

Percutaneous Transforaminal Endoscopic Lumbar Discectomy

- [Comparison of Clinical and Radiographic Outcomes Between Percutaneous Endoscopic Transforaminal Discectomy and Unilateral Biportal Endoscopic Discectomy for the Treatment of L4/5-Level MSU Size-3 Lumbar Disk Herniation: A 2-Year Retrospective Cohort Study](#)
- [Effectiveness and Safety of Transforaminal Spinal Endoscopy: Analysis of 1000 Clinical Cases](#)
- [Percutaneous Endoscopic Backhand Holding \(EBH\) Technique for Extraforaminal Lumbar Disc Herniations: A Modified Operative Technique](#)
- [The utilization of percutaneous endoscopic lumbar discectomy in recurrent lumbar disc herniation: a systematic review and meta-analysis](#)
- [Clinical observation of percutaneous transforaminal endoscopic discectomy for lumbar disc herniation and analysis of influencing factors for recurrence](#)
- [The effect of annulus fibrosus suture combined with percutaneous transforaminal endoscopic discectomy on obese patients with lumbar disc herniation](#)
- [Comparative efficacy and safety of three surgical procedures for the treatment of lumbar disc herniation: a Bayesian-based network analysis](#)
- [Biplane Ultrasound Versus Fluoroscopy for Guidance of Percutaneous Lumbar Intervertebral Foramen Insertion : A Randomized Controlled Clinical Trial](#)

Since Kambin experimentally induced [arthroscopy](#) to treat herniated nucleus pulposus, [percutaneous endoscopic lumbar discectomy](#) (PELD) has been developed.

Transforaminal [lumbar endoscopic discectomy](#) (TLED) is a [minimally invasive surgery](#) for removing [lumbar disc herniations](#). This technique was initially reserved for herniations in the foraminal or extraforaminal region.

It seems to be a promising technique to effectively treat LDH. The reported complication rate of PTED is low, as is the percentage of patients requiring additional surgery due to recurrent LDH. Due to its steep learning curve, however, PTED should be further investigated before widespread implementation. Open microdiscectomy remains the current standard therapy for the surgical decompression of LDH. High-quality randomized controlled trials are needed to generate Class I evidence on the efficacy and cost-effectiveness of PTED ¹⁾.

History

A technique for [percutaneous](#) nonvisualized indirect [spinal canal decompression](#)—[percutaneous nucleotomy](#)— through a posterolateral approach was described by [Parviz Kambin](#) in 1973 ²⁾ and [Hijikata et al.](#) in 1975. ³⁾

Kambin described using a Craig cannula and Hijikata a 2.6-mm cannula. The technical challenge of achieving sufficient removal of nucleus pulposus material through a needle was addressed by Kambin

and coworkers in 1986 and 1987 with the introduction of working cannulas possessing diameters up to 5 mm and flexible forceps ^{4) 5)}.

The next step in the advancement of the percutaneous discectomy technique was the addition of the endoscope. The first endoscopic views of a herniated nucleus pulposus were published by Kambin et al. in 1988 ⁶⁾ and the first reported introduction of a modified arthroscope into the intervertebral disc space was reported by Forst and Hausman in 1983 ⁷⁾

Schreiber et al. ⁸⁾ and Suezawa et al. ⁹⁾ published their bilateral approach for a percutaneous nucleotomy under endoscopic control and described injecting indigo carmine into the disc space to stain the abnormal nucleus pulposus and anular fissures.

Percutaneous endoscopic discectomy certainly must receive a great portion of the credit for advancing endoscopic spine surgery, but it also must likely take responsibility for endoscopic spine surgery's slow rate of acceptance as a feasible technique by most orthopedic and neurosurgical spine specialists. The surgical goal of percutaneous endoscopic discectomy is to indirectly decompress the neural elements by selectively removing the nucleus pulposus from the posterior one-third of the disc space. From its origin, the technique showed promising results: Kambin and Gellman reported a 72% success rate in 136 patients with their percutaneous technique in 1983, but it has been difficult to quantify the impact of such results because they were not matched with nonoperative controls ¹⁰⁾

It has several advantages over open [lumbar discectomy](#), including less paravertebral muscle injury, preservation of bony structure, and rapid recovery, and has gained popularity for removal of herniated disc (HD) material over the past few years since Kambin ¹¹⁾ introduced the percutaneous posterolateral approach in 1983.

Even sequestered disc material - regardless of its size and level - that slipped into the spinal channel can be removed with the minimal invasive method.

Large, uncontained, lumbar disc herniations can be sufficiently removed with remarkable long-term outcome. Although the neurological outcome is the same, the morbidity is significantly less than open [discectomy](#). Maximum benefit can be gained if we adhere to strict selection criteria. The optimum indication is single- or multi-level radiculopathy secondary to a single-level, large, uncontained, lumbar disc herniation ¹²⁾.

Indications

Proper surgical indications and good working channel position are important for successful PELD. PELD techniques should be specifically designed to remove the disc fragments in various types of [disc herniation](#) ¹³⁾.

Advantages

Immediate pain relief in 95% of the cases - study info needed

Direct access to herniated disc/sequester

The disc-annulus and the ligament remain intact

No general anesthesia, only a sparing local anesthetic necessary

Outpatient treatment

Shorter rehabilitation -study info needed

Faster return to profession and everyday life - study info needed

Small incision (only one stitch) = hardly any scarring.

For [adjacent segment degeneration](#) (ASD) and [recurrent lumbar disc herniation](#), PELD had more advantages over open lumbar surgery in terms of reduced blood loss, shorter hospital stay, operating time, fewer complications, and less postoperative discomfort ¹⁴⁾.

Technique

It can be performed under local anesthesia and requires only an 8-mm skin incision.

PTED performed under [local anesthesia](#) and [conscious sedation](#) is safe and effective to treat [sciatica](#) and yields high satisfaction rates from surgeons, anesthesiologists, and patients ¹⁵⁾

<html><iframe width="560" height="315" src="https://www.youtube.com/embed/buetFRHH55U" title="YouTube video player" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture" allowfullscreen></iframe></html>

Reoperations

Reoperation rates of PELD have been reported from 2.3% to 15% ^{16) 17) 18) 19) 20)}.

According to a nationwide cohort study, there is no significant difference in the reoperation rates between open discectomy (13.7%) and endoscopic discectomy (12.4%) ²¹⁾.

Age

PELD may not be an applicable option for all ages.

Kim et al. selected 15,817 patients who underwent open discectomy (n = 12,816) or PELD (n = 3,001) in 2003 from Korean Health Insurance Review & Assessment Service (HIRA) database. All patients in the cohort were followed until December 31, 2008, and the minimum follow-up period was 5 years. A time to event survival analysis was performed. Primary end-point was any type of second lumbar spine surgery during the follow-up period. Minimum P-value approach and two-fold cross validation approach were utilized to determine an age cut-off point.

The optimal age cut-off point was determined as 57 years. PELD for elder patients (≥ 57 years) had a higher reoperation risk during postoperative 3.4 years (Hazard ratio [HR] at 1 yr, 1.75; 2 yr, 1.57; 3 yr, 1.41). However, re-operation risk was not higher after PELD for patients of < 57 years from 1.9 years than open discectomy (HR at 2 yr, 0.86; 3 yr, 0.78; 4 yr, 0.70; 5 yr, 0.63).

In the present study, they showed that an age cut-off point of PELD for optimal reoperation rate may be 57 years with national-wide population based data. Reoperation rate seems to be not higher for patients younger than 57 years after PELD than open discectomy, but applying PELD for elder patients need careful consideration ²²⁾.

Case series

[Percutaneous Transforaminal Endoscopic Lumbar Discectomy Case series.](#)

Case reports

[Percutaneous Transforaminal Endoscopic Lumbar Discectomy case reports](#)

1)

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