

Should the Surgical Instrument Parts That Are Broken and Remain in the Distance of the Disc Be Removed? Should It Be Quit? A Case Report

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Abstract

Background and Aim: Lumbar posterior open microdiscectomy is a procedure that is widely used to treat lumbar disc diseases. These operations have a low risk of complications. It is unusual for the tool to break and remain in the intervertebral space during surgery. In this situation, we wanted to provide a set of suggestions based on our research of the literature on pituitary forceps blade fractures and the procedure for removing the fractured portion from the disc space during lumbar posterior open microdiscectomy surgery. **Case Presentation:** 10 days ago, a 37-year-old female patient presented to our clinic complaining of low back pain, left leg pain, and left foot weakness. A diagnosis of lumbar disc herniation necessitating surgery was obtained following neurological and radiographic examinations. The patient was advised to have surgery. The patient had standard lumbar microdiscectomy surgery. However, the tip of the pituitary forceps was broken during disc removal and remained in the L5-S1 disc space. The scope confirmed that the alien object was in space. After the evaluation, it was decided to remove the piece of instrument that was broken and remained in the disc space. The broken surgical handpiece was removed and documented under fluoroscopy. Additionally, it was forwarded to the technical unit for examination. **Conclusion:** A few case reports in the literature describe a surgical tool piece fracture that remained in the disc distance of the lumbar microdiscectomy. Complication management may be time-consuming and risky. Such a complication should be addressed and resolved appropriately because this situation might have detrimental terms on surgical risks and the legal procedure.

Keywords

Lumbar Microdiscectomy, Complication, Pituitary Disc Rongeur, Surgical Instrument Fracture

1. Introduction

Posterior open microdiscectomy is a minimally invasive surgical technique frequently used to treat lumbar disc diseases [1] [2]. With the increased use of MRI, diagnosing lumbar disc herniation is more accessible, and lumbar disc surgery is becoming more common. This scenario resulted in a proportional increase of complications to the increase in surgery. Fractures of the surgical blade tip, curette heads, and disc forceps tips are uncommon consequences of lumbar discectomy [3] [4] [5] [6]. After sterilization, most hand tools, particularly metal ones, are reused. Metal fatigue occurs due to these reuses and sterilization treatments on surgical tools. As a result, the tips may fracture due to metal fatigue during surgery. Displacement of broken intra-disc instrument components into the pelvic cavity or spinal canal, most notably the broken surgical blade tip, is one of the reasons for retrieval. Psychological responses of patients and families and forensic medicine findings are additional crucial indicators of re-operation. As a result of these considerations, any metal fragment that breaks during surgery and remains in the surgical region should be removed as soon as feasible. However, it has been noted that it can be kept in place if it is in a problematic site and may cause tissue damage if removed [7] [8] [9].

We intended to demonstrate the fracture of the pituitary forceps blade during lumbar microdiscectomy surgery and the method of retrieving the broken portion from the disc space in this case.

2. Case Report

A 37-year-old female patient presented with low back pain six months ago and left leg discomfort two months ago. Medical and physical therapy was administered in the health centers she applied to, but she received no benefit. She came to our clinic ten days ago when she had left foot weakness. The neurological examination revealed severely restricted lumbar movements, a positive Lasequé test in the left leg at a 10 degree angle, 3/5 motor power in the left ankle plantar flexion, and left EHL, hypoesthetic left S1 dermatome, and left Achill reflex was absent. An extruded disc herniation was seen at the L5/S1 distance by lumbar magnetic resonance imaging (MRI), compressing the dural subarachnoid sac on the left and the left S1 root farther and moving to the inferior (**Figure 1**). The patient was diagnosed with lumbar disc herniation, which necessitated surgical intervention.

The patient was recommended to undergo the operation. The procedure was described in detail, as well as any potential difficulties. After the patient agreed to the operation, her written consent was obtained, and she was admitted to the hospital for the operation. She was operated on under general anesthesia after preparations. The L5/S1 distance was determined using the standard lumbar microdiscectomy technique, and discectomy was reached. Meanwhile, the tip of the pituitary forceps used to remove the disc fractured and remained lodged in the L5-S1 disc space. Fluoroscopy was used to check the foreign body's distance (**Figure 2**).

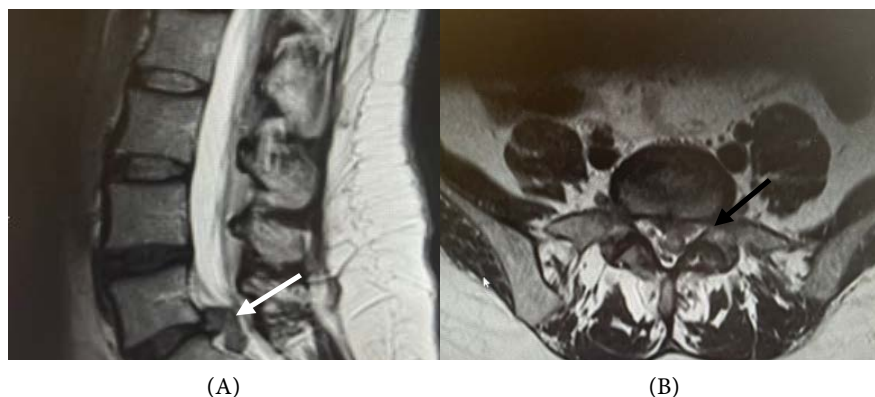


Figure 1. (A) Lumbo-sacral T2W sagittal MRI with extruded and inferiorly migrating disc herniation at L5/S1 level (white arrow). (B) Lumbo-sacral T2W axial MRI, showing extruded and dural Subarachnoid Hemorrhage at L5/S1 level and compression on the left S1 root (black arrow).

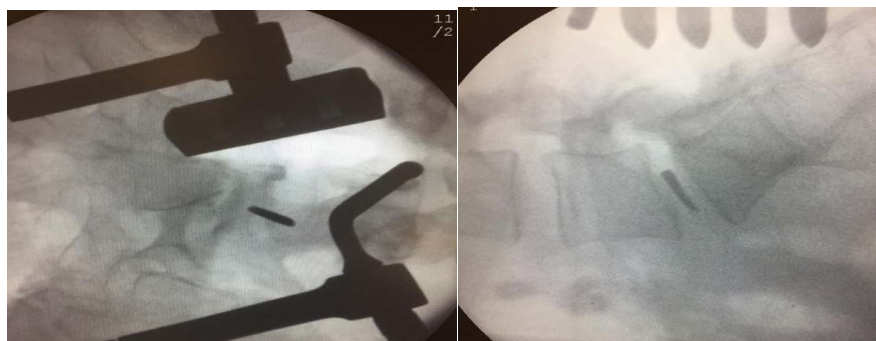


Figure 2. In the perioperative scopy, a 20 × 5 mm metal piece of the surgical handpiece broken in the L5-S1 disc space is seen.

Following a quick consultation with the clinic's other two neurosurgeons, it was agreed to remove the broken instrument fragment that remained inside the disc distance. L5 left lamina up to the spinous process, and the inferior spinous process was taken to allow for a broader exclusion of the dural sac and a clearer view of the distance. As a result, the disc distance has a wide range of views. After an hour of effort under fluoroscopy, the broken surgical handpiece piece could be removed (**Figure 3**). No additional complications have happened during the operation.

The surgical procedure was completed by continuing the routine procedures. The rongeur of the fractured disc was recorded, the fractured portion visualized (**Figure 4**), and the fractured portion was submitted to the technical unit for inspection. The patient was informed of possible problems before the operation, and permission was obtained. However, there was no mention of the possibility of surgical instrument breakage in the tissue, which is a possible complication. As a result, the patient was given extra information concerning this complication that emerged during surgery and was treated.

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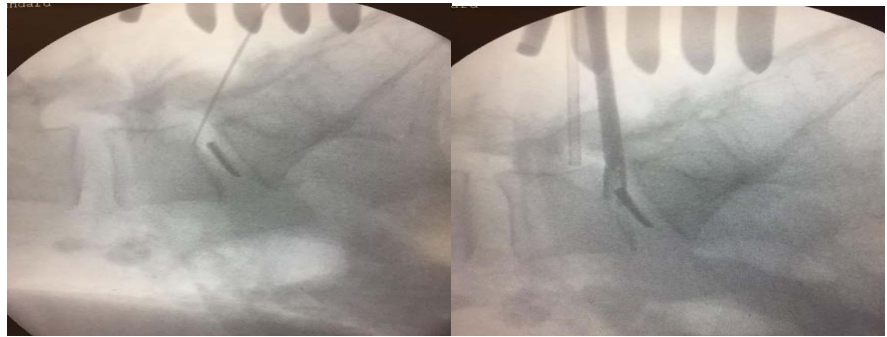


Figure 3. Removal of the broken metal piece in the L5-S1 disk range with the help of a scope.



Figure 4. Disc rongeur and broken tip (20 × 5 mm) removed from the intervertebral space (black arrow).

surgical instrument breaking in the tissue, which is a possible complication. As a result, the patient was given extra information concerning this complication that emerged during surgery and was treated.

3. Discussion

Lumbar disc herniation illness is becoming increasingly prevalent due to both personal and environmental causes. With the advancement of imaging technology, it is being identified and surgically treated more often around the globe. Posterior open microdiscectomy is a minimally invasive surgical procedure often used to treat lumbar disc diseases [1] [2]. We often do lumbar disc hernia surgery in our clinic using the posterior open microdiscectomy technique. Complications are uncommon in lumbar microdiscectomy surgery, one of the lumbar disc surgery techniques [1]. Shriver *et al.* reported a complication rate of 3.1 percent for surgical mistakes (including surgical instrument breakage), 1.3 percent for wound problems, and 6.0 percent for re-operation after a lumbar open microdiscectomy [1]. Another research reported that problems associated with surgical equipment are relatively infrequent [3]. These include blade tips, curette heads, and disc forceps tips that have been broken. In the case given, when using pituitary forceps to empty the disc space, the tip fractured during the forceps

removal technique, and the forceps tip remained in the distance. We met such a complication for the first time in our 20 years of surgical practice.

After sterilization, most hand tools, particularly metal ones, are reused. Metal fatigue occurs due to these reuses and sterilization treatments on surgical tools. As a result, the tips may fracture due to metal fatigue during surgery [4] [7] [8] [9]. There is insufficient information on the number of times surgical instruments may be used, the number of sterilizations, or the expiration date [9]. The disc rongeurs that we utilize in our clinic for lumbar open microdiscectomy have been routinely maintained for five years by four neurosurgeons. However, as stated in the literature, the surgical instruments we use do not include the number of times they may be used, the number of sterilizations, or the expiration date.

One justifying for removing the foreign body from the disc distance is the danger of dislodging instrument components remaining in the disc distance into the pelvic cavity or spinal canal, particularly the broken surgical blade tip. Additionally, the psychological responses of patients and families, the legal process, and the findings of forensic medicine are all significant indicators of the need for re-operation. The literature underlines the critical nature of removing foreign bodies from the disc space methodologically safe and effective. Additionally, it is observed that removing the broken component and leaving it in the distance is often preferred to leaving it [10] [11]. While removing the foreign body is typically preferred, this may not always be possible. Lv *et al.* reported that during an anterior cervical discectomy, the tip of the Kerrison rongeur was broken and remained in the anterior epidural area, and despite repeated procedures, including corpectomy, they were unable to locate the foreign body.

Additionally, they reported that they were required to leave the foreign body in the surgical region, but no complications emerged during follow-ups. Additionally, it has been reported that it can be left in place if it is in a location that poses a risk of removal and may result in tissue damage [7] [8] [9]. As previously emphasized in the literature, when a foreign body remained in the disc distance throughout the operation, we evaluated the situation briefly and decided to continue with the surgery using a progressive planning technique.

Removing broken instruments left in the distance after surgery involves forethought and patience, and consideration of subsequent surgical procedures if necessary. Once again, an evaluation of a phased strategy to object retrieval may be beneficial in lowering the operative time and stress [12]. However, removing the broken tool component may not always be possible. Attempts to remove foreign materials caused by iatrogenic causes can result in spinal procedures, including nerve root damage, vascular problems, durotomy, infection, and re-operation [1]. A. Rahimizadeh *et al.* reported that a knife blade fractured in the disc space during lumbar open microdiscectomy. The broken piece could not be removed despite three hours of effort; nevertheless, the broken piece was broken piece could be removed using the transforaminal approach during the second surgical intervention. According to Menger RP *et al.*, the following options for removing

the broken instrument piece during open microdiscectomy should be considered: use of interbody shavers, conversion to open laminectomy for bilateral complete disc inspection, conversion to transforaminal interbody fusion with complete discectomy, or anterior approach to the disc space [12].

In our situation, we initially attempted to remove the pituitary rongeur tip from the current entrance, which was at disc distance. We were unable to retrieve it, in any case. Following that, we removed the L5 left lamina superior to the spinous process and up to the spinous process to exclude the dural sac more broadly and better visualize the distance. As a result, we gave a wide field of view for the disc distance. After an hour of blind labor with a pituitary disc rongeur and fluoroscopy, we removed the broken surgical handpiece.

4. Conclusions

It is uncommon for tools to break during lumbar open microdiscectomy and remain fragmented in the intervertebral space. There are few case reports and suggestions on this issue in the literature. Managing complications of this kind may be time-consuming and dangerous. We feel that the elements listed below will assist you in managing the process. If components remain in the region after surgical instrument breakage, a quick situation evaluation and surgical planning should be performed during surgery.

* If the foreign body cannot be removed via the current surgical aperture, the operation should be continued by enlarging the surgical region.

* If the risk of developing further complications grows or if a different approach is needed, the operation should be stopped and a second one scheduled if necessary.

* Additionally, in terms of medical and legal process, instrument breakage should be documented, sent to the appropriate unit for technical assessment, the situation detailed in the operation report, and the complication appropriately conveyed to the patient and their relatives.

Ethics and Reporting Guidelines

Before this article was delivered, informed consent and verbal consent were obtained from the patient. Additionally, this article adheres to the Consensus Guidelines for Clinical Case Reporting and the Recommendations for the Conduct, Reporting, Editing, and Publishing of Scientific Studies in Medical Journals [13] [14].

Conflicts of Interest

There is no conflict of interest between the authors.

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