

# Low Back Pain, a Comprehensive Review: Pathophysiology, Diagnosis, and Treatment

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### **Purpose of Review**

Low back pain encompasses three distinct sources: axial lumbosacral, radicular, and referred pain. Annually, the prevalence of low back pain in the general U.S. adult population is 10-30%, and the lifetime prevalence among U.S. adults is as high as 65-80%.

Recent Findings: Patient history, physical exam, and diagnostic testing are important components to accurate diagnosis and identification of patient pathophysiology. Etiologies of low back pain include myofascial pain, facet joint pain, sacroiliac joint pain, discogenic pain, spinal stenosis, and failed back surgery. In chronic back pain patients, a multidisciplinary, logical approach to treatment is most effective and can include multimodal medical, psychological, physical, and interventional approaches.

**Summary:** Low back pain is a difficult condition to effectively treat and continues to affect millions of Americans every year. In the current investigation, we present a comprehensive review of low back pain and discuss associated pathophysiology, diagnosis, and treatment.

### **Overview of Low Back Pain**

Low back pain encompasses three distinct sources: axial lumbosacral, radicular, and referred pain

- Axial lumbosacral back pain refers to pain in the lumbar, or L1-5 vertebral region, and sacral spine, or S1 to sacrococcygeal junction region.
- Radicular leg pain travels into an extremity along a dermatomal distribution secondary to nerve or dorsal root ganglion irritation.
- Referred pain spreads to a region remote from its source but along a non-dermatomal trajectory.

**Chronicity**: acute (<6 weeks), subacute (6-12 weeks), and chronic (>12 weeks) low back pain

## Diagnostic and Therapeutic Approach to the Patient with Low Back Pain Patient with low back pain Perform a history and physical evaluating: Duration Red Flags Yellow Flags Perform diagnostic studies Are there any serious conditions suspected? to find cause Discuss conservative treatment options: Pharmacologic • Non Pharmacologic Assess response to treatment Continue conservative Back pain resolved or treatment and follow up in 'improved? 1 month Reassess symptoms and risk factors and reevaluate diagnosis. Consider imaging studies. Consider alternative pharmacologic and non-

pharmacologic

interventions

#### **Conclusions**

#### Multidisciplinary approach to treatment:

- Lower back pain management varies from person to person, as not all patients respond to the same treatment approach, and no single intervention is generally completely effective for all patients.
- Consequently, limited trials of one or more interventions guided by evidence and effectiveness are utilized to manage the pain, while aiming to decrease overall costs.
- Pertinent courses of care include pharmacological treatments, psychological treatments, physical and rehabilitation treatments, complementary and alternative medicine approaches, and minimally invasive percutaneous approaches.

#### References

- Atlas SJ, Deyo RA. Evaluating and managing acute low back pain in the primary care setting. J Gen Intern Med 2001;16:120–131.
- Bogduk N. On the definitions and physiology of back pain, referred pain, and radicular pain. Pain 2009; 147:17–19.
- Chou R, Qaseem A, Snow V, Casey D, Cross JT, Shekelle P, et al. Diagnosis and treatment of low back pain: A joint clinical practice guideline from the American College of Physicians and the American Pain Society. Ann Intern Med 2007;147:478.
- Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. Ann Rheum Dis;2014;73:968–74.
- Samanta J, Kendall J, Samanta A. 10-minute consultation: chronic low back pain. BMJ 2003; 326:535.

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