Case Report

UNLEASH™
MIS TLIF Solution

Dr. Claudius Thomé
Innsbruck Medical University, Innsbruck, Austria
Case Report UNLEASH™ MIS TLIF Solution

Patient history

A 56-year-old male suffered from progressive low back pain for more than 3 years with pseudoradicular pain in the buttocks and posterior thighs. Despite intensive conservative measures including physical therapy, pain meds and injections, pain and disability worsened over time. There was no neurological deficit. Previous medical history was remarkable for mild cervical dystonia managed by botox injections and repeated abdominal surgery with obstructive ileus.

Preoperative analysis

The patient presented to our outpatient clinic with magnetic resonance imaging (MRI) of the lumbar spine, which showed segmental osteochondrosis with Modic changes and a broad-based disc protrusion at L5/S1 (Fig. 1) but no evidence of nerve root compression or spinal stenosis. The adjacent segments demonstrated minimal degenerative changes. Facet joint blocks had been performed without success. There was foraminal stenosis on the right side. Preoperative computed tomography confirmed these results with a bony spur in the neuroforamen (Fig. 2). Standing x-rays revealed mild retrolisthesis of L5 (Fig. 3).
After failure of intensive conservative management fusion surgery at L5/S1 was indicated. With previous repeated abdominal surgery and the foraminal bony spur the patient was not considered a good candidate for ALIF surgery, but rather for a posterior approach. As decompression was only required at the right neuroforamen and there was no sagittal malalignment on long-standing x-rays (not shown), a TLIF approach was chosen. In these cases we prefer a MIS approach to maximize muscle sparing particularly in a patient with neurologic disease (dystonia). UNLEASH™ technology is chosen to maximize intervertebral disc clearance and bony fusion, while not enlarging the surgical access.

Intraoperative analysis

In our department most MIS instrumentation procedures are carried out using intraoperative CT and spinal navigation. The reference arc is positioned percutaneously in the iliac crest (Fig. 4). Pedicle screws are implanted via stab incisions and the VIPER PRIME™ System is preferred for ease of use and speed in a single-step maneuver. Using spinal navigation and the percutaneous VIPER PRIME set-up screw angle is as convergent as possible increasing biomechanical stability. This can hardly be achieved in open approaches. Even in spondyloysis ideal screw placement is accomplished in L5.

Technically the single-step tool, including the screw, is manually calibrated using the intended screw length, in accordance with the VIPER PRIME Navigated STG (Fig. 5). The stylet is positioned some 5 mm outside the screw tip. The stylet is used to enter the bone and advance the stylet screw combination through the pedicle into the vertebral body. The stylet is then retracted with the tool in place and the screw is advanced according to the navigation system. Awls, guidewires and Jamshidi needles are eliminated by this technique. In our department no fluoroscopy (and thus no lead) is used for pedicle screw placement, but can be applied if preferred.

The stab incisions on the side of the planned transforaminal access are joined to one approximately 4-5 cm incision and the tubular retractor is placed on the respective facet joint. In case of a very narrow corridor between the pedicle screws, the tube can be positioned more medially in case of convergent screws or screw placement can be done after the intervertebral work. The following steps are conducted under the microscope. Using a high-speed burr the facet joint is largely resected to access the neuroforamen. If the
spinal canal needs to be decompressed in addition the tube is angled medially and a laminotomy approach with contralateral undercutting can be accomplished. In the presented patient access was limited to the neuroforamen and the L5 nerve root was decompressed. Decompression is also checked by spinal navigation – in this case to ensure sufficient decompression laterally. Mobilisation of the disc space can be achieved with standard dilators or shavers. Ideally, disc clearance is accomplished using the CONCORDE® Clear MIS Discectomy Tool, as it minimizes the number of tool entries into the disc space. All these maneuvers are associated with a risk of manipulating or injuring the exiting nerve root, especially in patients with a tight neuroforamen. CONCORDE Clear is maneuvered in a fan-shaped manner both upward and downward to maximize disc clearance. Fluoroscopy shall be used for control.

As the next step, a TLIF cage is placed via the small access. In the presented case a CONCORDE cage (11 mm) in CFRP was used, as there was a asymmetric collapse of the disc space more pronounced on the right, so that cage placement was intended to lateralize to the right side. Banana cages can obviously also be applied depending on surgeon’s preference. Oblique cages usually have the advantage to better distract the vertebral bodies upon insertion. Most surgeons prefer positioning under fluoroscopic control. Autologous bone taken from the facets positioned inside and around the cage in the intervertebral space. Gel foam is placed intraforaminally and bone substitute can be put between the remnants of the resected articular processes. In our set-up a second intraoperative CT scan is performed for quality assurance (Fig. 6, 7).

Finally, the rod gauge is used to chose the appropriate length and the rod is inserted on both sides.

As the next step, a TLIF cage is placed via the small access. In the presented case a CONCORDE cage (11 mm) in CFRP was used, as there was a asymmetric collapse of the disc space more pronounced on the right, so that cage placement was intended to lateralize to the right side. Banana cages can obviously also be applied depending on surgeon’s preference. Oblique cages usually have the advantage to better distract the vertebral bodies upon insertion. Most surgeons prefer positioning under fluoroscopic control. Autologous bone taken from the facets positioned inside and around the cage in the intervertebral space. Gel foam is placed intraforaminally and bone substitute can be put between the remnants of the resected articular processes. In our set-up a second intraoperative CT scan is performed for quality assurance (Fig. 6, 7).

Finally, the rod gauge is used to chose the appropriate length and the rod is inserted on both sides.

As the next step, a TLIF cage is placed via the small access. In the presented case a CONCORDE cage (11 mm) in CFRP was used, as there was a asymmetric collapse of the disc space more pronounced on the right, so that cage placement was intended to lateralize to the right side. Banana cages can obviously also be applied depending on surgeon’s preference. Oblique cages usually have the advantage to better distract the vertebral bodies upon insertion. Most surgeons prefer positioning under fluoroscopic control. Autologous bone taken from the facets positioned inside and around the cage in the intervertebral space. Gel foam is placed intraforaminally and bone substitute can be put between the remnants of the resected articular processes. In our set-up a second intraoperative CT scan is performed for quality assurance (Fig. 6, 7).

Finally, the rod gauge is used to chose the appropriate length and the rod is inserted on both sides.
Postoperative follow-up

The patient was mobilized on the day of surgery and was discharged home after the minimum required amount of days in the Austrian reimbursement system. The postoperative course was uneventful and x-ray control after 3 months confirmed a correct implant position (Fig. 8).

![Fig. 8: Ap and lateral x-rays 3 months after MIS-TLIF at L5/S1.](image)

Conclusion

The combination of VIPER PRIME, tubular transforaminal access, CONCORDE Clear and cage placement allows a minimally invasive TLIF fusion. If combined with intraoperative imaging and spinal navigation, fluoroscopy can be largely reduced or eliminated.
The views and opinions expressed are those of the surgeon and do not necessarily represent the views of DePuy Synthes.

Results from case studies are not predictive of results in other cases. Results in other cases may vary.

For full product details and precautions, please consult the IFU.

This publication is not intended for distribution outside of the EMEA region.

The third-party trademarks used herein are the trademarks of their respective owners.

DePuy Synthes

Incorporated and registered in Scotland under company number SC132162.

Note: For recognized legal manufacturer, refer to the product label.

DePuy Spine, Inc.
325 Paramount Drive
Raynham, MA 02767
USA
Tel: +1 (800) 227-6633

depuysynthes.com

© DePuy Synthes 2019. All rights reserved.
118812-190717