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脊柱外科实用图谱

SPINE SURGERY

a practical atlas

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人民卫生出版社
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A PRACTICAL ATLAS

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NOTICE

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PREFACE

The core of medicine in general, and surgery in particular, is changing rapidly. As physicians, a challenge that faces us all is to educate our peers and the generations to come. Unfortunately, in a society that is increasingly preoccupied with economic efficiency and rapid data collection, this challenge has become even greater. As educational institutions are required to compete with more clinically oriented private institutions, graduate and postgraduate education will clearly suffer. Thus, the availability of understandable and concise reference materials is of paramount importance—perhaps more so now than at any time in the past.

It is the intention of the authors to provide a concise summary of current indications, techniques and outcomes for a variety of spinal surgical procedures. As one of the authors remarked, "This work is intended to be the meat of spine surgery." It is intended to be used as an elective reference work as well as a "night before" or "morning of" book. While the work was initially intended for physicians in training, the applicability may be even broader.

It is our hope that this book will provide a concise reference for busy clinicians. The book is not intended to be a definitive or detailed work on any of the procedures, indications, techniques or outcomes mentioned. In this sense, it should fulfill the paramount requirement for any educational material of substance—to stimulate further reading on the subject in question.

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ACKNOWLEDGMENTS

This book originally began as the brainchild of Edward Wickland at a meeting of the American Academy of Orthopaedic Surgeons. The initial concept, a detailed multi-volume atlas, evolved to the current format. Given the variety of such works on spinal disorders and their care, the practical utility of a more compact and portable reference work became apparent, and from this concept grew *Spine Surgery: A Practical Atlas.*

Aside from Mr. Wickland, the authors are indebted to Michael Medina for his initial management and persistent development of the project. Most of all, the authors are indebted to Pat Thomas and Christa Wellman for their wonderful illustrations. The patience and occasional frustration that these gifted illustrators displayed was to their credit as they attempted to alter the minutiae of their art to the preordained concepts of the authors. Finally, a monumental debt of gratitude is owed to Lynn M. Ridings, who not only served as transcriptionist, critic and editor, but also as motivator, and, in the final analysis, advocate. That Lynn completed the work with her sanity, is a minor miracle. The authors remain grateful not only for this, but for her not inconsiderable talents as well.

Any errors in the manuscript, stylistic or content, are the responsibility of the authors. The content of the text was written after detailed discussions and references to contemporary literature. Obviously, these are somewhat subject to interpretations and prejudices that we frankly acknowledge.

While no work can be free of controversial statements in the current atmosphere in spine surgery, we hope that the offenses to various points of view will be minimal and accepted with the spirit of academic difference.

CONTENTS

PART I

LUMBAR SPINE

1

HERNIATED LUMBAR DISK

- LAMINOTOMY – DISKECTOMY
- DISK EXCISION – FAR LATERAL

• LAMINOTOMY–DISKECTOMY

SUMMARY

Symptomatic lumbar disk herniation resulting in sciatica occurs in approximately 2% of the adult population. Ninety percent of patients improve with nonoperative care within 6 to 12 weeks of the onset of symptoms. One exception is the cauda equina syndrome, an acute surgical emergency characterized by multiple nerve root involvement, saddle anesthesia, and urinary retention. In the absence of the cauda equina syndrome, progressive neurologic deterioration, or intolerable pain, nonoperative care is the rule. In those individuals who are refractory to nonoperative care and remain persistently symptomatic after 6 to 12 weeks, laminotomy and diskectomy might be considered. In appropriately selected patients, the success rate of laminotomy with diskectomy should approach 100% in terms of pain relief and functional improvement.

PRESENTATION

In posterior and posterolateral disk prolapses, referred neurogenic pain (sciatica) typically radiates distal to the knee. The distribution of this pain differs according to the nerve roots involved. Ninety percent of disk prolapses involve the L_{4-5} and L_5–S_1 segments. Disk prolapse involving the L_{4-5} segment results in symptoms from L_5 root compression. Pain radiates posterolaterally to the dorsum of the foot and the first

web space. Weakness of the extensor hallucis longus may be noted. Sensation is frequently diminished in the lateral aspect of the calf. Posterolateral L_5–S_1 disk prolapse involves the S_1 nerve root. The pain radiates posteriorly to the heel. Sensation is altered in this area. The ankle jerk is diminished or absent and weakness might be noted in the gastrocnemius soleus group. More rostral disk herniations, e.g., L_{3-4}, might involve the L_4 nerve root, with pain radiating down the medial aspect of the leg, and weakness of the tibialis anterior. Sensation is altered on the medial leg and the knee-jerk reflex is diminished.

The hallmark of acute disk prolapse and sciatica is the presence of nerve root tension signs. The femoral stretch reproduces pain in the distribution of the involved nerve root in neural compression syndromes involving the L_3 or L_4 nerve roots. The straight-leg raising maneuver of Lasègue is positive, reproducing sciatic pain, when the L_5 or S_1 nerve roots are involved.

The acute cauda equina syndrome is caused by a large central disk prolapse involving multiple nerve roots. The triad of bilateral sciatica, saddle anesthesia, and urinary retention is diagnostic. Physical examination shows weakness, sensory dysesthesias, or reflex changes at many levels; straight-leg raising maneuvers will invariably be positive. The treatment includes immediate imaging in the form of myelography or Magnetic Resonance Imaging (MRI) and immediate surgical decompression. Even with prompt surgical decompression, 30% to 40% will have residual genitourinary or gastrointestinal dysfunction. The sentinel symptom is urinary retention, not incontinence. Overflow incontinence may occur only as a consequence of cauda equina syndrome when it is due to a distended, neurogenic bladder.

NONOPERATIVE CARE

Randomized prospective data have confirmed the efficacy of a brief period of bed rest (less than 48 hours), the use of nonsteroidal anti-inflammatory agents, and active physical therapy as tolerated in the nonoperative treatment of acute disk prolapse. The efficacy of oral or epidural steroids has not been convincingly demonstrated in randomized prospective studies. Likewise, passive physical therapy (e.g., modalities) has not been shown to be of any benefit; manipulation in particular should be avoided. The use of Transcutaneous Electrical Nerve Stimulation (TENS) is controversial. It has been shown to be of benefit in chronic neuropathic pain syndromes, but its utility in acute radiculopathy secondary to lumbar disk prolapse is unproven.

DIAGNOSTIC STUDIES

In cases of persistent symptomatology after 6 to 12 weeks of appropriate conservative care, the imaging modality of choice is MRI. In the patient without previous surgery, gadolinium enhancement is not necessary. In cases of so-called hard disks (disk prolapse associated with ossification or calcification), myelography followed by postmyelographic Computed Tomography (CT) may be beneficial because of the superior definition of bony architecture.

The use of Electromyography and Nerve Conduction Velocity (EMG/NCV) is controversial. Various investigators have shown that the likelihood of isolating a specific nerve root without motor findings is low. Overall, EMG/NCV provides little information in addition to that provided by a comprehensive neurologic examination.

PROCEDURE

LAMINOTOMY – DISKECTOMY (FIG. 1–1)

Laminotomy with diskectomy is performed most frequently under general anesthesia.

POSITIONING

The patient is placed prone, with the abdomen hanging free, usually in a knee-to-chest configuration (Fig. 1–1A). This configuration reverses lumbar lordosis and improves access to the interlaminar space. The appropriate level is localized by an x-ray.

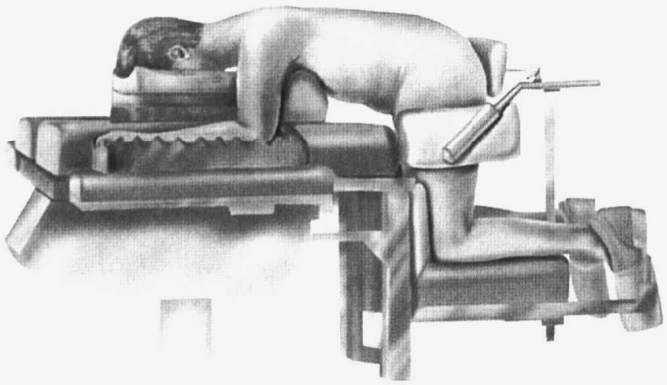

FIGURE 1–1A

HERNIATED DISK LAMINOTOMY–DISKECTOMY (L_{4-5}) POSITIONING. The patient is positioned prone in a standard knee-to-chest configuration, with the abdomen hanging free.

TECHNIQUE

To minimize soft tissue morbidity, the use of an operating microscope, surgical loupes, or endoscopic visualization has increased significantly. With these techniques, the incision can be kept small (Fig. 1–1B). In general, the incision for single-level laminotomy/diskectomy should be 3 to 5 cm. Before the incision, the skin may be anesthetized with 1% lidocaine and epinephrine at the discretion of the surgeon.

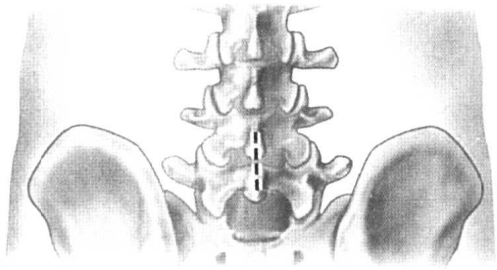

FIGURE 1–1B

The skin is incised in the midline from the spinous process of L_4 to L_5 (3 to 5 cm).

The skin is incised and self-retaining retractors are inserted. After appropriate hemostasis, dissection is carried through the subcutaneous fat to the lumbar dorsal fascia. The midline is easily visualized by palpating the groove over the spinous processes. This fascia is then divided on the side of the disk prolapse; a lateral spinal dissection then follows, with reflection of the muscles to the level of the facets. Care should be taken to spare the facet capsule.

A self-retaining retractor is then inserted and soft tissue removed from the interspace (Fig. 1–1C). The ligamentum flavum is gently dissected free and removed with

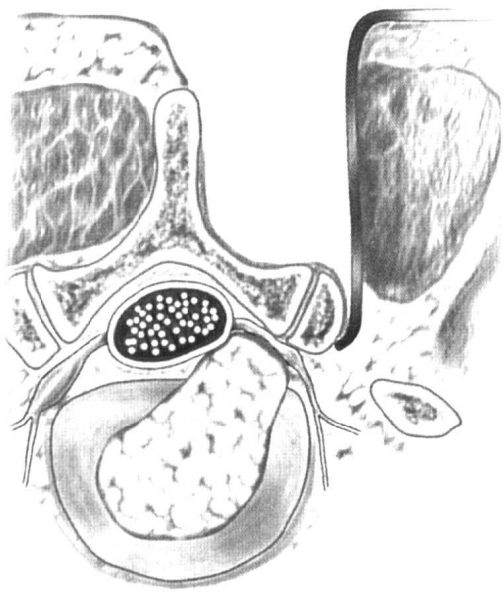

FIGURE 1-1C

On axial projection, the L_5 root is compressed by the posterolateral disk herniation.

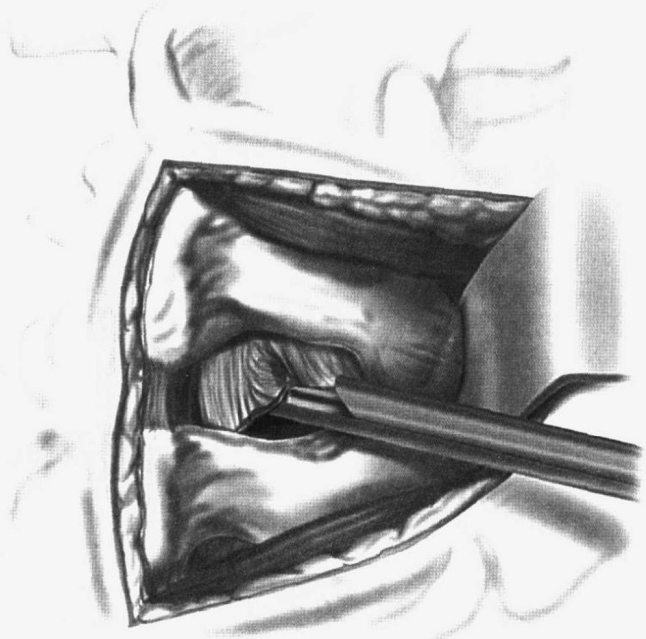

FIGURE 1-1D

The ligamentum flavum is removed by sharp and blunt dissection. Minimal bony resection is required.

a Kerrison rongeur (Fig. 1–1D). A laminotomy is then performed, with partial facetectomy if needed. The ligamentous fibers overlying the lumbar nerve root and defining the foraminal entry zone should be removed with a Kerrison rongeur to facilitate nerve root visualization laterally. After hemostasis with bipolar electrocautery, the affected nerve root is swept medially and the disk fragment visualized. The nerve root *must* be visualized or mobilized to prevent injury; in cases of an adherent root, the nerve trunk might be confused with disk tissue if mobilization is not done. The disk is nearly always more central to the nerve trunk. The annulus is then incised and the fragment removed (Fig. 1–1E). The nerve should then be inspected rostrally, caudally, and medially to be certain that no residual disk compression remains.

The wound is then closed in appropriate layers to include fascia, subcutaneous soft tissues, and skin.