

Thoracic Region Pain

ICD-9-CM: 724.4 Thoracic or Lumbosacral neuritis or radiculitis, unspecified

ICF codes: Activities and Participation Domain code: **d4108** Changing basic body position, other specified (specified as diffuse back pain, often with related diffuse extremity pain, associated with sustaining a long sitting or flexed position, such as driving in a car or sitting in a bathtub)

Body Structure code: **s76000** Cervical vertebral column

s76001 Thoracic vertebral column

s76002 Lumbar vertebral column

Body Functions code: **b28013** Pain in back

Common Historical Findings:

Pain or paresthesia associated with prolonged long sitting or flexed positions (e.g., driving in car, sitting in bath tub)

Diffuse and multiple areas of symptoms (e.g., headaches, entire spine, extremities)

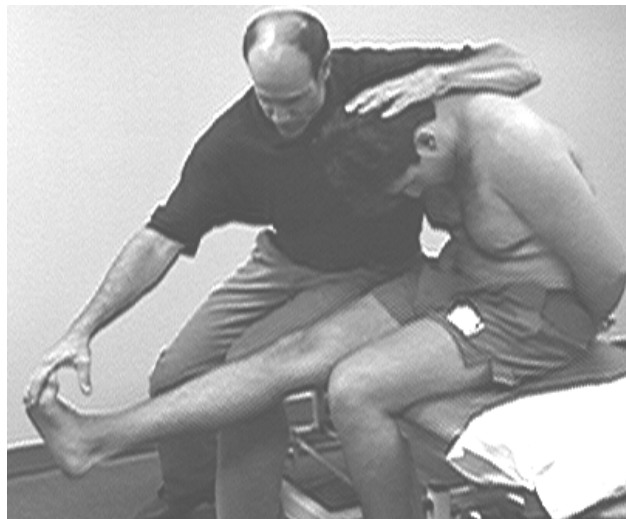
May report autonomic nervous system symptomatology (e.g., intolerance to cold, nausea following prolonged neck flexion activities, excessive sweating while in a slump sitting position)

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

Symptom reproduction with slump testing

Less than normal range of motion with nerve tension tests

Physical Examination Procedures:



Slump Test
Neck Flexion and Ankle Dorsiflexion

Performance Cues:

Establish baseline: Neutral sitting on edge of table, arms behind back

Note changes in symptoms with each maneuver:

Trunk Flexion

Neck Flexion

Knee Extension

Ankle Dorsiflexion

Bilateral Knee Extension

Bilateral Ankle Dorsiflexion

Determine symptom alteration with neck flexion and extension, knee flexion and extension, ankle dorsiflexion and plantar flexion

With high level of symptoms - active movements will reproduce/alleviate symptoms

With low level of symptoms - passive overpressures are required to reproduce/alleviate symptoms

Thoracic Region Pain: Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with the vernacular term
“Dural Adhesion”

Description: The dura mater is innervated primarily by the sinuvertebral nerve also known as recurrent meningeal nerve, but is also innervated by the nerve plexus of the posterior longitudinal ligament and the nerve plexus of radicular branches of segmental arteries. The sinuvertebral nerve is primarily a sympathetic nerve and courses in a cephalic direction up to 4 segments and a caudal direction for up to 4 segments. This results in considerable overlap of innervations between adjacent segments and count for the multiple pain sites of the dural adhesion. The anterior region of the dura mater is densely innervated, while the posterior region of the dura is sparsely innervated, which gives evidence as to why diffuse pain is noted with dural adhesions. In addition, there is no innervation in the medial part of the posterior region, which explains the fact that no pain is elicited on piercing of this area in such procedures as lumbar puncture.

Dural pain is described as funicular pain; diffuse, poorly localized, burning sensation or abrupt stabbing pain. It is not radicular in distribution but rather involves unilateral or bilateral limbs, trunk, or entire body. Headaches may also occur. Patients with dural disorders may also report autonomic nervous system symptomatology (i.e. cold intolerance, nausea, diffuse sweating with prolonged slump sitting). If there is pressure on the nerve trunk, paresthesia or an abnormal sensation such as a “pins and needles” feeling or tingling may be present. Pain or paresthesia is associated with prolonged long sitting or flexed positions (i.e., driving in car, working at computer, sitting in bathtub). Dural symptoms can also be triggered by spinal cord compression from cervical spondylosis or neoplasm of the cervical, thoracic and/or lumbar spine. Decreased tolerance with prolonged long sitting or flexed positions at the spine and/or hip is the main characteristic of this disorder

Etiology: The cause of this disorder is largely unknown. Theories state that dural adhesions can be caused by disc degeneration, intradural arachnoid cysts, spinal stenosis, trauma and intramedullary mass lesions among others. These disorders can cause inflammation of the spine,

which in turn may cause irritation and fibrosic adhesion in the dura to form. Myofascial and soft tissue restrictions in the muscles of the back may inhibit the mobility of the posterior primary rami nerve through its normal pathway, which may limit normal mobility of the mixed spinal nerve and the adjacent dura producing decreased mobility and quality of range of motion (i.e., a positive slump test). Research studies also suggest possible etiologies of trauma at more distal sites, such as repetitive hamstring strain or ankle inversion sprain.

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

ICF Body Functions code: **b28013.3** SEVERE pain in back

- Symptoms are produced or aggravated with slump test positions
- Postural adaptation to pain-free position may be observed – such as diminished thoracic kyphosis
- Limb nerve tension tests (e.g., SLR test) commonly exhibit limited range of motion
- Soft tissue restrictions in the posterior segmental spinal myofascial
- Autonomic nervous system signs (such as excessive perspiration) may be present

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

ICF Body Functions code: **b28013.2** MODERATE pain in back

- As above – except less severe symptoms are exhibited
- Pain takes longer to present itself while in slumped position
- Pain perception during the slump test is strongly correlated with passive tissue resistance felt by the examiner
- A decrease in tenderness and a reduction mobility deficits of the involved segments during the slump test is commonly associated with a reduction in symptoms

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

ICF Body Functions code: **b28013.2** MILD pain in back

- As above with the following differences:
- Passive overpressure while in slump position may be required to reproduce symptoms

Intervention Approaches / Strategies

Acute Stage / Severe Condition

Goal: Reduce dural (i.e., slump) related symptoms
Alleviate pain with normal (non end range) activities

- Manual Therapy
 - Soft tissue mobilization to restricted segmental myofascial of the thoracic region or site of peripheral nerve entrapments related to the patient's complaints
 - Joint mobilization/manipulation is usually restricted spinal segments

- Therapeutic Exercises
Slump and peripheral nerve mobility exercises in painfree ranges

Sub Acute Stage / Moderate Condition

Goals: As above

Increased flexibility of the dural elements (as measured by ability to assume the slump positions without symptoms)

- Approaches / Strategies listed above
- Therapeutic Exercises
Slump and peripheral nerve mobility exercises in creating mild stretch sensation at end ranges that do not worsen the symptoms with repeated exercises

Settled Stage / Mild Condition

Goals: As above

Increased flexibility of spinal flexion

Increased flexibility of upper and lower extremities

- Approaches / Strategies listed above
- Therapeutic Exercises
Slump and peripheral nerve mobility exercises in creating a strong stretch sensation at end ranges that do not worsen the symptoms with repeated exercises
- Re-injury Prevention Instruction:
Promote cardiovascular and flexibility and strengthening programs in order to maintain neural mobility and decrease the probability of future dural adhesions

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

Goals: Return to desired occupational or recreational activities

- Approaches / Strategies listed above
- Therapeutic Exercises
Provide specific stretches to enhance the ability to perform desired activity
General stretching/conditioning programs, such as yoga or Pilates type programs may be helpful interventions to promote high performance/high demand functioning

Selected References

Briggs CA, Lew PC. Relationship between the cervical component of the slump test and change in hamstring muscle tension. *Manual Therapy*. 1997;2:98-105.

Butler DS: *Mobilization of the Nervous System*. Melbourne: Churchill Livingstone, 1991

Butler DS: The concept of adverse mechanical tension in the nervous system. *Physiotherapy*. 1989;75:622-636.

Byrne T: *Spinal Cord Compression*. F.A. Davis Co. Salem, 1990.

Chiarello CM, Johnson EK: The slump test: the effects of head and lower extremity position on knee extension. *J Orthop Sports Phys Ther*. 1997;26:310-317.

Cuillere P, Faure A, Hamel O, Le Borgne J, Raoul S, Robert R, Rogez JM. Role of the sinu-vertebral nerve in low back pain and anatomical basis of therapeutic implications. *Surg Radiol Anat*. 2002;24:366-371.

Groen GJ, Baljet B, Drukker J. The innervation of the spinal dura mater: anatomy and clinical implications. *Acta Neurochir* 1988;92:39-46.

Kimmel D: Innervation of the spinal dura mater and dura mater of the posterior cranial fossa. *Neurology* 1961;10:800-809.

Kornberg C, Lew P: The effect of stretching neural structure on grade one hamstring injuries. *J Orthop Sports Phys Ther*. 1998;13:418-487.

Maitland GD: The slump test: examination and treatment. *Aust J Phys*. 1985;31:215-219.

Pathor S, Toppenberg R. An investigation of neural tissue involvement in ankle inversion sprains. *Manual Therapy* 1996;1:192-197.

Simon DG, Travell JG: Myofascial origins of low back pain. *Post Grad Med*. 1983;73:66 –108.

Turl S, George P: Adverse neural tension: A factor in repetitive hamstring strain? *J Orthop Sports Phys Ther*. 1998;27:16-21.

Webright WG, Randolph BJ, Perrin, DH: Comparison of nonballistic active knee extension in neural slump position and static stretch techniques on hamstring flexibility. *J Orthop Sports Phys Ther*. 1997;26:7-13.

George SZ. Characteristics of patients with lower extremity symptoms treated with slump stretching: a case series. *J Orthop Sports Phys Ther*. 2002;32:391-398.