

# COMPUTER ASSISTED MINIMALLY INVASIVE SPINE SURGERY FOR RESECTION OF OSSIFICATION OF THE LIGAMENTUM FLAVUM IN THE THORACIC SPINE

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## INTRODUCTION

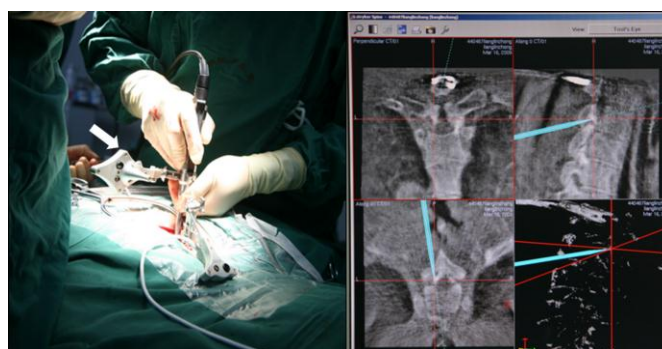
Ossification of the ligamentum flavum (OLF) has been widely recognized as one of the main causes of thoracic spinal canal stenosis and thoracic myelopathy. Decompression is the only effective strategy for treating thoracic myelopathy caused by OLF. The purpose of this study was to describe the clinical outcomes of computer assisted minimally invasive spine surgery (CAMISS) for posterior decompression in patients with thoracic myelopathy caused by OLF..

## MATERIALS AND METHODS

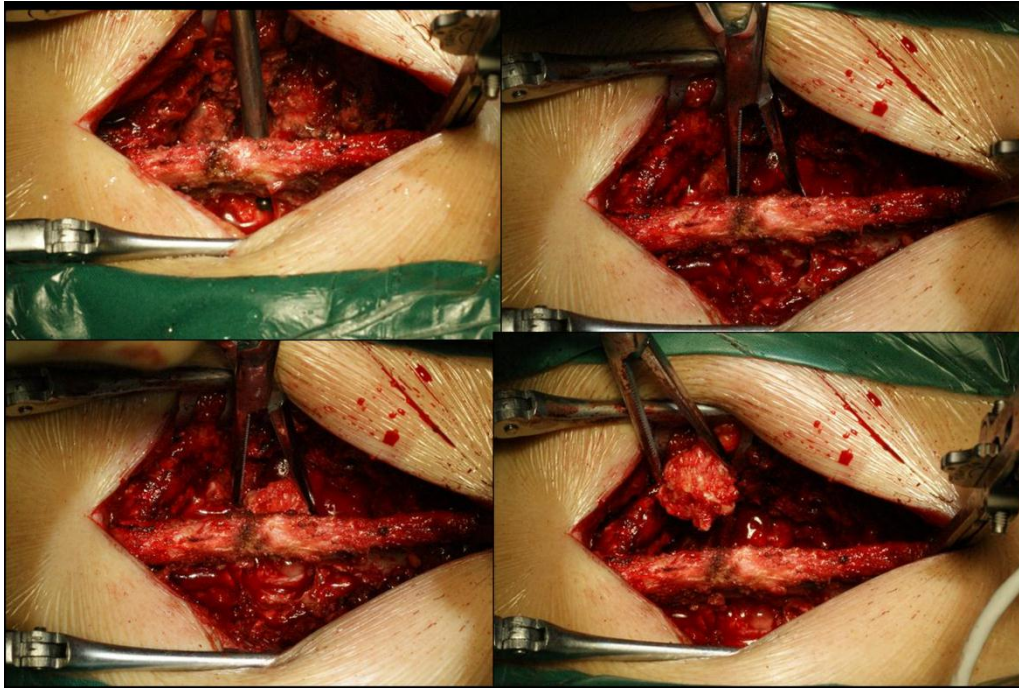
This study included 14 consecutive patients with thoracic OLF (eight men and six women; mean age, 55.2 years) who underwent surgical treatment in our department from 3 January 2006 to 9 June 2012. In all cases the surgical procedure was performed with the assistance of an intraoperative three-dimensional navigation system. Decompression of the spinal cord was performed with a high-speed drill; the supraspinal ligaments and spinous process were partially preserved. The outcomes were evaluated by a modified Japanese Orthopedic Association (JOA) scoring system and recovery rates.

## RESULTS

The mean duration of follow-up for the 14 cases was 3.9 years. All patients experienced neurological recovery, the mean JOA score improving from 6.1 points preoperatively to 8.6 points at final follow-up and the mean rate of recovery being 52.7% (excellent in two cases, good in eight, fair in three, and unchanged in one).



**Figure 1: Decompression with the intraoperative guidance of a 3-D navigation system. The high-speed drill is registered by a tracker (white arrow), allowing the surgeon to directly view the decompression area on the monitor.**



**Figure 2:** Resection of the OLF. A high-speed drill is used to resect the ossification and Kocher forceps to remove it.

## DISCUSSION

Decompressive surgery is indicated in patients in whom symptomatic thoracic spinal cord compression is caused by intruding OLF. Surgery should be performed as soon as possible, ideally before independent ambulatory function has been impaired.

Compared with the en bloc resection and laminectomy mentioned above, CAMISS for OLF preserves most of the structure of the posterior ligamentous complex and keeps most interspinous ligament(s) and the entire supraspinous ligament(s) intact. According to Denis's three column theory, the surgical trauma of CAMISS only decreases the stability of the posterior column. In two patients who underwent surgery on two adjacent segments, the facet joints were implanted with autogenous cancellous bone graft to reduce the instability.

The microendoscopic technique offers an alternative decompression surgery for thoracic OLF. The procedure can provide sufficient decompression with minimal damage to the paraspinal muscles. However, because of its technical difficulties, the microendoscopic procedure is indicated only for selected patients with thoracic OLF, such as those with OLF without fusion in the middle of the spinal canal and OLF without DO.

CAMISS is a safe and effective procedure for resection of OLF in the thoracic spine.

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