



## Surgical Treatment of Degenerative Lumbar Spine Disease in Rural Sub-Saharan Africa: A Retrospective Study of 450 Cases and Its Future Implications

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■ **BACKGROUND:** Treatment for lumbar disc disease and spinal stenosis is the most common reason patients seek neurosurgical consultation in rural sub-Saharan Africa. Yet the misperception remains that lacking access to magnetic resonance imaging/computed tomography and a “spine surgeon,” neither a definitive diagnosis can be made nor corrective treatment instituted. To combat such therapeutic nihilism, the author has supervised the on-site training of general surgeons in rural Kenya for the past 15 years with the intent of making spine surgery available for patients in outlying provincial areas.

■ **METHODS:** Using a simplified, cost-effective approach for both diagnosis (myelography) and treatment (hemilaminectomy/foraminotomy for radiculopathies; decompressive laminectomy for neurogenic claudication), this retrospective study of 450 patients was undertaken to 1) determine the efficacy of such an approach, and 2) the general surgeon’s role in it.

■ **RESULTS:** Whether performed by the instructor alone (326 cases) or by the trainee under supervision (124), 92% of patients were satisfied with their surgical results. Equally noteworthy, perioperative morbidity (less than 2%) was essentially the same within the 2 groups.

■ **CONCLUSIONS:** Assuming experienced spine surgeons are willing to involve themselves in such hands-on training, the results of this study affirm that general surgeons can diagnose efficiently and then treat safely such degenerative spine conditions—thereby addressing this

most prevalent of disease processes that has huge socio-economic implications for rural sub-Saharan Africans.

### INTRODUCTION

The single most prevalent neurosurgical condition on the African continent (as in all other venues worldwide) is degenerative lumbar spine disease. In underserved rural sub-Saharan Africa, however, this is not simply a “quality of life” issue; rather, there are immense socioeconomic implications for those unable to do the physical labor required to sustain either themselves or their families. During the past decade in particular, it has become clear that this all-but-ignored condition can be addressed readily in any rural or provincial hospital having a general surgeon who is 1) aware of the disease process and its clinical presentation; 2) able to diagnose and treat it; and 3) willing to do so (the latter up until now usually being the limiting factor).

On the basis of the premises that 1) low-cost, virtually risk-free myelography readily yields a diagnosis, and 2) lumbar laminectomy is straightforward, easily taught, and can be adequately mastered, the results of this retrospective review of 450 cases suggest that any general surgeon with some previous hands-on training can add these procedures to his or her surgical armamentarium.

This begs the question: Should they be allowed, if not encouraged, to do so? As such, the intent of this review of one neurosurgeon’s 15-year experience in rural Africa is to provoke open-minded, collegial discussion regarding this issue.

### Key words

- Clinical presentations of lumbar DJD
- Decompressive laminectomy
- Hemilaminectomy/foraminotomy
- Lumbar myelography
- Lumbar radiculopathy
- Neurogenic claudication
- Spinal stenosis

### Abbreviations and Acronyms

**COSECSA:** College of Surgeons of East, Central, and South Africa

**CT:** Computed tomography

**MRI:** Magnetic resonance imaging

**PAACS:** Pan African Academy of Christian Surgeons

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## MATERIALS AND METHODS

### Clinical Evaluation

Any methodology regarding the treatment of lumbar spine disease must begin with a good history and physical examination. Although all spine surgeons already know this, most practitioners outside our specialty do not. As was emphasized to the general surgeon-in-training, the patient's history in particular is the key; subsequent physical findings only support what the clinician expects to encounter after taking a careful history. (In the author's experience, such nuances of clinical screening were more challenging for the resident trainee to master than the techniques of myelography, interpretation of those studies, or even the surgical procedure itself.)

Therefore, two distinct clinical presentations in particular were underscored throughout that warranted radiographic evaluation in those cases refractory to previous conservative measures: 1) unilateral radiculopathy; and 2) neurogenic claudication.

### Radiographic Studies

Assuming the absence of "red flags" in the history taken (i.e., severe low back pain not relieved with bed rest; cyclical fevers; unexplained weight loss; a previous history of cancer, tuberculosis, or recent significant trauma), plain x-rays were never ordered before 1 month into the clinical presentation and appropriate conservative treatment already completed. That said, any radiographic confirmation of diagnosis relied solely on myelography—excluding those few patients who presented with a magnetic resonance imaging [MRI] scan in hand. (During the past year alone within more developed sub-Saharan countries such as Kenya, the cost of MRI has significantly decreased as the result of a number of competing radiographic centers—and hence is now more available. Whether that modality might someday become the gold standard even in poorer countries, the minimal cost of myelography should still make this an attractive alternative in rural provincial hospitals.)

These studies always were performed by the physician who examined the patient and were only undertaken after the following 2 criteria were met: 1) clearly manifest symptoms and signs of neural compressive disease in patients who had already not responded to conservative measures and who perceived themselves to be truly incapacitated by their disability; and 2) those willing to consider surgery after discussing its potential risks and benefits should the defect on the proposed myelogram conform to their clinical history and physical findings.

All studies were performed without fluoroscopy, and a maximum of 3 plain films was taken after the water-soluble, nonionic contrast was instilled. Despite computed tomography (CT) being available at Tenwek during the last 5 years, post-myelogram CTs were neither necessary nor used.

### Operative Considerations

In accordance with our "minimalist" approach, all patients who presented with unilateral radicular leg pain or weakness underwent simple hemilaminectomies with lateral recess decompression and foraminotomies involving the symptomatic root(s). The posterior longitudinal ligament was never transgressed to access subligamentous disc protrusions, and disc material was removed only if already penetrating the ligament or freely extruded. For patients

with neurogenic claudication, full decompressive laminectomies were performed; if the patient also presented with radicular leg pain or weakness at rest, foraminotomies of the affected roots were performed at the close of the decompression.

Spinal anesthesia was used in every case, because no procedure extended beyond 2 hours. Such a protocol was deemed "suboptimal" in 4% of cases, although the subsequent operations were completed successfully in all with the use of intravenous sedation and local infiltration of anesthetic when necessary. No patient required conversion to general anesthesia intraoperatively, nor were any complications encountered from the spinal itself.

The only indication for a posterolateral fusion in concert after a decompressive laminectomy was an unstable spondylolisthesis documented preoperatively by a "slip" in flexion via standing lateral dynamic x-rays taken at the close of the myelogram. Exceptions to this rule included the following: 1) the very unusual circumstance in which a large, partially extruded fragment had to be removed despite a satisfactory decompression of the posterior elements, thereby potentially rendering the spine unstable; or 2) equally infrequent, instability detected at the time of surgery despite "negative" lateral dynamic x-rays preoperatively.

To conform to our "minimalist standards," pedicle screw instrumentation (although desirable) was not required to assure a good fusion—assuming the patient was compliant with wearing an external orthosis for the 3 months required.

### Data Collection

Patients were seen at 1 month for follow-up and then again at 1 year. Of those who complied ( $n = 411$ ), the effectiveness of operative intervention was judged solely by the patient on the basis of the following criteria: 1) his or her ability to return to normal activities of daily living and/or occupational duties heretofore precluded; 2) taking no pain medication on a regular basis; and 3) those who would choose retrospectively to have undergone surgery on the basis of their satisfaction with having done so. Because of travel restrictions inherent for many rural Kenyans, 39 others returned only for their first postoperative visit at 1 month and were judged by the same criteria. No patients who failed to return ( $n = 25$ ) were included in this study, although all had experienced relief of their symptoms at the time of hospital discharge.

## RESULTS

The 450 patients included in this retrospective review underwent simplified surgery for lumbar degenerative disc disease during a 15-year period at Tenwek and Kijabe Hospitals in rural Kenya. Although the period of follow-up is admittedly short by Western academic standards (1 year in 411 cases; at least 1 month in 39), any recurrent symptomatology could arguably be attributed to progression of disease and not failure of the surgery itself. With that caveat in mind, from these data the following results can be summarized in numerical order of increasing importance:

- 1) Given our strict criteria for undertaking myelography only when operative intervention was under consideration, 92% of patients who met such criteria underwent surgery. The remaining 43 (8%) not found to have demonstrably operative pathology were given a single epidural steroid injection in the same

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