



## Technical Report

## Irrigation endoscopic assisted percutaneous pars repair: technical note

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**Abstract**

**BACKGROUND CONTEXT:** Spondylolysis is a common source of low back pain in children and adolescents. Despite the benign natural history of the pathology, however, it should be noted that as part of conservative management many young individuals are forced to discontinue their routine sports activities. In cases resistant to conservative management, direct repair of a pars defect is considered a safe and effective option in young adults with preserved discs. Recently, some reports of minimally invasive pars repair have been described, aiming at preservation of the paraspinal muscles and improvement of the postoperative course.

**PURPOSE:** The study aimed to present a new minimally invasive endoscopic technique for pars repair.

**STUDY DESIGN:** This is a technical note.

**PATIENT SAMPLE:** Seven consecutive patients complaining of back pain due to spondylolysis and resistant to conservative management were included.

**OUTCOME MEASURES:** Outcome was assessed using the modified Macnab criteria, and bone union was assessed on postoperative radiographs.

**METHODS:** Two portals of 0.5 cm were used on each side, 1 cm lateral to the midline. One portal is used for the endoscope and the second for the surgical instruments. Following endoscopic debridement of the defect, the inferior portal was used for percutaneous placement of the Buck screw. There was no source for external funding for this study and no potential conflict of interest to disclose.

**RESULTS:** Outcome was excellent in six cases and good in one case. All patients returned back to their normal level of activities. Complete radiographic union was seen in all patients. The mean period of postoperative hospital stay and follow-up was 8 hours and 21 months, respectively.

**CONCLUSIONS:** The irrigation endoscopic technique has previously shown promising results in lumbar discectomy and laminectomy. Similar results were observed in the current study on the ability to achieve minimally invasive pars defect debridement and a smooth postoperative course. This is a pilot study and larger patient series and different surgeons' experience are required for further evaluation of the technique. © 2016 Elsevier Inc. All rights reserved.

**Keywords:**

Endoscopic pars repair; Low back pain; Minimally invasive Buck screw; Minimally invasive pars repair; Percutaneous pars repair; Spondylolysis

FDA device/drug status: Not applicable.

Author disclosures: **HMS:** Nothing to disclose.

The study has been conducted following approval of the institutional review board: CUK-O220512.

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**Introduction**

Lumbar spondylolysis has been reported with an incidence of 6% and is considered as one of the main causes of low back pain in adolescents and young adults [1–3]. Conservative management is considered the mainstay of treatment; however, it should be noted that as part of conservative management many young individuals are forced to discontinue their routine sports activities [4,5].

Surgical intervention is generally reserved for cases with persistent disabling pain. Surgical treatment options include

instrumented fusion and direct pars repair. The latter is especially favored in patients with normal disc and facet joints due to the preservation of the motion segment and minimizing the risk of adjacent segment degeneration [3,6–17]. Recently, some studies about minimally invasive direct pars repair have been reported. The target was to minimize the surgical trauma and muscle dissection, allowing for an earlier functional recovery [18–20].

The irrigation endoscopic technique has previously shown promising results in performing lumbar discectomy and spinal stenosis decompression through 0.5-cm portals without any muscle dissection or dilatation [21,22]. In the current study, the objective is to evaluate the possibility of its application to perform a minimally invasive pars defect repair in conjunction with percutaneous screw placement.

### Materials and methods

The study was initiated following the approval of the institutional review board and ethics committee. A signed consent was obtained from each patient, stating the approval to be involved in a study about a new endoscopic assisted technique for percutaneous pars pair.

#### *Patient population*

The study involved seven consecutive patients, selected from the outpatient clinic at our institution. Preoperative anteroposterior, lateral, and oblique radiographs and magnetic resonance images were obtained for all cases. Inclusion criteria included back pain due to spondylolysis resistant to 6 months of conservative management, or cases showing dissatisfaction from restriction and modification of routine athletic activities. Conservative management included anti-inflammatory medications, physiotherapy, bracing, and activity modification. Patients showing vertebral spondylolisthesis and disc degeneration or complaining of radicular symptoms were excluded.

#### *Surgery*

After induction of general anesthesia, the patient was placed prone on a radiolucent frame (Jackson table). A spinal needle was placed under image intensification 1 cm parallel to the midline aiming at the level of the pedicle of the affected vertebra. After confirmation of the correct needle positioning, two portals 5 mm in size are created using a number 15 surgical blade. The portals are 1 cm lateral to the midline, with the first directly overlying the pedicle and is used for the introduction of the endoscope, and the second 3–4 cm caudal to the former and is used for the surgical instruments. The 5-mm periosteal elevator is then introduced through the paraspinal muscles without any dissection until it is docked over the lamina. Care should be taken, not to place it through the lysis defect to avoid neurologic injury. After correct placement is confirmed using the image intensifier, the soft tissue overlying the lamina is swept away.



Fig. 1. Intraoperative image showing the endoscope and arthroscopic shaver introduced through two separate portals.

#### *Debridement and preparation of the lysis defect*

The endoscope is placed through the superior portal and low pressure saline irrigation is initiated. Through the inferior portal, the shaver with the abrader function is introduced and used to clean any remnants of soft tissue or muscles over the lamina to obtain a clear surgical field (Fig. 1). The fibrous tissue in the defect is debrided with the abrader followed by the burr until bleeding bony surface is obtained (Fig. 2).

#### *Screw placement*

The endoscope is removed, and a cannulated 2.7-mm drill bit is introduced through the inferior portal aiming toward the inferior edge of the lamina, 10 mm lateral to the spinous process. After docking against the inferior edge of the lamina, the drill bit is directed so that its trajectory points toward the pedicle in the lateral and anteroposterior view. Thereafter, a K-wire is introduced through the drill bit and advanced into the desired direction. After ensuring that it has reached the pedicle in both views, without violating the neural foramen in the lateral view, the cannulated drill bit is advanced over the K-wire drilling the screw path (Fig. 3). This is followed by drill bit removal and placement of the cannulated 4-mm partial threaded screw over the K-wire. The same process is repeated on the contralateral side (Fig. 4).

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