

Establishment of the Japanese training system for percutaneous endoscopic lumbar discectomy: from the stand point of neurosurgery

Junichi Mizuno

Center for Minimally Invasive Spinal Surgery, Shin-Yurigaoka General Hospital, Kanagawa 210-0024, Japan.

Correspondence to: Dr. Junichi Mizuno, Center for Minimally Invasive Spinal Surgery, Shin-Yurigaoka General Hospital, Kanagawa 210-0024, Japan. E-mail: mizuno@shibire.com

How to cite this article: Mizuno J. Establishment of the Japanese training system for percutaneous endoscopic lumbar discectomy: from the stand point of neurosurgery. *Mini-invasive Surg* 2017;1:103-5.

Article history: Received: 5 Apr 2017 Accepted: 18 Apr 2017 Published: 30 Sep 2017

Historically, lumbar laminectomy and fusion is the traditional surgical intervention for lumbar degenerative diseases such as herniated discs or canal stenosis with or without spondylolisthesis. Although this procedure was once the most commonly performed technique, serious complications were frequent. The most common complications included instability and severe back pain due to destruction of the biomechanical stability of the lumbar spine. To compensate for these complications, an operating microscope was introduced to the field of spinal surgery in the 1950s. Currently, microdiscectomy, the so-called "micro-Love method" based on the classic technique that Dr. Love reported^[1] has been established as the gold standard procedure for herniated lumbar discs. Due to the less invasive approach and the fine surgical manipulations, conventional complications dramatically decreased and surgical outcome have significantly improved.

In the beginning of this century, microendoscopic discectomy (MED) was developed by using a less than 20 mm tubular retractor.^[2] Serial dilators also are used to avoid detachment of the paraspinal muscles from

the spinous process. This procedure was considered to be a less invasive, but it still requires the removal of the ligamentum flavum as well as to drill the lamina and the medial portion of the facet joint. Thus, this procedure gained popularity among some spinal surgeons, however the outcomes were not superior to the micro-Love technique. Invasion of the spinal canal by either micro-Love or MED can destabilize the spinal segment and create scarring in and around the spinal nerves. Destruction of soft tissues and bony structures is inevitable when approaching the compressed spinal nerves in micro-Love and MED.

Percutaneous endoscopic lumbar discectomy (PELD) and percutaneous endoscopic lumbar laminectomy (PELL) can avoid a significant portion of approach-related complications.^[3,4] Third generation systems, such as the Yeung Endoscopic Spine System,^[5] include a cannula set with slotted openings that allow instruments to exit the cannula for surgical work while a protruding tongue protects and retracts adjacent structures. The beveled cannula allows for visualization of the disc and epidural space simultaneously, thus



This is an open access article licensed under the terms of Creative Commons Attribution 4.0 International License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, as long as the original author is credited and the new creations are licensed under the identical terms.

For reprints contact: service@oaepublish.com

Quick Response Code:



facilitating the removal of subligamentous, extruded, and sequestered disc fragments. Foraminoplasty can enlarge the foramen to decompress the spinal canal and lateral recess stenosis.

PELD allows for targeted fragmentectomy of the herniated disc by performing the “inside-out” technique. Unlike the knee or hip joints, the spinal canal has no fluid cavity. Continuous irrigation of the endoscope is necessary. Basic techniques of PELD includes transforaminal approach and interlaminar approach. The route to the spinal canal or spinal nerves is different in these two approaches, and the spinal surgeons must select the best approach in each case. Once the cannula is placed inside the spinal canal, the “inside-out” technique is performed to remove the herniated disc.

In 2009, the first hands-on training course of spinal endoscopic procedure was organized at the 16th Annual Meeting of Japanese Society for Neuroendoscopy (JSNE) in Toyama (<http://www.med.u-toyama.ac.jp/nsurgery/jsne2009/>). Spinal endoscopic training was officially accepted as one of the neuro-endoscopic training courses by JSNE the following year. In 2014, the first hands-on training course was organized at the 34th Annual Meeting of Japanese Congress of Neurological Surgeons (<https://www.jcns-online.jp/en/>) in Osaka. In 2016, Neuro-Spinal Society of Japan (NSSJ) approved to start the official training system of PELD and PELL. Japanese Society Orthopedic Surgery had started the official training system prior to our training system, and there are 131 board-certified MED, surgeons and 23 board-certified PELD surgeons on November, 2016. NSSJ initially approved 5 board-certified PELD surgeons, Dr. Junichi Mizuno, Dr. Yasuhiko Nishimura, Dr. Yukoh Ohara, Dr. Yoshihiro Kitahama and Dr. Hisaaki Uchikado to initiate the training system. All of these 5 surgeons have experienced various techniques of PELD and PELL through huge volumes of knowledge and surgical techniques. Interested individuals who want to apply the certification system must be an official member of NSSJ and an official member of Japanese Society of Neurological Surgery. Ten clinical experience of either PELD or PELL as a major operator in the past are required. The lectures and hands-on training courses (both anatomical model and cadaver) are also mandatory to attend. This certification system restricts laser disc decompression or percutaneous endoscopic cervical discectomy. Additional, the member can only apply to this certification system after the number of attendance has reached the specified number of times. The applicants must send the operative summary of previous experiences of PELD and operative video record which is not edited

together with their curriculum vitae, recommendation letter by any of previously certified members to the PELD office in Shin-Yurigaoka General Hospital (office.peld@lesnm.ac). An investigation committee which consists of previously certified 5 members has a role of the judgment of the application form and the operative video record. The review process by the committee is closed to the general public but applications are strictly assessed. If applicant does not pass the examination, points for improvement will be conveyed to the applicant.

The learning curve for endoscopic spine surgery is very steep, however it can be grasped by every endoscopic surgeon with proper training. As with novel surgical procedures, the complication rate may be relatively higher during the learning curve. Proper inclusion and exclusion criteria for PELD is the first step for a successful operation. Correlation of the preoperative image and patients' subjective pain must be well understood by the surgeon who performs PELD. For the safer endoscopic operation, the importance of the intraoperative neurophysiological monitoring, anesthesia or surgical tools and techniques should be discussed for the future advances of endoscopic spine procedures.

Finally, several academic meetings related to the minimally invasive spinal operations including PELD or MED are listed below:

- Less-Invasive and Endoscopic Spinal Neurosurgery (LESNM)
- Japanese Society of Minimally Invasive Spinal Surgery (JASMISS)
- Pacific and Asian Society of Minimally Intervention Spinal Surgery (PASMIS)
- International Society of Minimally Intervention in Spinal Surgery (ISMIS)
- World Congress of Minimally Invasive Spine Surgery and Techniques (WCMISST)

DECLARATIONS

Authors' contributions

J. Mizuno contributed solely to this paper.

Financial support and sponsorship

None.

Conflicts of interest

There are no conflicts of interest.

Patient consent

Not applicable.

Ethics approval

Not applicable.

REFERENCES

1. Love JG. Protruded intervertebral disc (Fibrocartilage): (Section of Orthopædics and Section of Neurology). *Proc R Soc Med* 1939;32:1697-721.
2. Perez-Cruet MJ, Foley KT, Isaacs RE, Rice-Wyllie L, Wellington R, Smith MM, Fessler RG. Microendoscopic lumbar discectomy: technical note. *Neurosurgery* 2002;51:S129-36.
3. Yeung AT. The evolution of percutaneous endoscopy and discectomy: state of the art. *Mt Sinai J Med* 2000;67:327-32.
4. Kambin P, O'Brien E, Zhou L, Schaffler JL. Arthroscopic microdiscectomy and selective fragmentectomy. *Clin Orthop Relat Res* 1998;(347):150-67.
5. Yeung AT. Minimally invasive disc surgery with the Yeung Endoscopic Spine System (YESS). *Surg Technol Int* 1999;8:267-77.