

Lumbar Spine Mobility Deficits

ICD-9-CM code: 724.2 Lumbago (low back pain, low back syndrome, lumbalgia)

ICF codes: Activities and Participation Domain code: **d4105** Bending (Tilting the back downward or to the side, at the torso, such as in bowling or reaching down for an object)

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

Body Functions code: **b7101** Mobility of several joints

Common Historical Findings:

Felt "catch" in low back following a misstep, fall, bending, twisting, or lifting activity

Unilateral pain in low back, buttock, or posterior thigh (depending on level of segmental involvement)

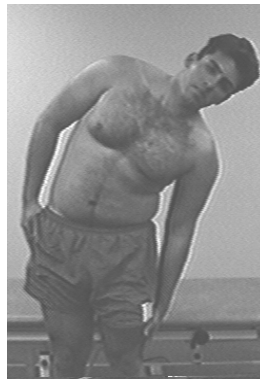
If subacute, may report stiffness

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

Increase in pain at end range of sidebending left or sidebending right

Symptoms reproduced with unilateral posterior-to-anterior pressure over the involved spinal segment

Physical Examination Procedures:



Lumbar Side Bending

Performance Cues:

"Do you have any discomfort at this moment?"

Demonstrate as you say "Bend to the side as far as you comfortably can and return"

"Did that motion cause an increase in your pain?"

"*WHEN* during the movement did you notice an increase in your pain?"



Unilateral Posterior-to-Anterior Pressures

Performance Cues:

Localize pressure to one transverse process

Sink deep enough to incriminate or "clear" the segment

When using thumbs - contact same side

When using a "dummy" thumb under pisiform - contact opposite side - fingers face away from iliac crest – using a flat, relaxed hand

Other physical examination procedures to identify the involved segment:



TP Assessment in flexion

Performance Cues:

Ensure that spinal extensors are relaxed ("Let your arms hang toward the floor")

Keep thumbs at same level of the segment's transverse process

Match right and left thumb PA pressure intensity

Determine symmetry of depth

Determine symmetry of resistance

Determine symptom response



TP Assessment in Extension

Performance Cues:

Ensure that the spinal extensors are relaxed ("Let your chin rest in your hands")

Remember to line up your dominant eye

Lumbar Spine Mobility Deficits: Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with the vernacular term "Lumbar Facet Syndrome"

Description: Dysfunction of the movement of the one vertebrae of the lumbar spine relative to its adjacent vertebrae – commonly due to facet irregularities, muscle imbalances or trauma.

Etiology: The suspected cause of this disorder is a movement abnormality where one segment of the spine is unable to either flex, extend, side bend or rotate in a normal pain free manner on its adjacent vertebrae. There is anatomical evidence that this movement abnormality is caused by either a displacement of fibro-fatty tissue within the outer borders of the facet capsule or posttraumatic fibrosis of the facet capsule. The cause of the movement abnormalities and the associated pain is believed to be an awkward, sudden, twisting or bending motion, (resulting in a reversible displacement of fibro-fatty tissue) or healing of the a posttraumatic facet capsule with its accompanying capsular contracture and shortening of the adjacent segmental myofascia.

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

ICF Body Functions code: **b7101.3** SEVERE impairment of mobility of several joints

- The patient's reported complaint of unilateral low back and/or buttock pain increases at the end ranges of left or right sidebending
- Repeated flexion and extension movements do not improve or worsen the patient's baseline level of pain
- Limited or pain-limited lumbar inclinometer measures are common
- Unilateral posterior-to-anterior pressures at the involved segment reproduce the patient's pain complaint
- Motion restrictions are present at the involved segment
- Myofascia associated with the involved segment is usually hypertonic and painful

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

ICF Body Functions code: b7101.2 MODERATE impairment of mobility of several joints

As above with the following differences

- The patient's unilateral symptoms are reproduced only with overpressures at end ranges of left or right sidebending
- Improved segmental mobility is commonly associated with improving symptomatology

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

ICF Body Functions code: b7101.1 MILD impairment of mobility of several joints

As above with the following differences

- The patient's unilateral symptoms are reproduced only with end range overpressures in either a combined extension and sidebending motion or a combined flexion and sidebending motion

Now when less acute – examine for muscle flexibility and strength deficits that may predispose the patient to future injury. For example:

- Muscles that commonly exhibit flexibility deficits in patients with facet abnormalities are latissimus dorsi/thoracolumbar fascia, hip flexors, hamstrings/sciatic nerve, and the gastrocsoleus complex
- Muscles that are commonly weak are the trunk extensors, trunk flexors, hip flexors, hip extensors, and hip abductors

Intervention Approaches / Strategies

Acute Stage / Severe Condition

Goal: Restore painfree active spinal mobility

- Physical Agents
Electrical stimulation, ice (or heat) to provide pain relief and reduce muscle guarding
- Manual Therapy
Soft tissue mobilization primarily to multifidus and rotatores of the involved segment
Joint mobilization/manipulation using isometric mobilization and contract/relax procedures to the involved segment to reduce associated rotatores or multifidus muscle guarding
Passive stretching procedures to restore normal lumbar segmental mobility to the involved segment

- Therapeutic Exercise
Instruct in exercise and functional movements to maintain the improvements in mobility gained with the soft tissue and joint manipulations
- Re-injury Prevention Instruction
Instruct the patient in efficient, painfree, motor performance of movements that are related by the patient to be the cause of the current episode of low back pain

Sub Acute Stage / Moderate Condition

Goal: Restore normal, painfree response to overpressures at end ranges of sidebending

- Approaches / Strategies listed above – focusing on soft tissue mobilization and joint mobilization/manipulation to normalize segmental mobility followed by mobility exercises to maintain the improvements gained from the manual procedures

Settled Stage / Mild Condition

Goal: Restore normal, painfree responses to overpressures of combined extension and sidebending and/or combined flexion and sidebending
Normalize lumbar, pelvis, and hip muscle flexibility and strength deficits

- Approaches / Strategies listed above
- Therapeutic Exercises
Instruct in stretching exercises to address the patient's specific muscle flexibility deficits
Instruct in strengthening exercises to address the patient's specific muscle strength deficits

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

Goal: Return to desired occupational or leisure time activities

- Approaches / Strategies listed above
- Therapeutic Exercises
Encourage participation in regular low stress aerobic activities as a means to improve fitness, muscle strength and prevent recurrences

Selected References

Childs JD, Fritz JM, Flynn TW, Irrgang JJ, Johnson KK, Majkowski GR, Delitto A. Which patients with low back pain benefit from spinal manipulation? validation of a clinical prediction rule. *Ann Intern Med.* 2004;141:920-928.

Fritz JM, Delitto A, Erhard RE. Comparison of classification-based physical therapy with therapy based on clinical practice guidelines for patients with acute low back pain. *Spine.* 2003;28:1363-1372.

Assendelft WJ, Morton SC, Yu EL, Suttorp MJ, Shekelle PG. Spinal manipulative therapy for low back pain. A meta-analysis of effectiveness relative to other therapies. *Ann Intern Med.* 2003;138:871-881

Bronfort G. Spinal manipulations: current state of research and its indications. *Neurologic Clinics* 1999;17:91-111.

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Manual Therapy for Lumbar Spine Segmental Motion Impairments

Flexion (opening) Impairment

Examination Active ROM – Sidebending movement/pain relation
Position – TP provocation/symmetry in sitting flexion
Passive ROM – Unilateral PA's movement/pain relation
Palpation – Segmental myofascial hypertonicity/tenderness
Passive ROM – Segmental (physiologic) motion tests

Treatment Soft Tissue Mobilization: Quadratus Lumborum
 Erector Spinae/Thoracolumbar Fascia
 Segmental Myofascia

Joint Mobilization/Manipulation: Lumbar Sidebending in Neutral
 Lumbar Sidebending/Rotation in Flexion

Extension (closing) Impairment

Examination Active ROM – Sidebending movement/pain relation
Position – TP provocation/symmetry in prone extension
Passive ROM – Unilateral PA's movement/pain relation
Palpation – Segmental myofascial hypertonicity/tenderness

Treatment Soft Tissue Mobilization: Psoas

Joint Mobilization/Manipulation: Lumbar Rotation in Neutral
 Lumbar Sidebending/Rotation in Extension



Quadratus Lumborum
Soft Tissue Mobilization



Psoas
Soft Tissue Mobilization



Lumbar Segmental Myofascia STM

Impairment: Limited Lumbar Segmental Rotation



Forward Bend up to Involved Segment



Rotate Down to the Involved Segment



Lumbar Rotation in Neutral

- Cues:
- Forward bend to midrange of involved segment
 - Rotate until motion just begins at the involved segment
 - Keeping involved segment perpendicular
 - Ensure that forces and contacts on the rib cage (not humerus) and ilium (not trochanter) are comfortable
 - Contract/relax, oscillation, and high velocity-low amplitude procedures can be employed as indicated
 - Utilize compression, slight lumbar sidebending, slight lumbar flexion or extension to create a “crisp” barrier at the involved segment prior to manipulation procedures

The following references provides additional information regarding this procedure:

Stanley Paris PT: Spinal Manipulative Therapy. *Clinical Orthopaedics and Related Research*, Volume 179, p. 55-61, 1983.

Freddy Kaltenborn PT: The Spine: Basic Evaluation and Mobilization Techniques, p. 134, 137, 1993

John Bourdillon FRCS, EA Day MD, and Mark Bookhout MS, PT: Spinal Manipulation, p. 184-185, 1992

Philip Greenman DO, FAAO: Principles of Manual Medicine, p. 294-295, 1996

Impairment: Limited Lumbar Segmental Flexion, Left Sidebending, and Left Rotation



Lumbar Left Rotation/Sidebending in Flexion

Cues: Position the upper knee anterior to the bottom knee to allow the pelvis to rotate
Flex up from below to the involved segment
Flex down from above to the involved segment
Retract the upper shoulder (don't pull the bottom arm)
Keep the involved segment perpendicular to the table
Push the pelvis *superiorly* and anteriorly to promote the sidebending and rotation

The following references provides additional information regarding this procedure:

John Bourdillon FRCS, EA Day MD, and Mark Bookhout MS, PT: Spinal Manipulation, p. 178, 1992

Philip Greenman DO, FAAO: Principles of Manual Medicine, p. 288–289, 1996

Impairment: Limited Lumbar Segmental Extension, Left Sidebending, and Left Rotation



Lumbar Left Rotation/Sidebending in Extension

Cues: A sheet between the patient and the table reduces friction during the set-up
Localize to the involved segments by 1) anterior translation of spine, 2) extension of the leg near table, 3) extension of the trunk, 4) simultaneous counter rotation with sidebending of the trunk and pelvis (maintain perpendicular at the involved segment)

The following references provides additional information regarding this procedure:

Freddy Kaltenborn PT: The Spine: Basic Evaluation and Mobilization Techniques, p. 161-162, 1993

John Bourdillon FRCS, EA Day MD, and Mark Bookhout MS, PT: Spinal Manipulation, p. 180-182, 1992

Philip Greenman DO, FAAO: Principles of Manual Medicine, p. 291-292 and 298-299, 1996