may be unilateral (foraminal stenosis) or bilateral (central or bilateral foraminal stenosis)
- Spondylolisthesis
  - Leg pain is greater than back pain; pain worsens with standing and walking, and improves with rest or when the spine is flexed; pain may be unilateral or bilateral
- Spondylolysis
  - Can cause back pain in adolescents, although it is unclear whether it causes back pain in adults; pain worsens with spine extension and activity
- Spondylosis (degenerative disk or facet joint arthropathy)
  - Similar to lumbar strain; disk pain often worsens with flexion activity or sitting, facet pain often worsens with extension activity, standing, or walking

Systemic

- Connective tissue disease
  - Multiple joint arthralgias, fever, weight loss, fatigue, spinous process tenderness, other joint tenderness
- Inflammatory spondyloarthropathy
  - Intermittent pain at night, morning pain and stiffness, inability to reverse from lumbar lordosis to lumbar flexion
- Malignancy
  - Pain worsens in prone position, spinous process tenderness, recent weight loss, fatigue
- Vertebral diskitis/osteomyelitis

**LOW BACK PAIN ADULT & PEDIATRIC**

- Constant pain, spinous process tenderness, often no fever, normal complete blood count, elevated erythrocyte sedimentation rate and/or C-reactive protein level

**Referred**

- Abdominal aortic aneurysm
  - Abdominal discomfort, pulsatile abdominal mass
- Gastrointestinal conditions: pancreatitis, peptic ulcer disease, cholecystitis
  - Abdominal discomfort, nausea/vomiting, symptoms often associated with eating
- Herpes zoster
  - Unilateral dermatomal pain, often allodynia, vesicular rash
- Pelvic conditions: endometriosis, pelvic inflammatory disease, prostatitis
  - Discomfort in low abdomen, pelvis, or hip
- Retroperitoneal conditions: renal colic, pyelonephritis
  - Costovertebral angle pain, abnormal urinalysis results, possible fever

**COMPLICATIONS**

- Chronic or recurrent back pain
- Absenteeism from work
- Dependency on or abuse of opioid analgesics
- Occupational disability

**INVESTIGATIONS AND DIAGNOSTIC TESTS**

- In the absence of any symptoms consistent with those identified in the Immediate Consultation Required in the Following Situations section, no investigations are needed within the first 4 weeks of acute LBP.
- Referral to a physician for evaluation of clients using MRI (preferred) or CT only when they have persistent LBP and signs or symptoms of radiculopathy or spinal stenosis.

**MAKING THE DIAGNOSIS**

- The diagnosis is usually made clinically based on the health history and physical exam.

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## MANAGEMENT AND INTERVENTIONS

### Goals of Treatment

- Relieve pain
- Promote rapid recovery and prevent chronicity
- Prevent further injury
- Prevent or reduce work absence
- Educate and reassure the client

### Appropriate Consultation

- Presentation consistent with those identified in the Immediate Consultation Required in the Following Situations section.
- Consult a physician/RN(NP) if the client's pain is not appropriately managed with acetaminophen and/or non-steroidal anti-inflammatory drugs (NSAIDs).

### Non-Pharmacological Interventions

- Treat clients with uncomplicated acute LBP conservatively and follow them closely if there are no emergency indicators of deteriorating neurologic function (even if sciatica is present). The Primary Care Provider Treatment Algorithms developed by the Saskatchewan Spine Pathway provide guidance in regards to initial management. Refer to the Government of Saskatchewan (2015b) website <http://www.sasksurgery.ca/provider/spine.html> for the specific documents for Patterns 1 through 4.
- Provide Saskatchewan Spine Pathway client education handout based on diagnosis. Refer to the Government of Saskatchewan (2015b) website <http://www.sasksurgery.ca/provider/spine.html> for the specific exercises for Patterns 1 through 4.
- Bed rest should be discouraged as it may actually increase pain and slow recovery; clients should be encouraged to continue activities of daily living as soon as possible and be reassured that pain on ambulation is not related to permanent damage.
- Return to work as soon as feasible (e.g., office workers may be able to return sooner than manual labourers); arrange return to modified duties if available and/or necessary.

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- Use a heating pad or hot water bottle to reduce muscle stiffness, pain, and spasm.
- Provide advice about nutrition and weight loss if client is overweight.
- Clients should be advised to avoid:
  - Prolonged standing
  - Prolonged sitting
  - Bed rest
  - Lifting > 11 kg (25 lbs)
  - Lifting and twisting motions
  - Slumping posture
- Clients should be encouraged to:
  - Change position frequently
  - Maintain normal spine alignment when sitting or standing
  - Use proper lifting techniques
- For clients who do not improve with self-care, consider adding non-pharmacologic therapy with proven benefits including:
  - Spinal manipulation
  - Intensive interdisciplinary rehabilitation
  - Exercise therapy
  - Acupuncture
  - Massage therapy
  - Yoga
  - Cognitive behavioral therapy
  - Progressive relaxation for chronic or subacute LBP

**Pharmacological Interventions**

- Analgesics to relieve back pain:
  - Ibuprofen (Advil, Motrin) 400-600 mg orally qid prn for 2-4 weeks  
Or
  - Naproxen (Naprosyn) 375-500 mg orally bid prn for 2-4 weeks  
Or
  - Acetaminophen (Tylenol) 650-1000 mg orally q4-6h (maximum dose 4 g/day)

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- Do not use ibuprofen or naproxen if there are contraindications to the use of aspirin or NSAIDs (e.g., allergy to aspirin or NSAIDs, peptic ulcer disease, chronic renal disease or renal dysfunction).
- Non-benzodiazepine muscle relaxants
  - Beneficial in the treatment of acute LBP. Most pain reduction from these medications occurs in the first 7-14 days and is thought to be related to their sedative properties.
    - Cyclobenzaprine (Flexeril) 5-10 mg orally tid
    - Or
    - Baclofen 5-10 mg orally tid
- If pain is moderate to severe, or if first-line agents are contraindicated, poorly tolerated or fail to control discomfort, consult a physician/RN(NP).

**Client and Caregiver Education**

- Counsel client/caregiver about appropriate use of medications (dose, frequency, compliance, etc.).
- Educate client on symptoms of neurological deterioration that require immediate assessment.
- Educate about the importance of maintaining as much activity as possible and to not use bed rest unless there is a period of severe symptoms.
- Discuss the aim to return to productive function at home and work (even if the pain is not completely resolved).
- Yoga, pilates, acupuncture, spinal manipulation, physiotherapy and massage therapy may be helpful for clients interested and with access to these modalities.
- Physical therapist-directed home exercise programs for acute back pain can reduce the rate of recurrence, increase the time between episodes of back pain, and decrease the need for health care services.

**Monitoring and Follow-Up**

- Arrange follow-up at 1-2 days and then every 2 weeks until client has recovered.
- Refer to a physician/RN(NP) if symptoms persist after 6 weeks or sooner if symptoms are worsening despite conservative treatment.
  - Referral to a Saskatchewan Spine Pathway Clinic will be considered based on Pattern.

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**Referral**

- Presentation consistent with those identified in the Immediate Consultation Required in the Following Situations section.
- Refer to a physician/RN(NP) if symptoms persist after 6 weeks or sooner if symptoms are worsening despite conservative treatment.

**DOCUMENTATION**

- As per employer policy

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### **Appendix A**

#### **Sequencing of the Exam**

- Combining information from the history with the findings of the physical examination, the clinician has the ability to rule out a number of potentially grim diagnoses.
- Sequence of exam should progress from tests best done standing to tests done kneeling, then to those done sitting (first on a chair and then on the examining table), and finally lying down, supine and prone.

#### **Additional Information on Findings**

- Direct nerve root irritation is uncommon but, when it occurs, 90% involves L4, L5, or S1 (including L3, the percentage increases to nearly 96%) so the neurological tests emphasize these levels.
- With back-dominant referred pain, one test for each nerve is generally sufficient.
- Clients with leg-dominant radicular pain may require a more detailed assessment.
- Intermittent back-dominant pain eliminates malignancy and active infection as causes of the pain.
- Normal upper motor tests rule out a cord lesion as the source of the symptoms. Unchanged bowel and bladder function, normal saddle sensation, and no crossover on straight leg raise remove the possibility of cauda equina syndrome.

**Appendix B**  
**Performing Motor Conduction Tests**

<b>Test</b>	<b>How to Perform</b>	<b>Findings</b>
Ankle dorsiflexion (L5)	The client walks on heels only while avoiding contacting the floor with the forefeet, using the examiner's hands for balance as needed.	Inability to maintain the forefoot off the ground is a positive result.
Hip Abductor (L5)	The client is positioned in side-lying with the asymptomatic limb against the table surface and the symptomatic thigh abducted to 30° from horizontal. The client maintains the abducted position as the examiner applies an adduction force. While standing, have the client take a step. During the step, instead of the pelvis being raised on the side of the lifted foot, it drops. Thus it is seen as the client's pelvis tilting towards the lifted foot, with much flexion needed at the knee on the affected side in order for the foot to clear the ground. Note that the lesion is on the contralateral side to the sagging hip.	Weakness may contribute to lumbar pain due to abnormal segmental movement of the lumbar spine if the pelvis is not stable during gait or standing.
Extensor Hallucis Longus (L5)	The client fully dorsiflexes the great toe and maintains this position as the examiner applies a plantarflexion force.	Weakness or inability to maintain dorsiflexion of the great toe would be a positive finding.
Flexor Hallucis Longus (S1)	The client stands on one foot while flexing the contralateral knee, while holding the examiner's hands or a countertop for balance. The client plantar-flexes the ankle, raising the heel of the supporting limb off the floor to maximal plantar-flexion.	Inability to perform ten successive heel raises is a positive result.
Gluteus Maximus (S1)	Client performs lateral rotation of the upper leg and extension of the thigh at the hip.	Impairment would reveal difficulty lifting out the leg to the side, making the thigh extend straight at the hip and twisting the thigh away from the centre of the body.

# SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

## RNs WITH ADDITIONAL AUTHORIZED PRACTICE CLINICAL DECISION TOOL DECEMBER 1, 2016

### LOW BACK PAIN ADULT & PEDIATRIC

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