

# Feasibility and Success Rate of Lumbar Full-Endoscopic Discectomy: A Preliminary Report From a Military Hospital

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**Introduction:** Disease and nonbattle injuries are common among deployed military forces and musculoskeletal disease is a leading burden of disease in military population. Consequently, military employees and veterans frequency need medical and surgical management for lumbar disc herniation. Because of considerable complications and long post operation rehabilitation period, minimal invasive procedures have substituted old techniques in many modern military hospitals.

**Case Presentation:** In this study, the preliminary results of 30 operated cases with the full endoscopic lumbar disc herniectomy technique in a military hospital were presented for feasibility, complications and follow-up outcomes. Disc herniation was more frequent in left side, particularly in L5-S1 level. Three patients from the first 10 cases were converted to open surgery. No important complication was observed and all patients were pain free, had no complication after 1 and 2 months follow-up and returned to their work.

**Conclusions:** We observed that the procedure is feasible and accompanied with an acceptable success rate, short hospital stay and very few perioperative and postoperative complications. It is an appropriate choice of treatment, even in combat region and moving hospitals and can reduce the morbidity of the disease.

**Keywords:** Surgery; Endoscopy; Disc Herniation

## 1. Introduction

The incidence and epidemiology of disease and non-battle injuries (DNBI) among military service members are called as "the hidden epidemic" (1). Musculoskeletal injuries, in particular lumbar disc herniation, are common problems in senior military officers and veterans because of special physical and occupational stress in military jobs (2, 3). This causes a substantial pain, disability and activity limitation for patients. Medical treatment and rehabilitation management have a limited efficacy (4). Consequently, many cases undergo open surgery to relieve their pain and remove nerve root pressure including hemi-laminectomy, laminectomy and disc removal. However, there are important perioperative and postoperative complications as well as long care and rehabilitation after open surgery. Alternatively, Lumbar full-endoscopic discectomy is a modern minimally invasive procedure in which a bone or a protruded disc is removed to alleviate pain caused by compressed spinal nerve (5). Here, the preliminary results of 30 operated cases were presented for feasibility, complications and follow-up aspects.

## 2. Case Presentation

Thirty patients not satisfied after medical management and physical rehabilitation were included in the study during January to September 2012. They were supposed to undergo minimal invasive procedure and admitted a day before the operation for paraclinical studies. Interlaminar approach was applied after general anesthesia and routine preparations. There was no major problem or minimal perioperative hemorrhage. The patients were examined regarding local neural signs and symptoms and discharged with Vitamin B1 and Naproxen medications as well as lumbosacral supportive corset administration for six weeks. They were followed up for 3-5 months.

### 2.1. Operation Techniques

After general anesthesia and intravenous injection of prophylactic antibiotic, the patient was positioned on the operating table compatible with fluoroscopy in a prone position and then prepped and draped in sterile fashion. The skin was marked by a skin marker and a small stab

skin incision was made 10-15 mm lateral to the midline on the approach side and fasciotomy of the lumbar fascia was performed. All surgical procedures were conducted by the first author and assisted by other colleagues. To avoid unintentional dural penetration, under fluoroscopic guidance, in lieu of a guide wire, the working channel of the endoscope was placed over the retractor and the angled endoscope was attached. Throughout the operation, the position of the endoscope was moved to an appropriate position to obtain the best view. After endoscope insertion and focus and image orientation, ligamentum flavum was detached from the lamina using an up-going angled curette under clear endoscopic visualization. After interlaminar identification, flavectomy was performed to ensure an adequate exposure. Resection of the ligamentum flavum proceeded from medial to lateral until the nerve root was identified. After complete clear eyesight to the nerve root, the root was retracted medially using a penfield dissector or suction retractor to expose the herniated disc. After removal of the herniated fragment and nerve root decompression, the disc space was irrigated with saline to remove any free fragments (Figure 1 and 2). Bleeding in the epidural space was controlled with bipolar cautery. Then, sodium hyaluronate was placed on the exposed dura, epidural fat, and nerve root to avoid scar formation. The instruments and tube were withdrawn. The fascia and skin were closed in the standard fashion.

The average age of males (96.6% of cases) was 36.5 (± 12.1 years) and 52 in females. The location frequency of lumbar discopathies in our cases was illustrated in Table 1. Ten percent of the cases (n = 3) were converted to open hemilaminectomy due to untreated neural defect and paresthesia. All of them were among the first 10 operations and were at left L2-L3, left L3-L4 and left L4-L5. Four patients received Gabapentin due to nerve root irritation with favorable results. All patients were pain free, had no complication after 1 and 2 months follow-up and returned to their work.

**Table 1.** The frequency of lesions in the patients group <sup>a,b</sup>

Level of Herniation	Side	
	Right	Left
L2-L3	-	3.4
L3-L4	3.4	-
L4-L5	13.7	17
L5-S1	23.8	37.4

<sup>a</sup> Abbreviations: L, Lumbar; S, Sacral.

<sup>b</sup> Data are presented as %.

### 3. Discussion

In this study, we reported 30 consecutive patients who underwent lumbar full-endoscopic discectomy in a military hospital. We observed that the procedure is feasible and accompanied with an acceptable success rate, short hospital stay and very few perioperative and postoperative

complications. Musculoskeletal injuries, particularly lumbar disc herniation are common problems among senior military officers (1, 2). It is common among young soldiers as well (5). It is most commonly a non-combat related injury due to excessive workload, incorrect posture during work and overuse (3-6). Routine open discectomy has a modest outcome in military personnel with a relatively long postoperative care and complications, which is worse than civilian individuals (4). However, in minimal invasive operations, vertebral elements remain intact and only the herniated disc is removed and consequently less complications rate is expected. Although Lumbar Full-Endoscopic Discectomy has been introduced in many developed countries (7), available reports from developing countries are scarce. Additionally, there are limited data about complications and feasibility of this method in military units. Conventional surgeries have been associated with scarring of epidural space, of which 10% become clinically symptomatic (7). Ruetten et al. performed a clinical trial comparing conventional microsurgical or full endoscopic discectomy and found a similar surgical success and serious complication rate as well as recurrence rate in the both groups, after 2 years of follow-up. Nevertheless, the rate of nonserious complications and mean operation time were significantly increased in microsurgical method (7). In reports on cases undergone full endoscopic discectomy, published complications were recurrent disc herniation on the same side, incomplete removal of a ruptured disc, infection, neuronal injury (including sensory changes), dural tears, vascular injury, psoas hematoma, and sympathetically mediated pain (5). Furthermore, it seems that full endoscopic procedure reduces intraoperative traumatization (7). Furthermore, full-endoscopic procedure reduces the costs of treatment and helps rapid mobilization. Nonetheless, one must consider limitations, required expertise, learning curve, and patients' selection.

In conclusion, with a careful selection criteria and expert surgical team, full endoscopic lumbar discectomy appears to be safe and feasible in military hospitals, which facilitates fast discharge and return to duty interval. This would be a good choice in military field surgical units or moving hospitals, albeit in hands of expert surgeons and precise inclusion criteria.



**Figure 1.** Herniated Disc Fragments



**Figure 2.** Final Appearance of the Operation Site

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### Authors' Contributions

All authors actively contributed in the surgical team,

post-op investigation, manuscript writing and revision.

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