Journal of Neuroscience and Neurological Research
2026 Volume 5, Issue 1
DOI: 10.59657/2837-4843.brs.26.034

BioRes Scientia
Value your Research

Research Article

Open Access

Puncture Laser Microdiscectomy in Elderly Patients with Protrusions and Hernias of The Lumbar Spine

Zorin M.O*

Department of Nervous Diseases and Neurosurgery, Faculty of Postgraduate Education, Dnipro State Medical University, Dnipro, MC "Endoscopic Neurosurgery", Dnipro, Ukraine.

Corresponding author: Zorin M.O.

Abstract

Objective: To improve the results of puncture laser microdiscectomy in elderly patients with protrusions and hernias of the lumbar spine.

Materials and methods; The work was performed at the Endoscopic Neurosurgery Medical Center in Dnipro, Ukraine. The study included 530 patients aged 50 to 72 years, with an average age of 58.6±5.63 years. There were 260 men and 270 women. Of all 530 patients, 2 groups were formed: in group I there were patients who underwent PLMD of one or, if necessary, two MHDs, with the presence of protrusions (410), in group II PLMD was performed MHD with hernia (120 patients). The examined group included patients whose age exceeded 50 years, the affected discs retained hydrophilicity and sufficient disc height (not less than 2/3 of the norm), the sagittal size of the hernia did not exceed 6 mm, there was no ossifying ligamentosis, no degenerative stenosis of the spinal canal, and no spondylolisthesis. Protrusions of 3 to 5 mm in size were taken into account. Pain was assessed before surgery and within 2 weeks using the VAS scale. The effectiveness of surgery after one month was assessed using the McNab scale.

Results. In elderly patients, pain increases slightly during the first week after PLMD, which is explained by the aseptic inflammatory reaction of the tissues surrounding the MCD. By the end of the month, the inflammatory reaction regresses, but the pain still remains at a high level. In our opinion, this is associated with less elasticity and a lower tendency to repair in elderly patients. But after 3 months, the condition of such patients improved significantly, as evidenced by the results of our examination with assessment on the McNab scale.

Conclusions: Temporary deterioration of the condition of elderly patients within a month after PLMD is explained by aseptic inflammation of the tissues surrounding the MCD and a decrease in elasticity and a decrease in the tendency to repair in such patients. With the correct selection of elderly patients, PLMD can be quite effective.

Keywords: puncture laser microdiscectomy; protrusions and hernias of the lumbar spine; advanced age

Introduction

According to many scientific studies, in young and middle-aged patients, both radicular pain and low back pain are significantly reduced one month after PLMD. Of course, degenerative spinal disorders (DSD) are primarily a disease of the elderly. At the same time, the majority of medical technologies concern patients of middle and working age. This also applies to puncture lumbar microdiscectomy (PLMD), which has confidently entered clinical practice since the 1980s and to this day occupies a significant place in the treatment of DSD [1,2]. This technique is called differently: nucleoplasty, intradiscal decompression, vaporization, etc. [3,4,5] At the suggestion of E.G. Pedachenko, this method is called "puncture laser microdiscectomy" [6]. We support this name because experimental and clinical studies have shown that, as a result of the ablation and vaporization effect, the laser beam significantly reduces the volume of the intervertebral disc (IDC) by 15-25% [7]. Despite the fact that most ICD protrusions are asymptomatic, there are protrusions that cause not only local pain syndrome in the lower back (lumbalgia), but also, not infrequently, radicular pain syndrome. As for hernias of lumbar MCD, they are more characterized by radicular pain syndrome and, to a lesser extent, lumbalgia. It is known that most protrusions are successfully treated with conservative methods. The same applies to hernias of small size, up to 6 mm without signs of sequestration [8]. But a relatively small group of such patients do not respond to conservative treatment, and at the same time they do not have absolute indications for open surgical intervention. For such cases, PLMD can be effective. However, extensive experience has shown that this method works better in middle-aged patients up to 50 years of age [9]. At the same time, elderly patients are more likely to suffer from DUH. How can

© 2026 Zorin M.O.

we help them? Our experience shows that PLMD can be effective in patients over 50 years of age. However, it is necessary to take into account several conditions.

Material and methods

The work was performed at the Endoscopic Neurosurgery Medical Center in Dnipro, Ukraine, where PLMD has been performed since 1997.

Study participants

The study included 530 patients aged 50 to 72 years, with an average age of 58.6±5.63 years. There were 260 men and 270 women. All patients gave written consent to participate in the research study, as indicated in the outpatient charts. The study was approved by the Ethics and Bioethics Commission of the Dnipro State Medical University of the Ministry of Health of Ukraine

Group characteristics

Out of all 530 patients, 2 groups were formed: group I included patients who underwent PLMD of one or, if necessary, two MHDs, with the presence of protrusions (410), in group II, PLMD was performed on MHD with hernia (120 patients).

Inclusion criteria

The examined group included patients whose age exceeded 50 years, the affected discs retained hydrophilicity and sufficient disc height (not less than 2/3 of the norm), the sagittal size of the herniation did not exceed 6 mm, the absence of ossifying ligamentosis, the absence of degenerative stenosis of the spinal canal, the absence of spondylolisthesis. Protrusions of 3 to 5 mm in size were taken into account

Research design

For the purity of the study, only patients from the last 10 years were selected, in which the Surgilas diode laser (Germany) and the domestic manufacturer – Lika-Surgeon (Cherkasy) was used. The wavelength of the laser was 980 nm. The load on one disk did not exceed 800 J. The duration of one pulse was 1 sec with a load of 15 J. Previously, all patients were examined on magnetic resonance imaging (MRI) machines of various manufacturers, but not lower than the magnetic field strength of 1.5 T. In addition, all patients underwent a computed tomography (CT) scan - a 16-slice tomograph from Toshiba (Japan). The operation was performed under a C-arch fluoroscope from Phillips (Netherlands). Pain was assessed before surgery and within 2 weeks using the VAS scale. The effectiveness of surgery after one month was assessed using the McNab scale.

Statistical analysis

The analysis of the obtained data was carried out using descriptive and analytical biostatistics methods. Quantitative indicators were presented using the arithmetic mean with the standard error (M±m). The magnitude of the treatment effect was calculated using the Cohen (d) method, and its reliability using the student's t-test for related samples. A p value < 0.05 (< 5%) was considered critically significant for all types of analysis performed [10].

Results and discussion

The neurological condition of the patients was heterogeneous. In patients of group I, the average score of radicular syndromes was 6.4±0.83 according to VAS, and the average score of radicular syndromes was 5.2±0.62 points. Other symptoms occurred in group II: radicular syndrome was 7.24±0.93 points according to VAS, and the average score of radicular syndromes was 4.65±1.43 points. When choosing the tactics of PLD for group II with only symptomatic protrusions, we applied a laser load of about 880 J to the discs from L2 to L5, and about 700 J to the herniated disc L5-S1, taking into account that the volume of this disc is smaller than other discs. In patients of group II with herniated L2-L5 MCD, the laser load was 950 J, and in the case of herniated L5-S1 disc, the laser load was reduced to 750 J.

The results of the study (**Tabl.No. 1**) 1 indicate that in elderly patients of both groups during the first week after PLMD pain increases slightly, which is explained by the aseptic inflammatory reaction of the tissues surrounding the MCD. As for the characteristics of the groups, it can be noted that in group I, patients had symptoms of lumbalgia, while in group II, patients had symptoms of radicular pain. Moreover, the severity of radicular pain was significantly higher than the pain of lumbalgia. By the end of the month, the inflammatory reaction regresses, but the pain still remains at a high level. In group I, radicular pain decreased by only 15%, while in group II, radicular pain decreased by 21%, which is also not very significant. In our opinion, this is due to lower elasticity and lower tendency to repair in elderly patients. According to many scientific studies, in young and middle-aged patients, both radicular pain and lumbalgia significantly decrease a month after PLMD. That is, an elderly patient should be prepared in advance for the fact that after PLMD, the pain

© 2026 Zorin M.O.

syndrome will remain for one month. But this cannot be a contraindication for performing PLMD in elderly patients. Because after 3 months, the condition of such patients has significantly improved, as evidenced by the results of our examination with assessment on the McNab scale. At the same time, it can be noted that in patients of group II, who had hernias, the treatment results were slightly better than in patients of group I **(Figure 1).**

Table 1: Results of PLM in different groups by pain intensity according to VAS scale

Pain type	Group	Number of patients	Pain intensity according to VAS			Cohen's d*
			Initial	1 week later	1 month later	
Radicular	I	410	5,2±0,62	6,3±0,76	4,4±1,43	-0,04
	II	120	7,2±0,93	7,8±1,45	5,7±0,87	-0,15
Lumbalgia	I	410	6,4±0,83	7,6±1,24	4,2±0,76	-0,14**
	II	120	4,65±1,43	6,3±0,95	3,9±1,24	-0,05

*Notes: * effect size when comparing initial pain intensity with values after 1 month; ** significance of treatment effect ($p<0.05$) by Student's paired t-test.*

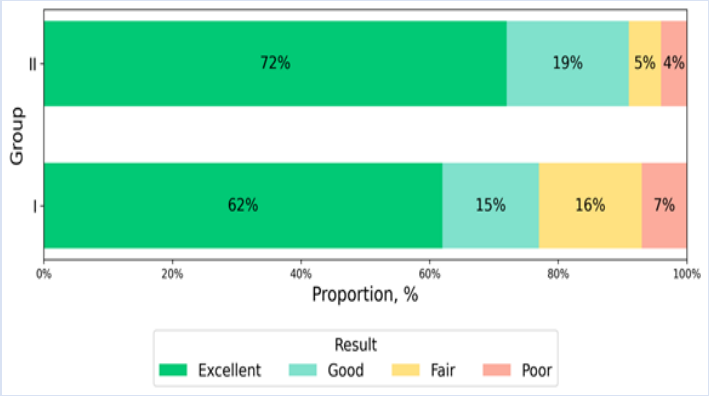

Figure 1: The condition of patients according to the McNab scale 3 months after PLMD

Thus, despite the fact that the results of PLMD in elderly patients are somewhat worse than in young and middle-aged patients, performing such an operation on them is advisable, given that other treatment methods are ineffective for them. The unsatisfactory results were explained not by technical errors, but by errors in the selection of patients for PLMD.

Conclusions

1. Temporary deterioration of the condition of elderly patients within a month after PLMD is explained by aseptic inflammation of the tissues surrounding the MHD and a decrease in elasticity and a decrease in the tendency to repair in such patients.
2. With the correct selection of elderly patients, PLMD can be quite effective.

Author information

Zorin Mykola, born in 1952. Neurosurgeon, Doctor of Medical Sciences, Professor, Department of Nervous Diseases and Neurosurgery, Dnipro State Medical University. Director of the Medical Center "Endoscopic Neurosurgery"

Disclosures

Conflict of Interest

The authors declare no conflict of interest.

Ethical Standards

All procedures performed on patients during the study comply with the ethical standards of the institutional and national ethics committees and the 1964 Declaration of Helsinki
and its later amendments or similar ethical standards.

Informed consent

Informed consent was obtained from each patient.

Funding

The study was not sponsored.

References

1. Choy DSJ, Michelsen J, Getrajdman D, et al., (1992). Percutaneus laser disc decompression: an update: spring. *J Clin Laser Med Surg*, 10:177–184.
2. Choy DSJ. (1998). Percutaneous laser disc decompression PLDD: twelve years' experience with 752 procedures in 518 patients. *J Clin Laser Med Surg*, 16:325–331.

© 2026 Zorin M.O.

3. Liebler WA. (1995). Percutaneous laser disc nucleotomy. *Clin Orthop*,310:58–66
4. Simons P, Lensker E, von Wild K. (1994). Percutaneous nucleus pulposus denaturation in treatment of lumbar disc protrusions: a prospective study of 50 neurosurgical patients. *Eur Spine J*,3:219–221.
5. Siebert W. (1996). Percutaneous laser disk decompression: experience since 1989. *Orthopade*, 25:42–48.
6. Pedachenko EG, (2014). ed. [Diagnosis and surgical treatment of discogenic neurocompression syndromes of the spine]. Kyiv: *VIK-PRINT*,Ukrainian.
7. Zorin MO, Zorina TV, Zorin MM. (2018). Puncture laser microdiskectomy: 20-year experience. *Ukrainian Neurosurgical Journal*, (1):60-5.
8. Gugliotta M, da Costa BR, Dabis E, Theiler R, Jüni P, et al. (2016). Surgical versus conservative treatment for lumbar disc herniation: a prospective cohort study. *BMJ Open.* 21;6(12): e012938.
9. Maksymowicz W, Barczewska M, Sobieraj A. (2004). Percutaneous laser lumbar disc decompression - mechanism of action, indications and contraindications. *Ortop Traumatol Rehabil*,6(3):314-8.
10. Lang TA, Secic M. (2006). How to report statistics in medicine: annotated guidelines for authors, editors, and reviewers. *ACP Press*.

Cite this article: Zorin M.O. (2026). Puncture Laser Microdiscectomy in Elderly Patients with Protrusions and Hernias of The Lumbar Spine. *Journal of Neuroscience and Neurological Research*. BioRes Scientia Publishers. 5(1):1-4. DOI: 10.59657/2837-4843.brs.26.034

Copyright: © 2026 Zorin M.O, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Article History: **Received:** May 15, 2025 | **Accepted:** January 15, 2026 | **Published:** January 22, 2026