Agri 2024;36(4):218–226
doi: 10.14744/agri.2023.75983

ORIGINAL ARTICLE

# The impact of trans-sacral epiduroscopic laser decompression on quality of life in lumbar disc herniation

## *Lumbar disk hernisinde trans-sakral epiduroskopik lazer dekompresyonun yaşam kalitesine etkisi*

**Sibel ÖZCAN,[1] Arzu MUZ,[2] Aysun Yıldız ALTUN,[1] Rustem PAYAM,[1] Mehmet Fatih POLAT,[1] Selami ATEŞ ÖNAL[3]**

**Summary**

**Objectives:** Trans-sacral epiduroscopic laser decompression (SELD), employing a video-guided catheter and laser, is one of the preferred options for minimally invasive treatment in lumbar disc disease. The aim of this study was to evaluate the effect of SELD treatment on pain, disability, and quality of life in patients with lumbar disc herniation.

**Methods:** Between January 2015 and June 2017, a total of 76 patients who underwent SELD were examined retrospectively. The Oswestry Disability Index (ODI) and Visual Analog Scale (VAS) scores were recorded preoperatively, as well as 1, 3, 6, and 12 months after SELD. Quality of life was recorded preoperatively and 12 months after SELD. Patient satisfaction was evaluated based on Odom's Criteria at the final follow-up.

**Results:** Improvement was observed in low back pain and radicular pain, with the VAS score decreasing from 6.5±0.9 and 7.2±0.3 to 2.31±1.6 and 2.9±1.3 at the final follow-up ($p<0.001$). The rate of disability, assessed by ODI, decreased from 65.21±1.7 to 21.38±1.0 at the final follow-up. SF-36 scores were statistically higher for all sub-variables of the questionnaire after the procedure. At the final follow-up, 65.8% of patients reported a degree of satisfaction as excellent-good based on Odom's Criteria.

**Conclusion:** Trans-sacral epiduroscopic laser decompression enhances quality of life by improving pain and disability scores in patients with chronic low back and/or radicular pain who do not respond to conservative treatments and epidural steroid administration.

Keywords: Epiduroscopy; lumbar disc herniation; quality of life; VAS.

**Özet**

**Amaç:** Trans-sakral epiduroskopik lazer dekompresyon (SELD), video kılavuzlu kateter ve lazer kullanılan, lomber disk hastalığında minimal invaziv tedavi için tercih edilen seçeneklerden biridir. Bu çalışmanın amacı, lomber disk hernisi olan hastalarda SELD tedavisinin ağrı, özürlülük ve yaşam kalitesi üzerine etkisini değerlendirmektir.

**Gereç ve Yöntem:** Ocak 2015–Haziran 2017 arasında SELD yapılan toplam 76 hasta retrospektif olarak incelendi. Oswestry Engellilik İndeksi (ODI) ve Görsel Analog Skala (VAS) skorları işlem öncesi ve SELD'den 1, 3, 6, 12 ay sonra kaydedildi. Yaşam kalitesi, işlem öncesi ve SELD'den 12 ay sonra kaydedildi. Hasta memnuniyeti ise son takipte Odom Kriterlerine göre değerlendirildi.

**Bulgular:** Bel ağrısı ve radiküler ağrıda, VAS skoru son takipte 6.5±0.9 ve 7.2±0.3'ten 2.31±1.6 ve 2.9±1.3'e düşerek iyileşme gözlendi ($p<0.001$). ODI ile değerlendirilen özürlülük oranında ise 65.21±1.7'den 21.38±1.0'a düşüş tespit edildi. İşlem sonrası SF-36 skoru, anketin tüm alt değişkenlerinde istatistiksel olarak daha yüksekti. Son değerlendirmede, hastaların %65.8'i işlem sonrası memnuniyetlerini Odom Kriterlerine göre mükemmel-iyi olarak bildirdi.

**Sonuç:** Trans-sakral epiduroskopik lazer dekompresyon, kronik bel ağrısı ve/veya radiküler ağrısı olan, konservatif tedavilere ve epidural steroid uygulamasına yanıt vermeyen hastalarda ağrı ve özürlülük skorunu iyileştirerek yaşam kalitesini artırmaktadır.

Anahtar sözcükler: Epiduroskopi; lumbar disk hernisi; VAS; yaşam kalitesi.

[1]Department of Anesthesiology and Reanimation, Fırat University Faculty of Medicine, Elazığ, Türkiye
[2]Department of Pain Management, Ankara Training and Research Hospital, Ankara, Türkiye
[3]Department of Pain Management, Acıbadem Hospital, İstanbul, Türkiye

**Submitted** *(Başvuru):* **02.03.2022** **Revised** *(Revize):* **18.08.2023** **Accepted** *(Kabul):* **09.10.2023** **Available online** *(Online yayımlanma):* **09.10.2024**

**Correspondence:** Dr. Sibel Özcan. Fırat Üniversitesi Tıp Fakültesi, Anesteziyoloji ve Reanimasyon Anabilim Dalı, Elazığ, Türkiye.
**Phone:** +90 - 424 - 233 35 55/2977 **e-mail:** dr.sibelcozcan@gmail.com

## Introduction

Epiduroscopy, also referred to as epidural spinal endoscopy, stands as a minimally invasive percutaneous technique that employs a flexible endoscope through the sacral hiatus for evaluating the epidural space. This procedure facilitates direct visualization of the epidural space, enabling diagnosis and a range of clinical applications, including epidural catheter placement, disc herniation decompression, epidural adhesiolysis, drug agent delivery, and spinal cord stimulation electrode implantation.[1] Its initial application in failed back surgery syndrome has expanded due to advancements in techniques and devices.[2,3]

In 1996, the United States Food and Drug Administration sanctioned a contemporary epiduroscopic technique via the sacral hiatus, specifically for the treatment of spinal epidural pathologies. Subsequently, the emergence of trans-sacral epiduroscopic laser decompression (SELD) aimed to alleviate symptomatic epidural lesions within the lumbosacral spine. Utilizing small-caliber endoscopes, flexible video-guided catheters, and minimally invasive laser technology since the 2000s, SELD distinguished itself from conventional procedures involving drug injection or adhesiolysis, such as epidural neuroplasty.[4,5] Notably, SELD harnesses the effects of laser ablation on hydrated soft tissue, potentially resulting in sustained decompression through the elimination of soft disc herniation.[6–10]

The benefits of SELD over open surgery are evident, including safe access to the ventral epidural space, elimination of the need for dissection, precise targeting guided by a flexible endoscope, reduced bleeding, minimal tissue damage, and a lower risk of refibrosis.[7] SELD's foundational principle of laser-based condensation on hydrated herniated discs defines its approach. While optimally suited for mild to moderate disc herniations, the broader indications of SELD remain a topic of ongoing discussion.[11] Reports have indicated the efficacy of SELD in various lumbar spinal conditions, including nerve root adhesions, failed back surgery, disc herniation, and spinal stenosis.[12–15]

Quality of life assessments help researchers, healthcare professionals, and policymakers understand the overall well-being, functioning, and satisfaction of individuals across various domains of life.[16] Moreover, quality of life assessment tools can be self-reported questionnaires, interviews, or a combination of both.[17] The choice of tool depends on the target population, the specific domains being assessed, and the research or clinical goals. These assessments provide valuable insights into the impact of health conditions on individuals' lives and help guide interventions and policies to improve overall well-being.[18]

Central to understanding the comprehensive impact of medical interventions is the assessment of quality of life. Such assessments serve as invaluable tools for grasping the overall well-being, functional capacity, and satisfaction of individuals across multifarious life domains. These assessment instruments can manifest in the form of self-administered questionnaires, structured interviews, or a combination thereof, contingent upon factors like the target demographic, the specific life domains under scrutiny, and the overarching research or clinical objectives. These assessments provide nuanced insights into how health conditions reverberate through individuals' lives, guiding evidence-based interventions and shaping policies aimed at elevating holistic well-being.[19]

This study aims to evaluate the effect of trans-sacral epiduroscopic laser decompression on pain, disability, and overall quality of life in patients with lumbar disc herniation, both before and after SELD treatment, with a reassessment at a 12-month follow-up.

## Material and Methods

The study was conducted as a retrospective trial in a tertiary university hospital in accordance with the principles of the Declaration of Helsinki. The approval of the local ethics committee (decision numbered 2018/13/01) was obtained before the study. The medical records of patients who underwent SELD for chronic low back pain and/or radicular pain from disc herniation were reviewed.

### Patient Population

From January 2015 to June 2017, among the 90 patients who underwent SELD in our pain clinic, 76 patients were retrospectively enrolled in the final cohort (Fig. 1). The study exclusion criteria were as follows: previous history of lumbar surgery, insuf-

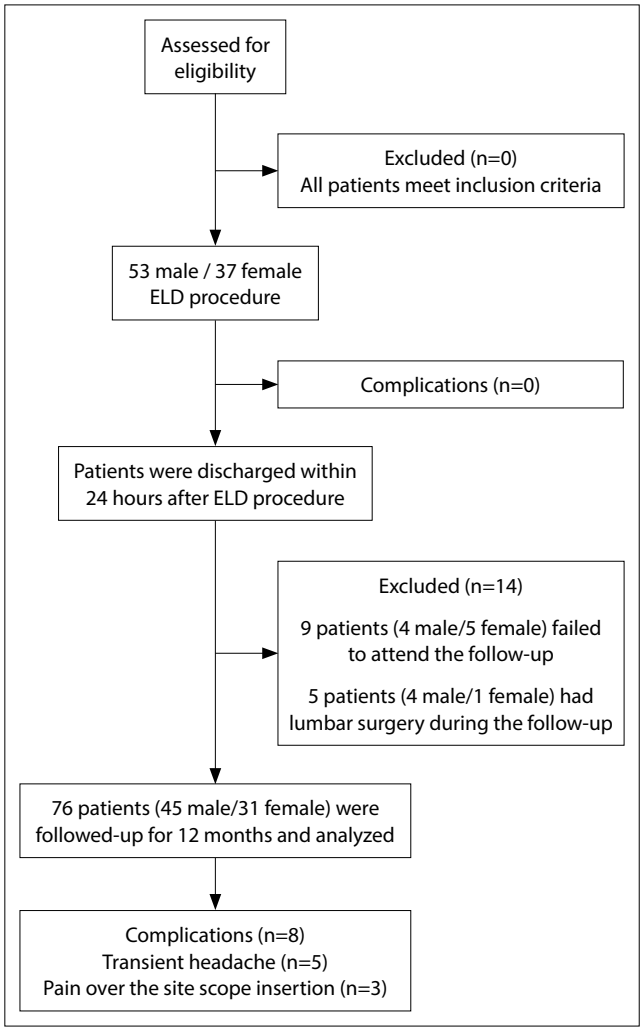


**Figure 1.** Patient flow chart.

ficient follow-up duration of 12 months, or incomplete medical records. The indications for SELD were as follows: patients with lumbar disc herniation and back pain and/or radicular pain detected by MRI, those who did not respond to conventional treatments (pharmacotherapy, physical therapy, and epidural steroid injection), those who refused open surgery, and patients who had limited daily activity due to pain. Contraindications for SELD were: spondylolisthesis, pain due to infection, bleeding tendency, and Tarlov cyst.

## Trans-Sacral Epiduroscopic Laser Decompression Procedure

Patients were administered 1 g of cephazolin intravenously (IV) 1 hour before the procedure to prevent infection risks. Conscious sedation was induced with midazolam and fentanyl, and the patients were monitored in the operating room. The procedure was performed under fluoroscopy using the C-arm unit while the patients were in the prone position. Local anesthetic of 2 ml lidocaine was injected into the skin and subcutaneous tissues, subsequent to the sterilization of the sacrococcygeal area. The 18-gauge Tuohy needle was inserted into the epidural area through the sacral hiatus. Fluoroscopy was used to identify the needle tip in the epidural area. Subsequently, the Seldinger technique was used, and the ventral epidural area was accessed via C-arm fluoroscopy with a 0.9 mm flexible video-guided catheter (Spinaut-v, Imedicom, Republic of Korea) that incorporated an epiduroscope and a Ho:YAG laser with end-firing fiber. The video-guided catheter was advanced to the target level indicated in the MRI. Radiopaque iohexol, introduced via a 2 ml injector, was employed for ventral epidurography, serving to outline the pathology. The injector, utilized for one or more administrations as per the study protocol, facilitated the injection of iohexol through an infusion port.

Subsequent fluoroscopic imaging was conducted to validate the catheter's position within the ventral epidural space and to delineate the disc hernia's outline. Saline solution was used to wash and clean the observed epidural area, to expand the epidural area by applying pressure, and to improve clarity on the endoscopic video screen. Bulging of the posterior longitudinal ligament was subsequently reduced using a Ho:YAG laser set at 2.5 W (0.5 J, 5 Hz). Then, decompression of the herniated disc was applied via the Ho:YAG laser set at 12 W (1.0 J, 12 Hz). After the disc decompression, epidurography was performed to evaluate the effectiveness of the procedure. Methylprednisolone (80 mg) and lidocaine (40 mg) were injected, and the video-guided catheter was removed after the adhesiolysis and decompression. Patients were observed for neurologic deficits or other procedure-related problems and were typically discharged on the same day or within 24 hours. The patients were also prescribed an anti-inflammatory drug and analgesic drugs for a five-day duration.

## Outcome Evaluations

Demographic data such as age, sex, body mass index, and clinical baseline characteristics, such as duration of symptoms, previous treatments, and symptom dominance (low back pain or radiating leg pain), were assessed. Furthermore, preoperative lumbar MRI findings such as degree of disc her-

**Table 1.** Odoms' criteria

| Outcome | Criteria |
|---|---|
| Excellent | Patients with no complaints and can perform daily activities without impairment. |
| Good | Patients with intermittent discomfort related to lomber disc disease that does not significantly interfere with their work |
| Satisfactory | Patients with subjective improvement, whose physical activities were still significantly limited |
| Poor | Patients whose condition did not improve or worsened after the treatment. |

niation (bulging, protruded, or extruded) and degree of stenosis (none, mild, moderate, or severe) were evaluated. The scales used to evaluate clinical outcomes were: VAS for low back pain, VAS for radiating leg pain (at 1st, 3rd, 6th, and 12th months), Oswestry Disability Index (ODI) (at 1st, 3rd, 6th, and 12th months), and SF-36 (at 12 months).

The Oswestry Disability Index is a questionnaire that consists of ten questions and assesses personal care, lifting, walking, sitting, standing, sleeping, social life, traveling, pain intensity, and changing the degree of pain. The scores are expressed in percentage values and are interpreted as minimal disability (0–20%), moderate disability (21–40%), severe disability (41–60%), crippling pain (61–80%), and bedbound or patients that exaggerate their symptoms (81–100%). This form is used to compare different treatments and treatment outcomes in chronic LBP, and its validity and reliability in Turkish have been previously shown.[20,21]

The assessment of quality of life within this study utilized the Short Form 36 Health Survey (SF-36) questionnaire, developed by the RAND Corporation within the context of the Medical Outcomes Study.[22] The SF-36 is a firmly established and widely utilized instrument designed to evaluate diverse dimensions of individuals' health-related quality of life. Comprising a series of questions, the SF-36 encompasses eight distinct domains: physical functioning, role limitations stemming from physical health issues, bodily pain, general perceptions of health, vitality, social functioning, role limitations arising from emotional challenges, and mental health. Through these delineated domains, the SF-36 offers an inclusive perspective on individuals' holistic well-being, functional capabilities, and contentment across a range of life facets.[23] Characterized by its self-administered format, the SF-36 questionnaire is recognized for its proficiency in capturing a multidimensional vantage point on health status and quality of life. Its inclusion in our study serves as a robust and standardized means to meticulously assess the impact of medical interventions on parameters such as pain, disability, and overall quality of life in patients grappling with lumbar disc herniation. The SF-36 holds a prominent international standing as one of the most extensively employed functional health status scales, and its validity and reliability in the Turkish context have been previously established through comprehensive assessments.[24]

In addition, patient satisfaction was evaluated based on Odom's Criteria at the final follow-up (Table 1).

## Statistical Analysis

The SPSS statistical software (SPSS Institute, Chicago, IL, USA), version 22.0 for Windows (licensed by Firat University, Türkiye), was used in data analysis. Power analysis was used to estimate the sample size for the current investigation, and the results showed that 30 participants were enough to obtain a type I error ($\alpha$=0.05), a type II error ($\beta$=0.10), effect size (d=0.50), and power of 0.90 for Quality of Life in Lumbar Disc Herniation. A Shapiro-Wilk test was used to verify the normal distribution of variables. VAS, ODI, and SF-36 scores were evaluated with two-way repeated ANOVA, followed by the Student–Newman–Keuls multiple range post-hoc test. Odom's criteria were compared with Yates' corrected chi-square test. Statistical significance was accepted as $p<0.05$.

## Results

Demographic Data and Baseline Characteristics: The 76 study subjects included 45 males and 31 females, with a mean age of 44.9±1.36 years. The mean body mass index was 24.12±3.52 kg/m$^2$, and the median duration of symptoms was 26.8±2.4 weeks. Twenty-five patients (32.9%) had low back

**Table 2.** Demographic data and baseline characteristics

| Characteristics | n (n=76) | % |
|---|---|---|
| Sex | | |
| Male | 45 | 40.8 |
| Female | 31 | 59.2 |
| Age (year) | 44.94±1.36 | |
| Body mass index (kg/m²) | 24.12±3.52 | |
| Symptom duration (weeks) | 26.8±2.4 | |
| Dominant symptom | | |
| Low back pain | 25 | 32.9 |
| Radiating leg pain | 51 | 67.1 |
| Previous treatments | | |
| Medical treatments (NSAID, Gabapentinoids, TCA etc) | 60 | 78.9 |
| Epidural steroid injection | 46 | 60.5 |

n: Number; NSAID: Nonsteroidal anti-inflammatory drug; TCA: Tricyclic antidepressants.

**Table 3.** Baseline characteristics determined by preoperative magnetic resonance imaging

| Characteristics | n (n=76) | % |
|---|---|---|
| Disc morphology (bulging/protrusion/extrusion) | 19/49/8 | 25/64.4/10.5 |
| Location of herniation (central/right/left) | 25/29/22 | 32.8/38.1/28.9 |
| Degree of stenosis (none/moderate) | 63/13 | 82.8/17.1 |
| Surgical level | | |
| L3-4 | 2 | 2.6 |
| L4-5 | 37 | 48.7 |
| L3-4, L4-5 | 3 | 3.9 |
| L4-5, L5-S1 | 13 | 17.1 |
| L5-S1 | 21 | 27.6 |

n: Number.

pain as the dominant symptom other than radicular leg pain. Within our study encompassing a total of 76 patients, 60 individuals had previously used neuropathic pain medications like gabapentinoids and tricyclic antidepressants (TCAs), while 46 patients had prior experience with Epidural Steroid Injections (Table 2). When lumbar MRI images of the patients were examined, the percentages for different hernia types were 48.7% (n=37) for L4-5, 27.6% (n=21) for L5-S1, and 2.6% (n=2) for L3-4. The percentage of patients with more than one level of hernia was 21% (n=16) (Table 3).

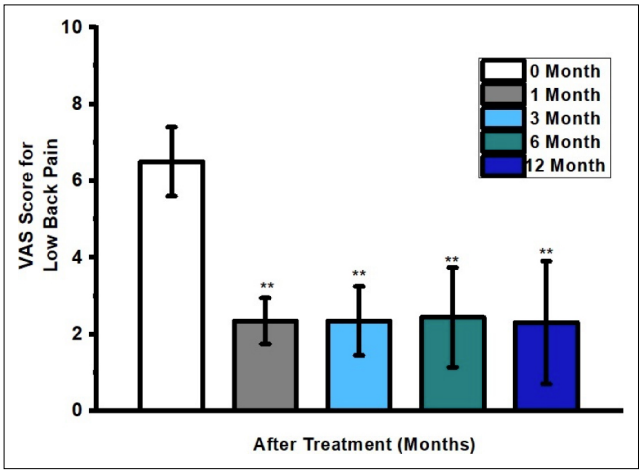


**Figure 2.** Visual Analogue Scale (VAS) for low back pain. VAS scores were recorded preoperatively and postoperatively. Each bar represents the mean and SD for seventy-six patients. **P<0.001 compared with pre-SELD using the Student–Newman–Keuls (SNK) test.

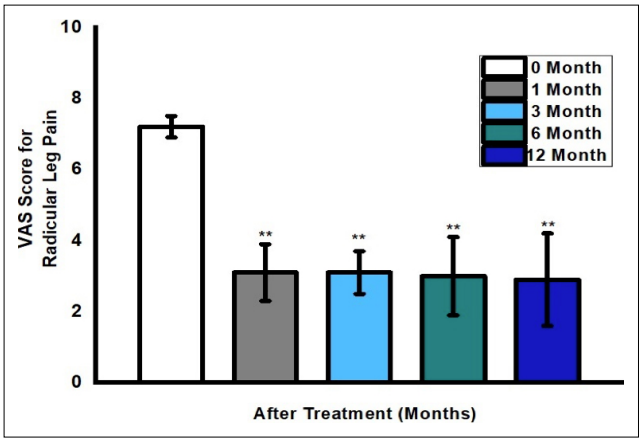


**Figure 3.** Visual Analogue Scale (VAS) for radicular leg pain. VAS scores were recorded preoperatively and postoperatively. Each bar represents the mean and SD for seventy-six patients. **P<0.001 compared with pre-SELD using the Student–Newman–Keuls (SNK) test.

Clinical Outcomes: For all 76 study subjects, the mean preoperative VAS for low back pain was 6.5±0.9, which decreased to 2.35±0.6 at 1 month postoperation and 2.31±1.6 at the final follow-up. When postoperative VAS for low back pain was compared with preoperative scores, it was found that postoperative 1st, 3rd, 6th, and 12th-month VAS scores were significantly lower than preoperative scores (p<0.001; Fig. 2). The mean preoperative VAS for radicular pain was 7.2±0.3, which decreased to 3.1±0.8 at 1 month postoperation and 2.9±1.3 at the final follow-up. When postoperative VAS for radicular pain was compared with preoperative scores, it was found that postoperative 1st, 3rd, 6th, and 12th-month VAS scores were significantly lower than preoperative scores (p<0.001; Fig. 3).

The mean preoperative ODI score was 65.21±1.74, which decreased to 21.38±1.00 at the final follow-up. When postoperative ODI scores were compared with preoperative scores, it was found that postoperative 1st, 3rd, 6th, and 12th-month ODI scores were significantly lower than preoperative scores (p<0.001; Fig. 4). The effect of SELD on quality of life was evaluated via the SF-36 form. To increase patient compliance, SF-36 was evaluated before the procedure and at the final follow-up. Commonly, SF-36 scores were statistically higher for all sub-variables of the questionnaire after the procedure. These sub-variables were physical function, physical role limitation, emotional well-being, emotional role limitation, energy/vitality, mental health, social function, pain, general health perception, and health change. Physical role limitation and pain were the parameters that indicated the highest increase, showing a 75% improvement in health (Fig. 5). According to Odom's criteria, the results were excellent in 12 patients (15.8%) and good in 38 patients (50%) at 12 months after the procedure (Fig. 6).

Surgical Outcomes: The median operation time was 45 minutes (range, 30.0–70.0). Several epiduroscopy-related complications, including transient headache (n=5) and pain over the site of the scope insertion (n=3), were experienced by the patients. However, no serious complications such as bleeding, dural/neural injuries, or infections were recorded.

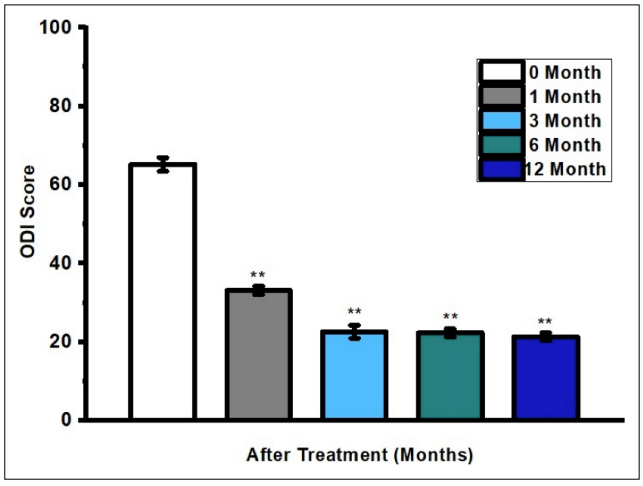


**Figure 4.** Oswestry Disability Index (ODI) scores were recorded preoperatively and postoperatively during 12 months. **P<0.001 compared with pre-SELD.

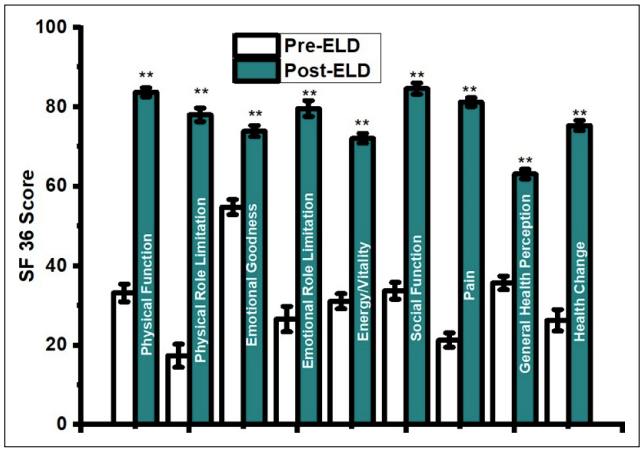


**Figure 5.** Effects of the SELD procedure on the quality of life according to SF-36. **P<0.001 compared with pre-SELD for all sub-variables.

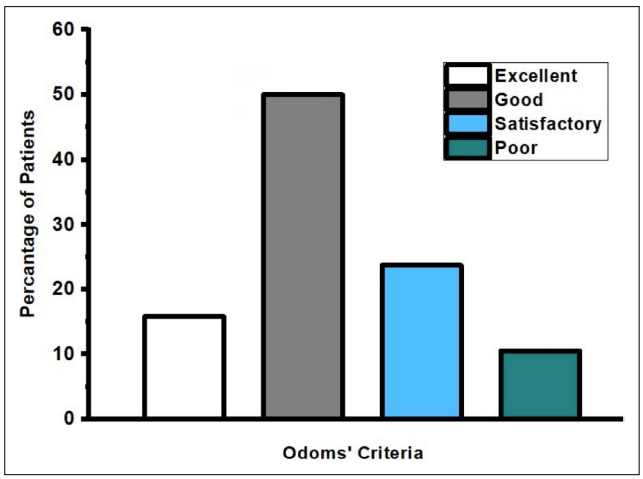


**Figure 6.** Effects of the SELD procedure on satisfaction levels based on Odom's Criteria.

## Discussion

This study has demonstrated that SELD holds the potential to offer significant pain relief, decrease functional disability, enhance quality of life, and elevate patient satisfaction levels among individuals dealing with chronic low back pain and/or radicular pain. Following the approval of epiduroscopy by the United States Food and Drug Administration, the concept of SELD emerged, and subsequent clinical outcomes have been reported not only in cases of disc herniation but also in scenarios encompassing spinal stenosis, chronic low back pain, and instances of failed back surgery syndrome.[2,13,14,25,26] This positioning of SELD as a therapeutic middle ground between interventional treatments like nerve blocks or neuroplasty and surgical interventions underscores its distinctive role in the treatment spectrum.[27,28] Notably, SELD carries several advantages, including a shorter procedural duration, mitigated risks associated with general anesthesia, real-time patient communication during the procedure (thus reducing the potential for accidental nerve damage), and swifter post-procedure recovery when compared to surgical interventions. Moreover, SELD allows for the

targeted removal of herniated discs, fibrosis, and adhesions through laser technology, all while visualizing the epidural area with the assistance of an epiduroscope. This methodology contrasts with the temporary effects often seen in interventions involving drug administration or adhesiolysis, as the laser ablation of soft disc herniation through SELD could potentially lead to a more lasting and sustainable decompression effect.[8–10,12] It is prudent to note that the optimal indication for SELD appears to align more closely with cases of soft disc herniation, as opposed to conditions such as stenosis, adhesions, or failed back syndrome.[12] Additionally, within the context of our study, a significant proportion of participants had previously undergone treatments involving gabapentinoids, TCAs, and epidural steroid injections. However, it is imperative to highlight that these interventions yielded neither the expected pain relief nor substantial improvement in their condition. This crucial observation underscores the intricate nature of pain management within this patient subset, thereby emphasizing the pressing need to explore alternative therapeutic avenues. In this context, the pursuit of SELD treatment within our study emerges as a pivotal endeavor, offering the promise of addressing the persistent challenges of pain management while simultaneously enhancing the overall quality of life for this specific patient cohort.

There are few reports about the clinical outcomes of SELD for low back pain in the literature, and in most studies, the success of SELD has been evaluated through the decrease in VAS and ODI scores.[8,18] Jo et al.[2] reported that epiduroscopic laser neural discectomy (ELND) was satisfactory for patients with chronic low back pain and/or leg pain regardless of surgery history (85% success rate), but no objective scoring was used in their study. Son et al.[1] reported 82 patients who did not respond to conservative treatment and underwent single-level SELD using Ho:YAG laser, showing positive results according to Odom's criteria and VAS scores, and they reported patient satisfaction as 58.5%. VAS and Odom's criteria were used in their study to assess the outcomes of SELD, and the patients were followed up for only 6 months. In these procedures that treat multifactorial low back pain, 6 months of follow-up is not sufficient. In our study, the patients were followed up for 12 months to assess their VAS scores and ODI scores, and we also evaluated the QoL of patients. The mean preoperative VAS for low back pain was 6.5±0.9, which decreased to 2.35±0.6 at 1 month postoperation and 2.31±1.6 at the final follow-up. The mean preoperative VAS for radicular pain was 7.2±0.3, which decreased to 3.1±0.8 at 1 month postoperation and 2.9±1.3 at the final follow-up. The mean preoperative ODI score was 65.21±1.74, which decreased to 21.38±1.00 at the final follow-up. Commonly, SF-36 scores were statistically higher for all sub-variables of the questionnaire after the procedure. The physical role limitation and pain were the parameters that indicated the highest increase, showing a 75% improvement in health. According to Odom's criteria, the results were excellent in 12 (15.8%) and good in 38 patients (50%) at 12 months after the procedure. Naturally, patients with reduced pain and improved quality of life were highly satisfied with the treatment, and 65.8% of the patients indicated that the treatment was successful.

During epiduroscopy, laser decompression, adhesiolysis, and drug application are possible. In a study in which the epidural area was washed with intermittent infusion of saline solution and hyaluronidase, followed by ozone and ciprofloxacin application, patients were followed for 48 months, and 66% of patients had VAS scores below 5, and 78% of the patients had ODI scores below 40%.[13] In our study, we used laser application and methylprednisolone, and patients were followed for 12 months. At the final follow-up, the mean VAS for LBP was 2.3, VAS for radicular leg pain was 2.9, and the mean ODI score was 21%. Clinical and radiological results of SELD and microscopic open lumbar discectomy (OLD) for L5-S1 disc herniation were compared over 6 months, and back and leg VAS and ODI improved significantly in both groups. Return to work was shorter in the SELD group, but radiological outcomes and recurrence rates were significantly superior in the OLD group. The study demonstrated that SELD proved to be advantageous, with significantly shorter hospital stays, and was not inferior to OLD in terms of back and leg pain control.[8] However, the clinical efficacy and safety of SELD were compared with percutaneous epidural neuroplasty (PEN), and the change in disc volume after SELD was evaluated with pre- and postoperative MRI. Although clinical outcomes improved in both groups, SELD provided a significantly higher clinical success rate than PEN, and a significant reduction in protruded lumbar disc volume was detected after SELD.[7] Oh et al.[10] reported 4 cases where patients did not want to undergo open surgery and received epiduroscopic laser

neural decompression (ELND) for their low back pain with radiating leg pain from migrated disc herniation. They reported that the NRS of all patients was dramatically reduced just after the procedure, and patients indicated that other discomfort symptoms, such as numbness, were also reduced. No adverse events occurred after the procedure in all cases. The authors concluded that ELND provided sufficient treatment for lumbar migrated herniated discs for patients who did not want to undergo open spine surgery.

Previously recommended outcome measures were evaluated in patients with LBP who underwent ESI. Although the pain scale, NRS, yielded the highest sensitivity for detecting change after ESI, evaluating other components, such as ODI, Istanbul Low Back Pain Disability Index (ILBPDI), and SF-36, is essential for multivariate analysis.[29] Although the effects of LBP treatments on QoL have been extensively studied, only a few studies have investigated changes in QoL after ESI.[30] A study evaluating the effect of SELD treatment on QoL was not found in our literature review. QoL is an important component that needs to be measured in outcome measures. In this study, the effect of SELD on quality of life was evaluated via the SF-36 form. To increase patient compliance, SF-36 was evaluated before the procedure and at the final follow-up. Commonly, SF-36 scores were statistically higher for all sub-variables of the questionnaire after the procedure. These sub-variables were physical function, physical role limitation, emotional well-being, emotional role limitation, energy/vitality, mental health, social function, pain, general health perception, and health change. The physical role limitation and pain were the parameters that indicated the highest increase, showing a 75% improvement in health.

Indeed, the absence of a control group is a recognized constraint that can potentially affect the scope of interpretation. Without a control group, direct comparisons and causal relationships become challenging to establish. However, within this context, our study holds distinct value. It represents a pioneering effort, offering a comprehensive evaluation of the sustained outcomes resulting from SELD treatment for individuals grappling with chronic low back pain and/or radicular pain. Moreover, our study extends its inquiry into the broader ramifications of SELD treatment on the overall quality of life experienced by the individuals under scrutiny.

## Conclusion

In conclusion, the findings gleaned from this study assert that SELD exhibits the potential to enhance pain scores, mitigate disability, and elevate the quality of life among patients grappling with chronic low back pain and/or radicular pain who have not responded favorably to conservative treatments and epidural steroid administration.

***Ethics Committee Approval: The Fırat University Non-Interventional Research Ethics Committee granted approval for this study (date: 19.07.2018, number: 01).***

***Authorship Contributions: Concept – SÖ, SAÖ; Design – SAÖ, SÖ, AM; Supervision – SÖ, SAÖ; Resource – AM, AYA; Materials – SÖ, AM; Data collection and/or processing – AYA, RP; Analysis and/or interpretation – RP, MFP; Literature review – SÖ, AYA; Writing – SÖ; Critical review – SÖ, SAÖ.***

***Conflict-of-interest issues regarding the authorship or article: None declared.***

***Use of AI for Writing Assistance: Not declared.***

***Financial Disclosure: This study has no funding or sponsor.***

***Peer-rewiew: Externally peer-reviewed.***

## References

1. Son S, Lee SG, Ahn Y, Kim WK. Clinical outcomes of Trans-Sacral Epiduroscopic Laser Decompression (SELD) in patients with lumbar disc herniation. Pain Res Manag 2020;2020:1537875. [CrossRef]
2. Jo DH, Kim ED, Oh HJ. The comparison of the result of epiduroscopic laser neural decompression between FBSS or not. Korean J Pain 2014;27:63–7. [CrossRef]
3. Sakai T, Aoki H, Hojo M, Takada M, Murata H, Sumikawa K. Adhesiolysis and targeted steroid/local anesthetic injection during epiduroscopy alleviates pain and reduces sensory nerve dysfunction in patients with chronic sciatica. J Anesth 2008;22:242–7. [CrossRef]
4. Sircus W. Milestones in the evolution of endoscopy: A short history. J R Coll Physicians Edinb 2003;33:124–34.
5. Ruetten S, Meyer O, Godolias G. Application of holmium:YAG laser in epiduroscopy: Extended practicabilities in the treatment of chronic back pain syndrome. J Clin Laser Med Surg 2002;20:203–6. [CrossRef]
6. Jo D, Lee DJ. The extent of tissue damage in the epidural space by Ho / YAG laser during epiduroscopic laser neural decompression. Pain Physician 2016;19:E209–14. [CrossRef]
7. Moon BJ, Yi S, Ha Y, Kim KN, Yoon DH, Shin DA. Clinical efficacy and safety of trans-sacral epiduroscopic laser decompression compared to percutaneous epidural neuroplasty. Pain Res Manag 2019;2019:2893460. [CrossRef]
8. Kim SK, Lee SC, Park SW. Trans-sacral epiduroscopic laser decompression versus the microscopic open interlaminar approach for L5-S1 disc herniation. J Spinal Cord Med 2020;43:46–52. [CrossRef]

9. Hazer DB, Acarbaş A, Rosberg HE. The outcome of epiduroscopy treatment in patients with chronic low back pain and radicular pain, operated or non-operated for lumbar disc herniation: A retrospective study in 88 patients. Korean J Pain 2018;31:109–15. [CrossRef]
10. Oh J, Jo D. Epiduroscopic laser neural decompression as a treatment for migrated lumbar disc herniation: Case series. Medicine (Baltimore) 2018;97:e0291. [CrossRef]
11. Lee SH, Lee SH, Lim KT. Trans-sacral epiduroscopic laser decompression for symptomatic lumbar disc herniation: A preliminary case series. Photomed Laser Surg 2016;34:121–9. [CrossRef]
12. Donato AD, Fontana C, Pinto R, Beltrutti D, Pinto G. The effectiveness of endoscopic epidurolysis in treatment of degenerative chronic low back pain: A prospective analysis and follow-up at 48 months. Acta Neurochir Suppl 2011;108:67–73. [CrossRef]
13. Igarashi T, Hirabayashi Y, Seo N, Saitoh K, Fukuda H, Suzuki H. Lysis of adhesions and epidural injection of steroid/local anaesthetic during epiduroscopy potentially alleviate low back and leg pain in elderly patients with lumbar spinal stenosis. Br J Anaesth 2004;93:181–7. [CrossRef]
14. Jo DH, Yang HJ, Kim JJ. Approach for epiduroscopic laser neural decompression in case of the sacral canal stenosis. Korean J Pain 2013;26:392–5. [CrossRef]
15. Lee GW, Jang SJ, Kim JD. The efficacy of epiduroscopic neural decompression with Ho:YAG laser ablation in lumbar spinal stenosis. Eur J Orthop Surg Traumatol 2014;24(Suppl 1):S231–7. [CrossRef]
16. Bakas T, McLennon SM, Carpenter JS, Buelow JM, Otte JL, Hanna KM, et al. Systematic review of health-related quality of life models. Health Qual Life Outcomes 2012;10:134.
17. Pequeno NPF, Cabral NLA, Marchioni DM, Lima SCVC, Lyra CO. Quality of life assessment instruments for adults: A systematic review of population-based studies. Health Qual Life Outcomes 2020;18:208. [CrossRef]
18. Garratt A, Schmidt L, Mackintosh A, Fitzpatrick R. Quality of life measurement: Bibliographic study of patient assessed health outcome measures. BMJ 2002;324:1417. [CrossRef]
19. Sanders C, Egger M, Donovan J, Tallon D, Frankel S. Reporting on quality of life in randomised controlled trials: Bibliographic study. BMJ 1998;317:1191–4. [CrossRef]
20. Fairbank JC, Pynsent PB. The Oswestry Disability Index. Spine (Phila Pa 1976) 2000;25:2940–52. [CrossRef]
21. Yakut E, Düger T, Oksüz C, Yörükan S, Ureten K, Turan D, et al. Validation of the Turkish version of the Oswestry Disability Index for patients with low back pain. Spine (Phila Pa 1976) 2004;29:581–5. [CrossRef]
22. RAND Health Care. 36-Item Short Form Survey (SF-36). Available at: https://www.rand.org/health-care/surveys_tools/mos/36-item-short-form.html. Accessed Sep 17, 2024.
23. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care 1992;30:473–83. [CrossRef]
24. Koçyigit H, Aydemir O, Fisek G, Olmez N, Memis AK. Validity and reliability of Turkish version of the Short Form 36 (SF-36). A study of a patients with romatoid disorder. Turk J Drug Therapy1999;12:102–6.
25. Kim SK, Lee BH, Song MB, Lee SC. A novel technique for managing symptomatic spinal cysts using epiduroscopic neural laser decompression: Technical note and preliminary results. J Orthop Surg Res 2018;13:136. [CrossRef]
26. Ceylan A, Aşık İ, Özgencil GE, Erken B. Evaluation of the efficacy of epiduroscopic adhesiolysis in failed back surgery syndrome. Turk J Med Sci 2019;49:249–57. [CrossRef]
27. Jo DH, Yang HJ. The survey of the patient received the epiduroscopic laser neural decompression. Korean J Pain 2013;26:27–31. [CrossRef]
28. Park CH, Lee SH. Endoscopic epidural laser decompression versus transforaminal epiduroscopic laser annuloplasty for lumbar disc herniation: A prospective, randomized trial. Pain Physician 2017;20:663–70. [CrossRef]
29. Erçalık T, Gencer Atalay K, Şanal Toprak C, Gündüz OH. Outcome measurement in patients with low back pain undergoing epidural steroid injection. Turk J Phys Med Rehabil 2019;65:154–9. [CrossRef]
30. Benyamin RM, Manchikanti L, Parr AT, Diwan S, Singh V, Falco FJ, et al. The effectiveness of lumbar interlaminar epidural injections in managing chronic low back and lower extremity pain. Pain Physician 2012;15:E363–404. [CrossRef]