

Lumbar Spine Movement Coordination Deficits

ICD-9-CM code: 846.0 Lumbosacral ligament sprain

ICF codes: Activities and Participation Domain code: **d4159** Maintaining a body position, unspecified

Body Structure code: **s76002** Lumbar vertebral column

Body Functions code: **b7601** Control of complex voluntary movements

Common Historical Findings:

Trauma, such as a vehicular accident

Bending/twisting strain

Pain with sustained, end-range postures - relief with position change

Common Impairment Findings - Related to the Reported Activity Limitation or Participation Restrictions:

Pain worsens with sustained positions that put an end range strain on the involved structures

Segmental hypermobility with manual examination procedures such as posterior-to-anterior pressures over the lumbar spinus processes

Physical Examination Procedures:



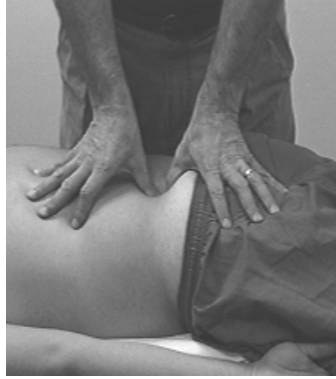
Overpressure in Flexion

Performance Cues:

Intensity of symptoms in mid-range position are compared with sustained end-range positions

With high level of symptoms - gentle overpressures will reproduce complaints

With low level of symptoms - strong, sustained overpressures are required to reproduce the complaints



Central Posterior-to-Anterior Pressures

Performance Cues:

Localize pressure to one spinus process

Assess amount of mobility and resistance to the manually applied pressure

Assess for the presence of pain, type of pain with regards to the patient's reported symptoms, and the relation of the onset of the pain to the onset of resistance

Lumbar Spine Movement Coordination Deficits: Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with the vernacular term "Lumbar Instability or Lumbar Ligament Strain"

Description: A sprain is a stretch and/or tear of a ligament, the fibrous band of connective tissue that joins the end of one bone with another. In the lumbar spine, ligaments produce pain when they are held at end range. An abnormal end range stress to a lumbar ligament for a short period of time will produce pain. Or, a normal end range stress held for an abnormal amount of time will produce pain. And thirdly, a normal stress for a short period of time to abnormal tissue will also produce pain. These stress/time relationships help define Robin McKenzie's classification of Postural Syndrome and Dysfunction Syndrome. The outer fibers of the annulus fibrosis serve the same physiological function as other ligaments of the lumbar spine (such as the posterior longitudinal ligament, interspinous ligaments, or supraspinus ligaments). Thus, abnormal stresses to the annulus fibrosis may be the actual tissue that is the source of the low back pain for many patients within this diagnostic category. In any case, the intervention is essentially the same – avoid the end range, pain-producing positions.

Etiology: Lumbar ligaments are "sprained" secondary to 1) trauma, bending / twisting, and 2) sustained end ranges postures or positions, such as prolonged sitting. Most of the ligaments of the lumbar spine, as well as the annulus fibrosis, function to limit anterior shearing with forward bending. Thus, forward bending positions appear to be the most pain producing positions for patients with ligament disorders.

Acute Stage / Severe Condition: Physical Examinations Findings (Key Impairments)

*ICF Body Functions code: **b7601.3** SEVERE impairment of motor control/coordination of complex voluntary movements*

- Pain limits movements into end ranges of motion of the lumbar spine – especially flexion
- Central posterior-to-anterior pressures onto the involved segment reproduce the patient's symptoms
- Guarding/hypertonicity of the muscles adjacent to the involved segment
- Proprioceptive deficits (i.e., inability to single leg stand with eyes closed)
- Poor trunk control – including poor control of the muscles that stabilize the involved lumbar spine segment(s) (i.e., multifidus and transversus abdominus)
- Muscle flexibility deficits in regions above and below the lumbar spine (that result in excessive compensatory movement taking place at the lumbar segments)
- Nerve mobility deficits in regions adjacent to the lumbar spine

Sub Acute Stage / Moderate Condition: Physical Examinations Findings (Key Impairments)

*ICF Body Functions code: **b7601.2** MODERATE impairment of motor control/coordination of complex voluntary movements*

As above with the following differences

- Manual overpressure movements into end ranges of motion of the lumbar spine – especially flexion – reproduce symptoms. Symptoms are eased when overpressure is relieved

Settled Stage / Mild Condition: Physical Examinations Findings (Key Impairments)

*ICF Body Functions code: **b7601.1** MILD impairment of motor control/coordination of complex voluntary movements*

As above with the following differences

- Sustained postures held at end ranges of motion of the lumbar spine – especially flexion – reproduce symptoms. Symptoms are eased when the patient repositions him/herself into a more neutral position.

Intervention Approaches / Strategies

Acute Stage / Severe Condition

Goals: Decrease pain

Ability to stabilize lumbar spine during basic daily activities, such as transitional movements

- Physical Agents

Cold pack
Electric stimulation

- External Devices (Taping/Splinting/Orthotics)
Consider using taping or a brace or issue a lumbar roll to remind the patient to maintain his/her lumbar spine neutral positions during daily activities and limit forward bending
- Re-injury Prevention Instruction
Take caution to avoid end range positions that reproduce the symptoms
Patient education in correct posture, body mechanics and ergonomics.
- Therapeutic Exercises
Directionally biased, repetitive end-range movements if required for centralization of symptoms
Trunk isometric exercises in neutral positions (e.g., abdominal sets, back extensor sets) and maintenance of the contractions during transitional movements such as supine-sit, and sit-stand
Aquatic therapy
Lumbar segmental contract/relax (muscle energy techniques) as appropriate for symptom reduction.
Initiate stretching exercises to muscles (e.g., hamstrings) with flexibility deficits.

Sub Acute Stage / Moderate Condition

Goals: Increase trunk strength
Increase activity tolerance

- Approaches / Strategies listed above
- Therapeutic Exercises
Add resistance to trunk isometric exercises in neutral positions (e.g., leg sliding, leg lowering, bridging, quadruped alternate arm/leg lifts)
Initiate proprioceptive exercises (e.g., single leg standing with a neutral foot positions)
Promote participation in aerobic conditioning exercises (e.g., walking)

Settled Stage / Mild Condition

Goals: As above
Increased tolerance to perform lumbar flexion activities

- Approaches / Strategies listed above

- Therapeutic Exercises
 - Progress resistance to trunk isometric and isotonic exercises in neutral or near-neutral positions
 - Progress proprioceptive exercises
 - Progress in aerobic conditioning
 - Initiate stretching exercises to muscles (e.g., hamstrings) with flexibility deficits
 - Initiate mobility exercises to nerves (e.g., sciatic) with flexibility deficits
- Re-injury Prevention Instruction
 - Promote self-efficacy with exercise body mechanics, ergonomics and correct posture during daily activities for symptom control
 - Promote maintenance of optimal fitness and weight control

Intervention for High Performance / High Demand Functioning in Workers or Athletes

Goals: Return patient to optimal activity level for performance of desired occupational and recreational activities
Avoid re-injury

- Approaches / Strategies listed above
- Therapeutic Exercise
 - Progress stretching, strengthening, and proprioception and nerve mobility exercises
 - Maximize muscle performance of the relevant lower quadrant (hip, knee, ankle and lumbar) muscles or upper quadrant (scapular, shoulder, elbow, and forearm) required to perform the desired occupational or recreational activities
- Ergonomic Instruction
 - Provide job/sport specific training to lessen strain on the lumbar spine and to maximize activity tolerance

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Exercise and Movement Re-Education Interventions for Patients with Lumbar Spine Impairments

Body Function Label	Critical Impairments	Other Supportive Criteria	Interventions
Lumbar Spine Mobility Deficits Other vernacular terms: “Facet Syndrome” Mobilization Exercises	End-range pain ROM limitations	Acute low back pain Minimal/no previous history of LBP	End-range stretching to maintain segmental ROM gained from manipulative procedures. Ergonomic instruction, trunk & pelvic girdle strengthening & stretching, as indicated, to prevent future disability.
Lumbar Spine Stability Deficits Other vernacular terms: “Ligamentous Instability” Stabilization Exercises	Symptoms reproduced with sustained end range positions Symptoms eased with neutral positions and midrange movements	Long history of progressively worsening symptoms (i.e., less tolerance to end range positions – such as sitting)	Isometric mobilizations to normalize pelvic girdle symmetry. Ergonomic cuing to maintain mid-range lumbar and pelvic girdle positions. Proprioceptive training and trunk/pelvic girdle strengthening to improve ability to stay in mid-range positions. Taping or bracing as indicated.
Lumbar Spine and Related Lower Limb Pain Other vernacular terms: “Disc Derangement” Extension Exercise, or Specific Exercise Group	Location of symptoms move centrally with repeated lumbar extension or with repeated lateral trunk shifts	Difficulty with sitting and forward bending Multiple previous episodes of LBP (progression of “Ligamentous Instability”) Observable reduced lumbar lordosis – may have lateral trunk shift	Manual procedures, postures, or exercises that centralize the symptoms. Ergonomic cuing to maintain lumbar lordosis prevent peripheralization. Progress to treatment of underlying segmental instability.
Lumbar Spine and Related Lower Extremity Radicular Pain “Nerve Root Adhesion” or “Dural Adhesion” Nerve Mobility Exercises	Narrow band of lancinating pain Symptoms reproduced with SLR and/or slump testing	Nerve mobility deficits with lower limb tension testing	Dural and nerve mobility exercises as indicated to address the patient’s key impairments Soft tissue and/or joint mobilization to areas of potential spinal and peripheral nerve entrapments

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