

CONTENTS

Preface	xi
Kerry H. Levin	

Anatomy and Examination of the Spine	331
Michael W. Devereaux	

A basic knowledge of anatomy of the spine is an essential ingredient to understanding disease and disorders of the spine. The second section of this article details the neurologic examination of the spine in patients with neck and back pain. Understanding anatomic concepts leads to an informed examination of the spine. Through the history and neurologic examination, many disorders of spinal anatomy can be diagnosed.

Epidemiology and Risk Factors for Spine Pain	353
Devon I. Rubin	

Low back and neck pain is a common problem and one of enormous social, psychologic, and economic burden. It is estimated that 15% to 20% of adults have back pain during a single year and 50% to 80% experience at least one episode of back pain during a lifetime. Low back pain afflicts all ages, from adolescents to the elderly, and is a major cause of disability in the adult working population. Risk factors for developing spine pain are multidimensional; physical attributes, socioeconomic status, general medical health and psychologic state, and occupational environmental factors all contribute to the risk for experiencing pain.

Cervical Radiculopathy	373
David W. Polston	

Cervical radiculopathy is a condition encountered commonly in the evaluation of neck pain that may result in significant discomfort and functional deficits. Although the long-term prognosis of this condition is favorable, a standardized approach to therapy is

important to minimize unnecessary tests and identify patients who require more urgent intervention. Patient education, pain control, and physical therapy are the first line of therapy. Patients who have protracted pain or significant functional deficits may require a more thorough evaluation, including imaging, electrodiagnostic testing, and, possibly, surgical referral. This article outlines the basic clinical, diagnostic, and therapy considerations in the evaluation of cervical radiculopathy.

Lumbosacral Radiculopathy

387

Andrew W. Tarulli and Elizabeth M. Raynor

Lumbosacral radiculopathy is one of the most common disorders evaluated by neurologists and is a leading referral diagnosis for the performance of electromyography. Although precise epidemiologic data are difficult to establish, the prevalence of lumbosacral radiculopathy is approximately 3% to 5%, distributed equally in men and women. Degenerative spondyloarthropathies are the principal underlying cause of these clinical syndromes and are increasingly commonplace with age. Men are most likely to develop symptoms in their 40s, whereas women are affected most commonly between ages 50 and 60. The clinical presentation and initial management of lumbosacral radiculopathies of various etiologies are discussed.

Lumbar Spinal Stenosis

407

David A. Chad

Lumbar spinal stenosis may be congenital or acquired. A classic clinical presentation is described as neurogenic claudication. Physical signs of sensory loss, weakness, and attenuation of reflexes often are mild and limited in distribution. Neuroimaging of the lumbosacral spine with MRI and electrodiagnostic (electromyographic [EMG]) tests are the most informative diagnostic modalities. Conservative management often is successful, but surgical decompression may be indicated in refractory cases.

Neck and Back Pain: Musculoskeletal Disorders

419

Alec L. Meleger and Lisa S. Krivickas

In this article, non-neurologic causes of neck and back pain are reviewed. Musculoskeletal pain generators include muscle, tendon, ligament, intervertebral disc, articular cartilage, and bone. Disorders that can produce neck and back pain include muscle strain, ligament sprain, myofascial pain, fibromyalgia, facet joint pain, internal disc disruption, somatic dysfunction, spinal fracture, vertebral osteomyelitis, and polymyalgia rheumatica. Atlantoaxial instability and atlanto-occipital joint pain are additional causes of neck pain. Back pain resulting from vertebral compression fracture, Scheuermann's disease, spondylolysis and spondylolisthesis, pregnancy, Baastrup's disease, sacroiliac joint dysfunction, and sacral stress fracture is discussed.

Neck and Low Back Pain: Neuroimaging

Manzoor Ahmed and Michael T. Modic

Spine imaging accounts for a major share of expenses related to neck and back pain. Improving image quality translates into better morphologic evaluation of the spine. Unfortunately, the morphologic abnormalities on spine imaging are common and nonspecific, obscuring the relevance to patient symptomatology. Furthermore, distinction between degenerative and age-related changes is not clear. The key is clinical correlation of imaging findings. This article presents a concise and illustrated discussion of spinal neuroimaging related to neck and back pain, with emphasis on degenerative disease.

The Electrodiagnosis of Cervical and Lumbosacral Radiculopathy

Bryan Tsao

473

This article reviews the usefulness of the electrodiagnostic examination in patients who have suspected cervical and lumbosacral radiculopathy. This study can verify the presence and severity of radiculopathy, determine which levels are involved, and provide an electrodiagnostic correlate to imaging abnormalities. A practical approach for conducting the nerve conduction portion and needle electrode examination in these patients is discussed.

Nonsurgical Interventions for Spine Pain

Kerry H. Levin

495

Nonsurgical, conservative approaches to spine pain include medication and physical therapy. In addition, several invasive procedures have been developed to provide relief when conservative options fail. These include facet joint injection and radiofrequency ablation techniques, translaminar and transforaminal epidural corticosteroid injections, and intradiscal coagulation procedures. Controlled studies to assess the effectiveness of some of these therapeutic modalities have been performed.

Surgical Management of Neck and Low Back Pain

Ajit A. Krishnaney, John Park, and Edward C. Benzel

507

Surgical intervention for neck pain and low back pain may be of benefit to some patients. It should be considered, however, only in cases where medical management has failed and there is a clearly identifiable anatomic lesion that likely is the pain generator. Indications, preoperative evaluation, and common surgical procedures are reviewed.

Physical Medicine and Complementary Approaches

Deborah A. Venesy

523

Medical approaches to the treatment of spine pain are the cornerstone of therapy for neck and back pain. Although these techniques

are used widely, seldom have they been subjected to the scrutiny of careful randomized and controlled clinical trials. The costs of complementary treatments, such as spinal manipulation, massage therapy, and acupuncture, now are reimbursed by many medical insurance providers, but these modalities lack much scientific support. Physical medicine and complementary treatment modalities and some of the scientific studies aimed at assessing their effectiveness are reviewed.

Chronic Pain Management in Spine Disorders

539

Edward Covington

Chronic nonmalignant pain is less a symptom of a disease than a disease in itself. Accordingly, successful treatments rely less on identifying underlying pathology than on treating neural causes of pain amplification, psychologic causes of disability, and the sequelae of deconditioning and psychiatric illness. The outcome, when such treatment is provided, is remarkably favorable.

Index

567

Lumbar Spinal Stenosis

David A. Chad

Noninvasive Interventions for Spine Pain

Kerry H. Levin

Lumbar spinal stenosis is a condition of the spine that is characterized by a narrowing of the spinal canal and/or the neural foramina. This condition can cause pain, numbness, and weakness in the lower extremities. Conservative approaches to spine pain include physical therapy, medication, and epidural steroid injections. In addition, several minimally invasive surgical options have been developed to provide relief when conservative options fail. These include laser, minimally invasive discectomy, and minimally invasive laminectomy and foraminotomy. This article reviews the effectiveness of some of these therapeutic modalities that have been performed.

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Ajit A. Krishnan, John Park, and Edward C. Beck

Surgical intervention for neck pain and low back pain may be of benefit to some patients. It should be considered, however, only in cases where medical management has failed and there is a clearly identifiable anatomic lesion that likely is the pain generator. Indications, preoperative evaluation, and common surgical procedures are reviewed.

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Deborah A. Vespey

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