LUMBAR SPINE

The patient is a 42-year-old female physical therapist presenting with a two-week history of severe low back pain and right leg pain following a lifting injury sustained while transferring a patient at work. She describes the pain as sharp and shooting, originating in the lower back and traveling down the back of her right thigh into her calf and foot. Her pain is accompanied by intermittent tingling and numbness in the right calf and foot. Symptoms are exacerbated by sitting or standing for extended periods, coughing, and sneezing. Symptoms are minimally relieved by over-the-counter pain medications. She reports difficulty walking on her toes and weakness in her right foot. She denies any changes in bowel or bladder habits. She scored 80% on the Oswestry Disability Index.

Clinical examination reveals decreased lumbar lordosis and an antalgic gait with decreased weightbearing on the right lower extremity. Neurological examination reveals decreased sensation to light touch on the right peroneals and lateral dorsum of the right foot, decreased strength into right ankle dorsiflexion, and a reduced Achilles deep tendon reflex on the right. She is unable to perform a single leg heel raise on right.

Special tests indicate a positive straight leg raise at 30° and a positive Well Leg Raise Test for typical symptom provocation. She is motivated to return to work, as her rehab hospital is short-staffed, but the severity of her symptoms has necessitated time off.

1. Given the above presentation, which of the following diagnoses is most likely?
    a. Acute LBP with mobility impairment.
    b. Acute LBP with radiating pain.
    c. Acute LBP with movement coordination impairments.
    d. Acute LBP with related cognitive or affective tendencies.

The correct answer is **B. Acute LBP with radiating pain**. The patient presents with acute LBP with associated radiating pain in the involved lower extremity. Lower extremity paresthesias, numbness, and weakness are reported. Symptoms are reproduced with lower limb tension tests. Nerve root involvement (sensory, strength, or reflex deficits) is present. These are characteristic signs and symptoms of LBP with radiating pain. While LBP with movement coordination impairments can also present with leg pain, there is no indication of aberrant movements or symptom provocation with low back movement. No mobility deficits are reported and no physical testing was performed to reveal hypomobility. Although a high Oswestry Disability Index is noted, the patient does not report fear or catastrophizing, making negative cognitive or affective tendencies unlikely at this time.

2. Given the above presentation, what is the likely *dominant* pain mechanism involved in this patient's presentation?

a. Nociceptive pain.
b. Neuropathic pain.
c. Nociplastic pain.
d. Central sensitization.

The correct answer is **B. Neuropathic pain.** Neuropathic pain, also referred to as neurogenic pain, is a type of pain that arises from damage, irritation, or dysfunction within the nervous system. Unlike nociceptive pain, which is caused by actual or perceived tissue damage or injury localized to the site of injury or dysfunction, neurogenic pain originates from problems within the nerves themselves causing symptom reports in a dermatomal or cutaneous nerve distribution. Nociplastic pain is a type of pain that arises from altered nociception despite no clear evidence of actual or threatened tissue damage that activates peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain. Central sensitization refers to an increased responsiveness or hypersensitivity of the central nervous system to stimulation, leading to an amplification of pain signals. This phenomenon can result in persistent pain and heightened sensitivity to pain even in the absence of ongoing tissue damage. Given the patient's pain reports of neural symptoms, and signs of nerve involvement, neuropathic pain would be the most likely predominant mechanism involved.

3. Given this patient's presentation and diagnosis, what would be the most relevant intervention today?
    a. Flexion based exercises.
    b. Aerobic exercise.
    c. Aquatic exercise.
    d. Neural tissue mobilization.

The correct answer is **D. Neural tissue mobilization**. Unchanged from the original clinical practice guideline (CPG), according to the 2021 CPG revision, there is moderate evidence supporting a treatment-based classification approach to reduce pain and disability in patients with acute LBP. The patient has what appears to be a predominant neuropathic pain mechanism and acute LBP with radiating pain, which would be best managed by addressing neural impairment. There is no evidence of directional preference or centralization with flexion based exercises. While aerobic and aquatic exercise may reduce pain sensitivity, they do not directly address the primary pain reports and have less supportive evidence for the likely pain mechanism or impairment-based classification.

References

- Interventions for the Management of Acute and Chronic Low Back Pain: Revision 2021
- Decision Tree – Interventions for the Management of Acute and Chronic LBP: Revision 2022