

30

Lumbar Radicular Pain

- I. Know the structure of the lumbar vertebral canal and intervertebral foramina (Bogduk 1997, Chapter 5).
- II. Know the disposition of the lumbar and sacral nerve roots in the cauda equina and their dural, skeletal, and articular relations (Bogduk 1997, Chapter 10).
- III. Know the disposition of the lumbar and sacral nerve roots in the intervertebral foramina and their dural, skeletal, and articular relations (Bogduk 1997, Chapter 10).
- IV. Understand, and be able to explain, how radicular pain and radiculopathy differ from low back pain and somatic referred pain (Merskey and Bogduk 1994).
- V. Understand the difference between radicular pain and radiculopathy and understand their respective, different mechanisms (Smyth and Wright 1959; Howe et al. 1977; Howe 1979; Devor 1996; Kawakami et al. 1996a,b; Olmarker 1996; Bogduk 1997).
- VI. Be able to list systematically the possible causes of radicular pain and of radiculopathy, and be aware of their relative prevalences (Bogduk and Govind 1999, Chapter 3).
- VII. Appreciate the reliability and validity of history and neurological examination for diagnosis of radiculopathy, but understand their limitations in the diagnosis of radicular pain (Norlen 1944; Knutsson 1961; Spangfort 1972; Nelson et al. 1979; Kosteljanetz et al. 1984, 1988; Morris et al. 1986; Deyo et al. 1987; Haldeman et al. 1988; McCombe et al. 1989; Thelander et al. 1992).
- VIII. Know the indications and validity of medical imaging in the assessment of lumbar radicular pain (Weisel 1986; Boden et al. 1990; Jensen et al. 1994; Albeck et al. 1995; Brant-Zawadzki et al. 1995; Andersson et al. 1996; Herzog 1996).
- IX. Understand the lack of validity of electrodiagnostic tests for the investigation of lumbar radicular pain (Knutsson 1961; Haldeman et al. 1988; Andersson et al. 1996; Dvorak 1996).
- X. Understand the natural history of acute lumbar radicular pain and its relevance to management (Saal et al. 1990; Bozzao et al 1992; Bush et al. 1992; Delauche-Cavalier et al. 1992; Maigne et al. 1992; Weber et al. 1993; Dullerud and Nakstad 1994; Matsubara et al. 1995).
- XI. Appreciate the lack of any proven or demonstrated physiological basis for commonly used interventions for lumbar radicular pain (Bogduk and Mercer 1995).
- XII. Be aware of the cardinal evidence for the efficacy, or lack thereof, of interventions commonly used for acute low back pain and for chronic low back pain (Matthews and Hickling 1975; Larsson et al. 1980; Coxhead et al. 1981; Fraser 1984; Kepes and Duncalf 1985; Bogduk and Govind 1999, Chapters 9, 11, 12; Pal et al. 1986; Haimovic and Beresford 1986; Gogan and Fraser 1992; Bogduk 1995; Bogduk et al. 1995; Koes et al. 1995; Watts and Silagy 1995; McQuay and Moore 1996; Saal 1996; Crette et al. 1997; Vroomen et al. 1999; Riew et al. 2000; Karppinen et al. 2001a,b; Vad et al. 2002), such as:
 - A. Bed rest
 - B. Staying active
 - C. Drugs

- D. Exercises
 - E. Manual therapy
 - F. Traction
 - G. Epidural steroid injections
 - H. Transforaminal injections of steroids
 - I. Chemonucleolysis
- XIII. Understand the indications and efficacy of surgical treatment for lumbar radicular pain (Gibson et al. 1999; Waddell et al. 2000).

REFERENCES

- Albeck MJ, Hilden J, Kjaer L, et al. A controlled comparison of myelography, computed tomography, and magnetic resonance imaging in clinically suspected lumbar disc herniation. *Spine* 1995; 20:443–448.
- Andersson GBJ, Brown MD, Dvorak J, et al. Consensus summary on the diagnosis and treatment of lumbar disc herniation. *Spine* 1996; 21(Suppl 24S):75S–78S.
- Boden SD, Davis DO, Dina TS, Patronas NJ, Wiesel SW. Abnormal magnetic-resonance scans of the lumbar spine in asymptomatic subjects. *J Bone Joint Surg* 1990; 72A:403–408.
- Bogduk N. Spine update: epidural steroids. *Spine* 1995; 20:845–848.
- Bogduk N. *Clinical Anatomy of the Lumbar Spine and Sacrum*, 3rd ed. Edinburgh: Churchill Livingstone, 1997.
- Bogduk N, Govind J. *Medical Management of Acute Lumbar Radicular Pain: An Evidence-Based Approach*. Newcastle: Newcastle Bone and Joint Institute, 1999.
- Bogduk N, Aprill C, Derby R. Epidural steroid injections. In: White AH (Ed). *Diagnosis and Conservative Treatment*, Spine Care, Vol. 1. St. Louis: Mosby, 1995, pp 322–343.
- Bozzao A, Galluci M, Masciocchi C, et al. Lumbar disc herniation: MR imaging assessment of natural history in patients treated without surgery. *Radiology* 1992; 185:135–141.
- Brant-Zawadzki M, Jensen MC, Obuchowski N, Ross JS, Modic MT. Interobserver and intraobserver variability in interpretation of lumbar disc abnormalities. *Spine* 1995; 20:1257–1264.
- Bush K, Cowan N, Katz DE, Gishen P. The natural history of sciatica associated with disc pathology: a prospective study with clinical and independent radiologic follow-up. *Spine* 1992; 17:1205–1210.
- Carette S, LeClaire R, Marcoux S, et al. Epidural corticosteroids injections for sciatica due to herniated nucleus pulposus. *N Engl J Med* 1997; 336:1634–1640.
- Coxhead CE, Inskip H, Meade TW, North WRS, Troup JDG. Multicentre trial of physiotherapy in the management of sciatic symptoms. *Lancet* 1981; 1:1065–1068.
- Delauche-Cavallier M-C, Budet C, Laredo J-D, et al. Lumbar disc herniation: computed tomography scan changes after conservative treatment of nerve root compression. *Spine* 1992; 17:927–933.
- Devor M. Pain arising from the nerve root and the dorsal root ganglion. In: Weinstein JN, Gordon SL (Eds). *Low Back Pain: A Scientific and Clinical Overview*. Rosemont, IL: American Academy of Orthopaedic Surgeons, 1996, pp 187–208.
- Deyo RA, Tsui-Wu YJ. Descriptive epidemiology of low-back pain and its related medical care in the United States. *Spine* 1987; 12:264–268.
- Dullerud R, Nakstad PH. CT changes after conservative treatment for lumbar disc herniation. *Acta Radiol* 1994; 35:415–419.
- Dvorak J. Neurophysiologic tests in diagnosis of nerve root compression caused by disc herniation. *Spine* 1996; 21(Suppl 24S):39S–44S.
- Fraser RD. Chymopapain for the treatment of intervertebral disc herniation; the final report of a double blind study. *Spine* 1984; 9:815–818.
- Gibson JNA, Grant IC, Waddell G. The Cochrane review of surgery for lumbar disc prolapse and degenerative lumbar spondylosis. *Spine* 1999; 24:1820–1832.
- Gogan WJ, Fraser RD. Chymopapain: a 10-year, double-blind study. *Spine* 1992; 17:388–394.
- Haimovic IC, Beresford HR. Dexamethasone is not superior to placebo for treating lumbosacral radicular pain. *Neurology* 1986; 36:1593–1594.
- Haldeman S, Shouka M, Robboy S. Computed tomography, electrodiagnostic and clinical findings in chronic workers' compensation patients with back and leg pain. *Spine* 1988; 13:345–350.
- Herzog RJ. The radiologic assessment for a lumbar disc herniation. *Spine* 1996; 21(Suppl 24S):19S–38S.
- Howe JF. A neurophysiological basis for the radicular pain of nerve root compression. In: Bonica JJ, Liebeskind JC, Albe-Fessard DG (Eds). *Proceedings of the Second World Congress on Pain*, Advances in Pain Research and Therapy, Vol. 3. New York: Raven Press, 1979, pp 647–657.

- Howe JF, Loeser JD, Calvin WH. Mechanosensitivity of dorsal root ganglia and chronically injured axons: a physiological basis for the radicular pain of nerve root compression. *Pain* 1977; 3:25–41.
- Jensen MC, Bran-Zawadzki MN, Obucjowski N, et al. Magnetic resonance imaging of the lumbar spine in people without back pain. *N Engl J Med* 1994; 331:69–73.
- Karppinen J, Malmivaara A, Kurunlahti M, et al. Periradicular infiltration for sciatica: a randomized controlled trial. *Spine* 2001a; 26:1059–1067.
- Karppinen J, Ohinmaa A, Malmivaara A, et al. Cost-effectiveness of periradicular infiltration for sciatica: subgroup analysis of a randomized controlled trial. *Spine* 2001b; 26:2587–2595.
- Kawakami M, Weinstein JN, Tamaki T, Hashizue H. The difference in nociceptive potential of the nucleus pulposus and the annulus fibrosus. In: Weinstein JN, Gordon SL (Eds). *Low Back Pain: A Scientific and Clinical Overview*. Rosemont, IL: American Academy of Orthopaedic Surgeons, 1996a, pp 209–213.
- Kawakami M, Tamaki T, Weinstein JN, et al. Pathomechanism of pain-related behavior produced by allografts of intervertebral disc in the rat. *Spine* 1996b; 21:2101–2107.
- Kepes ER, Duncalf D. Treatment of backache with spinal injections of local anesthetics, spinal and systemic steroids: a review. *Pain* 1985; 22:33–47.
- Knutsson B. Comparative value of electromyographic, myelographic and clinical-neurological examination in diagnosis of lumbar root compression syndrome. *Acta Orthop Scand* 1961; Suppl 49.
- Koes BW, Scholten RJPM, Bouter LM. Efficacy of epidural steroid injections for low back pain and sciatica: a systematic review of randomized clinical trials. *Pain* 1995; 63:279–288.
- Kosteljanetz M, Espersen JO, Halaburt H, Miletic T. Predictive value of clinical and surgical findings in patients with lumbago-sciatica: a prospective study (Part I). *Acta Neurochir* 1984; 73:67–76.
- Kosteljanetz M, Bang F, Schmidt-Olsen S. The clinical significance of straight-leg raising (Lasegue's sign) in the diagnosis of prolapsed lumbar disc: interobserver variation and correlation with surgical finding. *Spine* 1988; 13:393–395.
- Larsson U, Choler U, Lidstrom A, et al. Auto-traction for treatment of lumbago-sciatica. *Acta Orthop Scand* 1980; 51:791–798.
- Maigne JY, Rime B, Delinge B. Computed tomographic follow-up study of forty-eight cases of nonoperatively treated lumbar intervertebral disc herniation. *Spine* 1992; 17:1071–1074.
- Matsubara Y, Kato F, Mimatsu K, Kajino G, Nakamura S, Nitta H. Serial changes on MRI in lumbar disc herniations treated conservatively. *Neuroradiology* 1995; 37:378–383.
- Matthews JA, Hickling J. Lumbar traction: a double-blind controlled study for sciatica. *Rheumatol Rehab* 1975; 14:222–225.
- McCombe PF, Fairbank JCT, Cockersole BC, Punsent PB. Reproducibility of physical signs in low-back pain. *Spine* 1989; 14:908–918.
- McQuay HJ, Moore A. Epidural steroids for sciatica. *Anaesth Intensive Care* 1996; 24:284–286.
- Merskey H, Bogduk N (Eds). *Classification of Chronic Pain: Descriptions of Chronic Pain Syndromes and Definitions of Pain Terms*, 2nd ed. Seattle: IASP Press, 1994.
- Morris EW, Di Paola M, Vallance R, Waddell G. Diagnosis and decision making in lumbar disc prolapse and nerve entrapment. *Spine* 1986; 11:436–439.
- Nelson MA, Allen P, Clamp SE, de Dombal FT. Reliability and reproducibility of clinical findings in low-back pain. *Spine* 1979; 4:97–101.
- Norlen G. On the value of the neurological symptoms in sciatica for the localization of a lumbar disc herniation. *Acta Chir Scand* 1944; 95(Suppl):1–96.
- Olmarker K. Mechanical and biochemical injury of spinal nerve roots: an experimental perspective. In: Weinstein JN, Gordon SL (Eds). *Low Back Pain: A Scientific and Clinical Overview*. Rosemont, IL: American Academy of Orthopaedic Surgeons, 1996, pp 215–233.
- Pal B, Mangion P, Hossain MA, Diffey BL. A controlled trial of continuous lumbar traction in the treatment of back pain and sciatica. *Br J Rheumatol* 1986; 25:181–183.
- Riew KD, Yin Y, Gilula L, et al. The effect of nerve-root injections on the need for operative treatment of lumbar radicular pain: a prospective, randomized, controlled, double-blind study. *J Bone Joint Surg* 2000; 82A:1589–1593.
- Saal JA. Natural history and nonoperative treatment of lumbar disc herniation. *Spine* 1996; 21(Suppl 24S):2S–9S.
- Saal JA, Saal JS, Herzog RJ. The natural history of lumbar intervertebral disc extrusions treated nonoperatively. *Spine* 1990; 15:683–686.
- Smyth MJ, Wright V. Sciatica and the intervertebral disc: an experimental study. *J Bone Joint Surg* 1959; 40A:1401–1418.
- Spangfort EV. The lumbar disc herniation: a computer-aided analysis of 2,504 operations. *Acta Orthop Scand* 1972; (Suppl 142).
- Thelander U, Fagerlund M, Friberg S, Larsson S. Straight leg raising test versus radiological size, shape, and position of lumbar disc hernias. *Spine* 1992; 17:395–399.
- Vad VB, Bhat AL, Lutz GE, Cammisa F. Transforaminal epidural steroid injections in lumbosacral radiculopathy. *Spine* 2002; 27:11–16.
- Vroomen PCAJ, de Krom CTFM, Wilmlink JT, Kester ADM, Andre KJ. Lack of effectiveness of bed rest for sciatica. *N Engl J Med* 1999; 340:418–423.
- Waddell G, Gibson JNA, Grant I. Surgical treatment of lumbar disc prolapse and degenerative lumbar disc disease. In: Nachemson A, Jonsson E (Eds). *Neck and Back Pain: The Scientific Evidence of Causes, Diagnosis, and Treatment*. Philadelphia: Lippincott, Williams & Wilkins, 2000, pp 305–325.

Watts RW, Silagy CA. A meta-analysis on the efficacy of epidural steroids in the treatment of sciatica. *Anaesth Intensive Care* 1995; 23:564–569.

Weber H, Holme I, Amlie E. The natural course of acute sciatica with nerve root symptoms in a double-blind placebo-controlled trial evaluating the effect of piroxicam. *Spine* 1993; 18:1433–1438.

Wiesel SW. A study of computer- assisted tomography. 1. The incidence of positive CAT scans in an asymptomatic group of patients. *Spine* 1986; 9:549–551.