



## Comparative Study of 2 Skin Incisions for Microscopic Lumbar Discectomy

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■ **OBJECTIVE:** Microscopic lumbar discectomy is a common minimally invasive surgery. A transverse skin incision has sound theoretical cosmetic advantages compared with the classic vertical incision. We compared transverse and vertical skin incisions for microscopic discectomy regarding cosmetic outcome, postoperative pain, and the provided surgical cutaneous inlet.

■ **METHODS:** This prospective study enrolled 86 patients who were randomly assigned to a vertical incision group or a transverse incision group. The maximum surgical cutaneous inlet provided was measured in 2 diameters. Pain was recorded on postoperative days 1, 3, and 7 using a numeric patient rating scale from 0 to 10 with 0 indicating no pain. The cosmetic appearance of the wound was evaluated by a plastic surgeon and by the patients as excellent, very good, good, fair, and poor.

■ **RESULTS:** Compared with vertical incisions, transverse incisions provide similar surgical cutaneous inlets, cause higher pain scores on postoperative days 1 and 3 but a similar score on postoperative day 7, and ensure significantly better wound cosmesis.

■ **CONCLUSIONS:** Transverse skin incision for microscopic lumbar discectomy is an applicable alternative to classic midline or paramedian vertical incision with better esthetic results.

neurosurgical procedure in the United States, with nearly 300,000 procedures performed each year.<sup>2</sup> Since the first report of lumbar disc surgery in 1934 by Mixer and Barr,<sup>3</sup> progressively less invasive techniques have been developed. Using the operative microscope, Yasargil<sup>4</sup> and Caspar<sup>5</sup> introduced the microdiscectomy procedure. Microdiscectomy has become the most adopted procedure for lumbar discectomy worldwide.<sup>6</sup>

The concept behind performing a “less invasive” procedure is minimizing surgically induced tissue damage, while achieving good clinical outcomes comparable with conventional “larger” surgeries. Patients subjected to less invasive procedures are expected to experience less postoperative pain, smaller and more cosmetic skin incisions, shorter hospitalization, and a quicker return to their normal daily activities.<sup>6</sup> The surgical skin incision is one of the most appraised operative outcomes in minimally invasive procedures. Traditionally, the smaller and less painful the incision is, the higher the incision is praised, on the sole condition that the limited access did not jeopardize the patient’s safety or the surgical success. In this study, based on anatomic and esthetic facts regarding the healing of skin incisions, a newly adopted transverse skin incision—which would presumably improve outcomes from the minimally invasive microscopic paramedian interlaminar approach for lumbar discectomy—was compared with the classically performed paramedian vertical incision.

### MATERIALS AND METHODS

We enrolled 86 patients who presented to our clinic over a 4-year period (from early 2010 to late 2013) with classic signs and symptoms of discogenic sciatica. Inclusion criteria were persistent sciatica for at least 6 months despite medical treatment in the form of nonsteroidal antiinflammatory drugs and corticosteroids as well as physiotherapy sessions and a nonenhanced magnetic resonance imaging study confirming a lumbar nerve root compression by a herniated intervertebral disc at either the L4-5 or L5-S1 levels that could be correlated with the sciatica. Exclusion criteria included previous spine surgery, history of poor wound

### INTRODUCTION

Sciatica caused by lumbar intervertebral disc herniation is the most frequent indication for spinal surgery,<sup>1</sup> and lumbar discectomy has become the most common

#### Key words

- Lumbar
- Microdiscectomy
- Skin incision
- Transverse

#### Abbreviations and Acronyms

- T group:** Transverse skin incision group
- V group:** Vertical skin incision group

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healing or keloid formation, other spine pathologies that might influence postoperative pain assessment (e.g., facet arthropathy, spondylolisthesis), and body mass index  $>35$  kg/m<sup>2</sup>. Patients with diabetes mellitus should have their blood glucose level medically controlled during the entire perioperative period.

Preoperative preparation included routine blood tests (complete blood count, coagulation profile, liver and kidney functions, and blood glucose levels) and dynamic lumbar spine x-ray studies to rule out instability. Patients were admitted on the same day of operation. After giving informed consent, patients were to undergo minimally invasive single-level microscopic lumbar discectomy surgery via a paramedian interlaminar approach. Patients were assigned to 1 of 2 groups: a vertical skin incision group (V group) or a transverse skin incision group (T group). Patients were randomly assigned to each group using a computer-generated table.

In the operating room, patients were positioned supine on a Wilson frame. The targeted intervertebral level was marked using a localizing needle and fluoroscopy. Before skin incision, the targeted site was infiltrated with 10 mL of bupivacaine 0.25%. Operative steps after the skin incision included ipsilateral medially based curvilinear paravertebral fascia flap, lateral displacement of the paravertebral muscles to expose the interlaminar space, ligamentum flavum excision, mild medial retraction of the traversing nerve root, and disc fragment retrieval along with discectomy. Postoperative care involved encouraging ambulation when tolerated. Patients were discharged the following morning. Postoperative follow-up clinic visits were scheduled at 1 week and 1 month.

The only intraoperative difference between the 2 groups was the skin incision marking and orientation. As mentioned earlier, the localization depended on lateral fluoroscopic images detecting a spinal needle (placed percutaneously off the midline on the non-symptomatic side) strictly perpendicular to the targeted intervertebral disc space. The so-called main entry point, where both types of incisions are centered, would be 5 mm lateral to the midline on the symptomatic side, in the same transverse plane of the contralateral localization spinal needle. Both skin incisions are initially marked as a 3-cm line.

The vertical paramedian incision runs 5 mm parallel to the midline on the symptomatic side and 15 mm cephalic and 15 mm caudal to the main entry point (Figure 1). In the first few cases in our series, we started the transverse incision 10 mm lateral to the midline on the asymptomatic side and then moved transversely, crossing the midline to the symptomatic side and running 5 mm medial and then 15 mm lateral to the main entry point. However, a slight modification to the horizontal incision placement was later implemented to be 10 mm medial and 20 mm lateral to the main entry point, as this seemed to provide easier self-retaining microdiscectomy retractor placement (Micro Lumbar Discectomy System; Aesculap AG, Tuttlingen, Germany) with less skin traction (Figure 2).

The study groups were compared regarding 3 points. First, in the operative skin inlet area provided by each incision, the rostrocaudal and lateromedial diameters of the maximally opened skin incision were measured. Second, postoperative surgical incision pain was assessed using a patient numeric rating scale, from 0 to 10, with 10 being the worst pain and 0 denoting no pain.

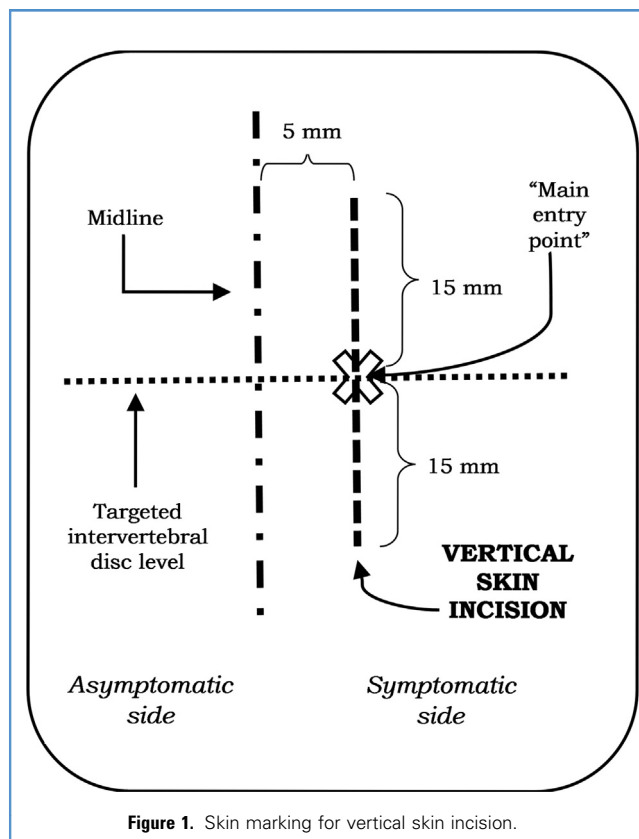


Figure 1. Skin marking for vertical skin incision.

This scale was recorded by each patient on a provided chart at days 1, 3, and 7 postoperatively.

Finally, the appearance of the surgical incisions was evaluated at the follow-up visit 1 month postoperatively. Unmagnified colored photos of the wound taken by a 13-megapixel digital camera at a 30-cm distance were shown to each patient and were reviewed by an independent plastic surgeon. The esthetic appearance of the surgical wound was assessed using 5 grades: “excellent (100%), very good (75%), good (50%), fair (25%), and poor (0%).”

Statistical analysis was performed using SPSS for Windows version 12.0 (SPSS, Inc., Chicago, Illinois, USA). All values were calculated as mean  $\pm$  SD. Demographic characteristics such as age and sex of patients were analyzed using the Student t-test and the  $\chi^2$  test for the intergroup comparison, respectively. The mean intraoperative open wound diameters and the postoperative numeric rating scale scores at the specified days were compared between groups using the Student t-test. The scaling percentages given by the plastic surgeon and patients regarding surgical wound appearance were analyzed between groups using the  $\chi^2$  test.

## RESULTS

Of 86 patients enrolled in the study, 41 were assigned to the V group, and 45 were assigned to the T group. Seven patients were lost to follow-up. Mean age (V group, 42.8 years  $\pm$  7.3; T group,

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