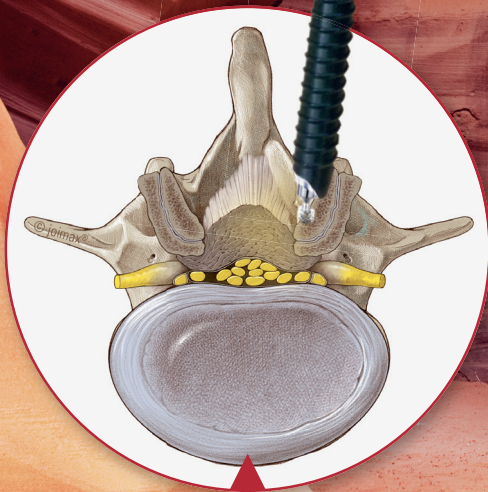


HIGH QUALITY  
**MADE IN  
GERMANY**  
SYSTEMS



# **iLESSYS<sup>®</sup> + iLESSYS<sup>®</sup> Delta**

**Interlaminar Endoscopic Surgical System**

**Interlaminar endoscopic access for  
the treatment of herniated discs and stenosis**



## iLESSYS® – INTRODUCTION

Endoscopic surgery has been a routine procedure in laparoscopy and arthroscopy since the 1980s. In neuro and cardiac surgery, endoscopic minimally invasive techniques were first introduced in the 1990s.<sup>1</sup> The last decade has seen a significant evolution of the minimally invasive procedures for spinal surgery which lessen post-operative pain, damage fewer structures and invol-

ve the removal of less soft tissue. Therefore, faster recovery is possible.<sup>2</sup> Ongoing technological advances have resulted in increasingly sophisticated surgical approaches for disease-specific treatment and ultimately allowed endoscopic spinal surgery to become a reality.

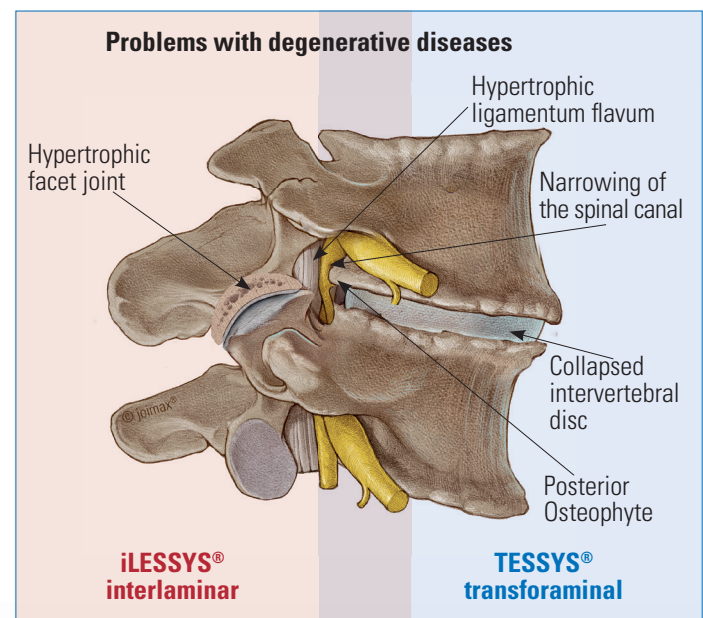
## iLESSYS® – CONCEPT

The iLESSYS® method uses an interlaminary access path to remove disc herniation or treat stenosis. As an endoscopic minimally invasive surgical procedure, it is less traumatic than microsurgical techniques. The minimal diameter of the joimax® laminoscope (endoscope) and the working tube protect the structures along the access path and in the spinal canal. The optics provide an excellent direct view of all structures at the site of the surgery. The iLESSYS® method is an exceptionally minimally invasive surgical technique for pathologies of the dorsal spinal canal.

Interlaminary access is particularly suitable for spinal disc sequester and herniations which are difficult to reach via a transforaminal approach. These include sequestered herniated discs dorsal to the dura, pathologies at L5/S1, for example, when the iliac crest line is high, or for cranially sequestered herniations.

For treatment of stenosis, the different access paths to the spinal canal and to the foramen are an excellent alternative to the conventional microsurgical technique, which usually cannot

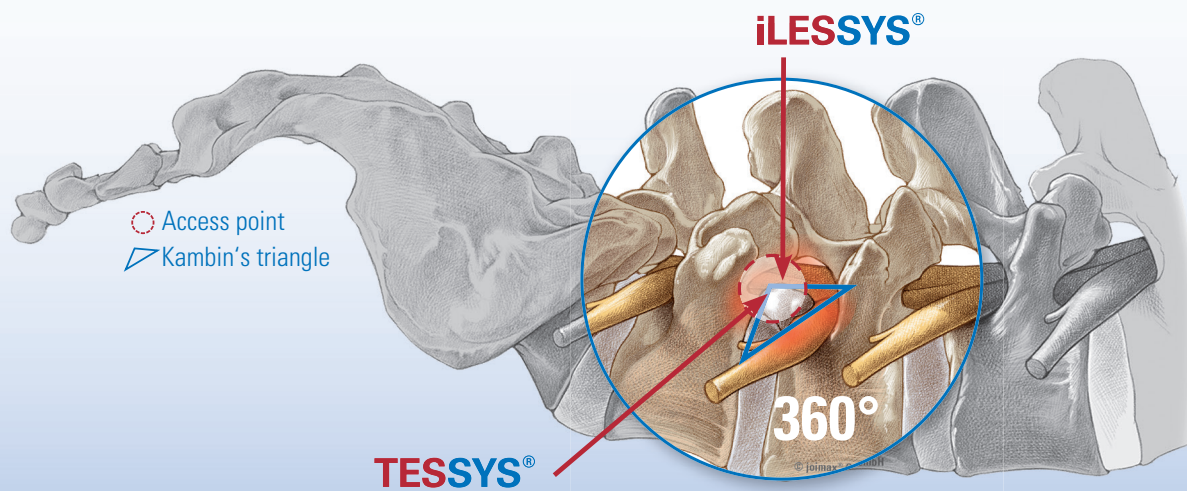
avoid removing parts of the lamina, ligamenta flava and/or parts of the facet joint. iLESSYS® Delta is particularly suitable for the treatment of extensive stenosis. Due to the larger diameter of the working tube, more powerful punches and special diamond shaver blades can be used under endoscopic view.



## TESSYS® and iLESSYS®: 2 accesses – 1 target The 360° decompression of the spinal canal

TESSYS® and iLESSYS® provide two alternative endoscopic minimally invasive access points to the spinal canal. The combination of both methods provides surgeons with the option of

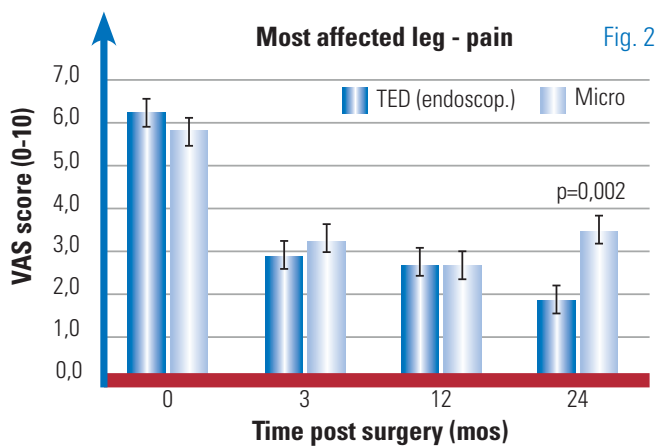
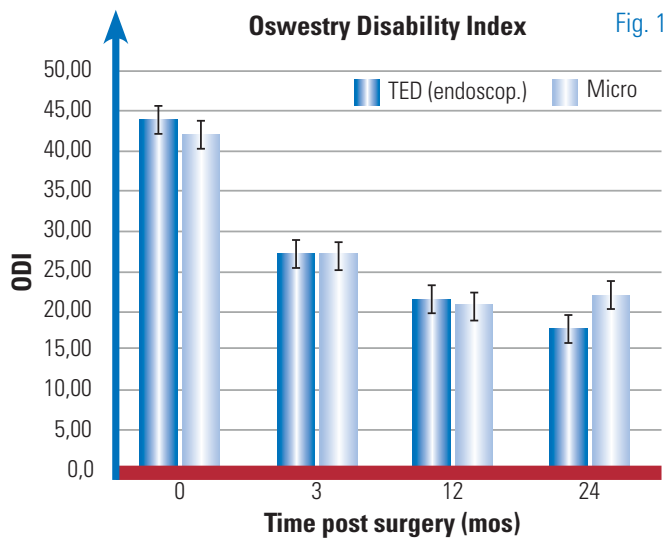
a 360° decompression of the spinal canal. All areas can be accessed, from the foramen to the area ventral and dorsal of the spinal marrow.



## Clinical results support endoscopy

There is now plenty of clinical evidence supporting the benefits of endoscopic treatment of the spinal column compared to microsurgery. The risk of infection is much lower<sup>3</sup> and a faster return to work<sup>4</sup> is evident. Empirical data is now available for an increasing number of endoscopic methods and access paths. For example, clinical results for treatment of central stenosis by means of interlaminary endoscopic access now show that the VAS values for pain and the rating of the Oswestry Disability Index

as standard for functional restrictions are considerably reduced.<sup>5</sup> In a randomized study, Gibson et al. compared the transforaminal endoscopic disc operation to the micro-surgical operating procedure. Both patient groups benefited from the operation (Fig. 1), although after two years, pain in the more strongly affected leg was significantly lower in the group of patients who had been treated endoscopically (Fig. 2)<sup>6</sup> Spinal stenosis is classified based on the morphological characteristics (Fig. 3).



*“Endoscopic techniques may speed recovery, minimize postoperative pain and improve the final outcome. What once required 3 to 6 months of recovery requires now only 3 to 6 weeks!”*

The Cleveland Clinic Foundation

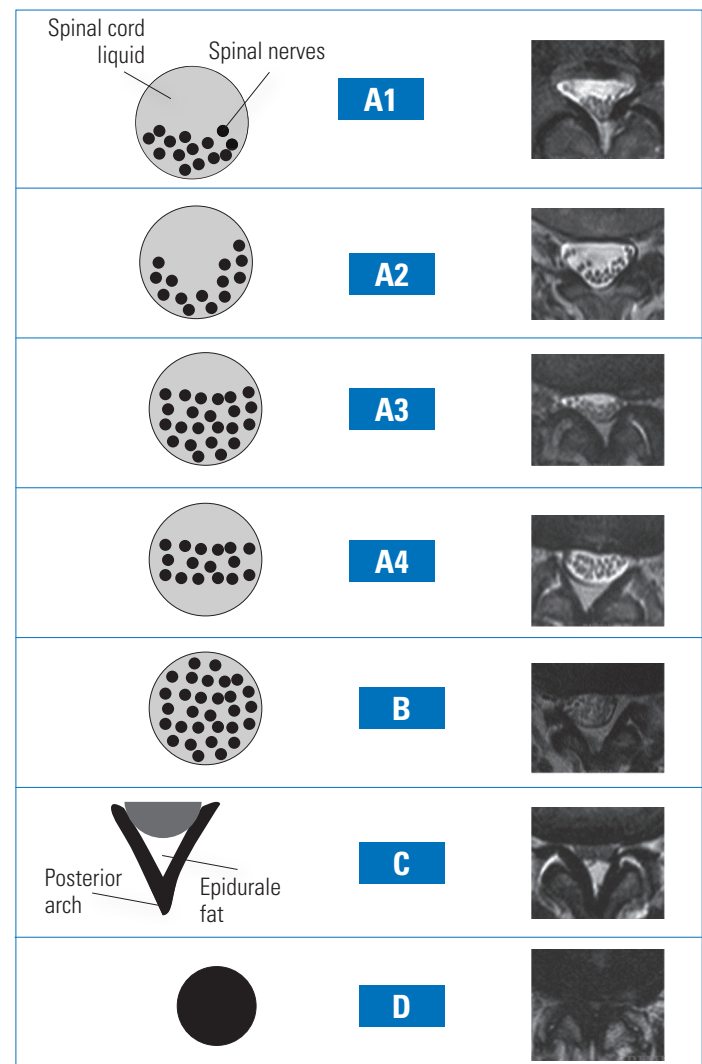


Fig. 3: Description of morphological classification of spinal stenosis<sup>7</sup>

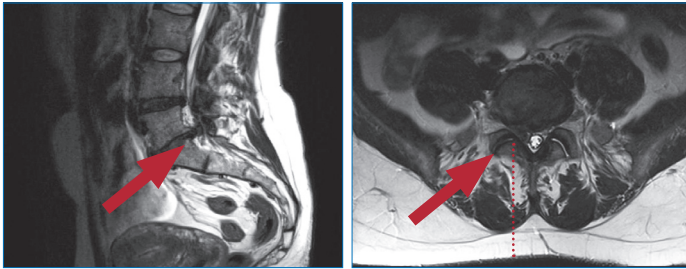
### The benefits of the surgical technique are obvious:

- Minimally invasive surgery
- Tissue-conserving surgical access due to gradual dilation
- Visual endoscopic monitoring during the operation
- Minimal destabilization and traumatization
- Stability of spinal column is retained
- Small incision, therefore hardly any scar tissue
- Reduced risk of infection
- Short recovery time and rapid return to everyday life

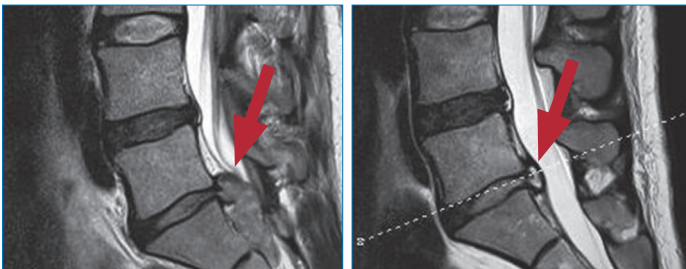


## iLESSYS® – INDICATIONS

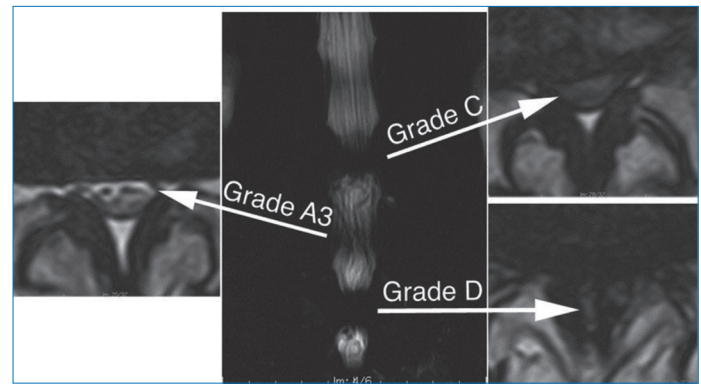
iLESSYS® was developed for endoscopic, interlaminar decompression. Due to the large interlaminar window, it is especially suitable for the lower lumbar spinal column. Considered indications are pathologies in the dorsal spinal canal, in the recessus and in the area of the medial of the foramen intervertebrale. This includes central stenosis, dorsal facet joint cysts, and sequestered herniations dorsal or lateral to the dura. Pathologies at L5/S1 which are difficult to access transforaminally are also good indications for interlaminar access.



MRT lateral (l.) and axial (r.): Herniated disc at L5/S1 dorsally sequestered



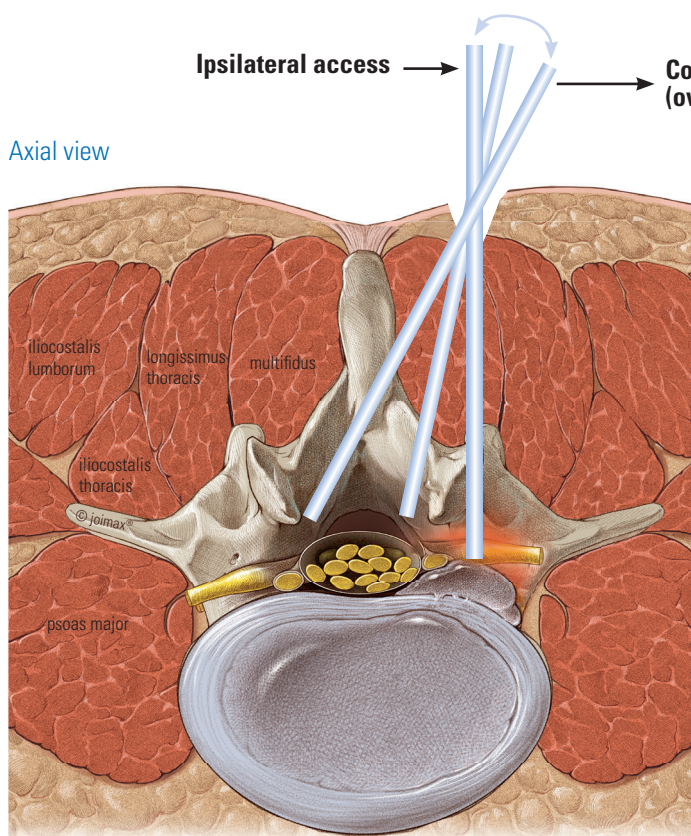
36-year-old woman with a mass prolapse at L5-S1 before (left) and two days after surgery (right)



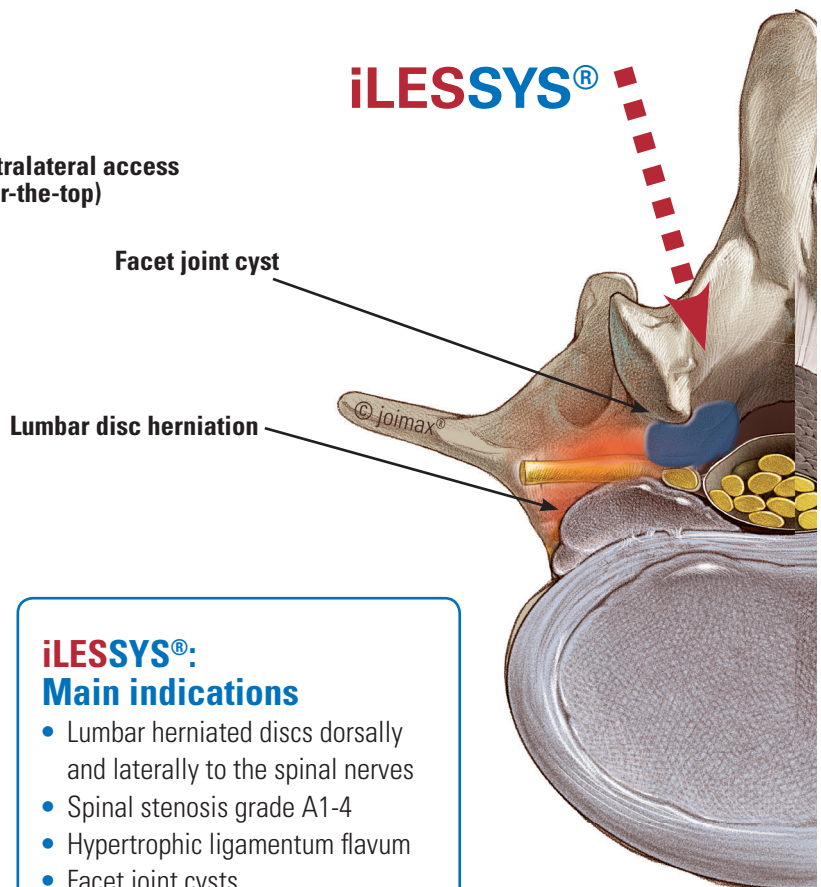
Myelographic sequence shows myelographic block at two levels (Grade C and D) associated with a Grade A morphology<sup>6</sup>

### Over-the-top technique

The over-the-top or cross-over technique allows a bilateral decompression via unilateral endoscopic surgery access. After extension of the interlaminar window, a look at the opposite side is given. So, it is possible to reach the other side of the spinal canal with the instruments, without the need for a second skin incision and a new access. Thus, in this minimally invasive procedure the surgeon works crosswise (cross over).



Axial view



### iLESSYS®: Main indications

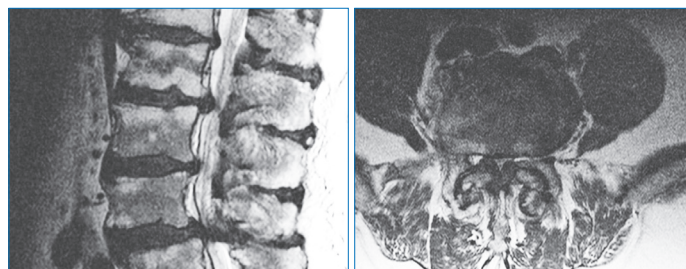
- Lumbar herniated discs dorsally and laterally to the spinal nerves
- Spinal stenosis grade A1-4
- Hypertrophic ligamentum flavum
- Facet joint cysts



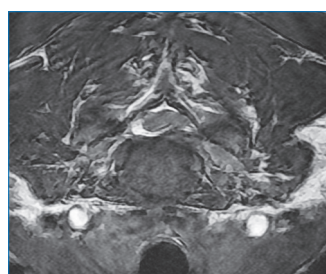
The instrument set of iLESSYS® Delta has been developed to enable more comprehensive removal of bone structures due to its larger working tube. The most important indication for iLESSYS® Delta surgery is the dorsal and dorsolateral endoscopic treatment of spinal stenosis. Both ipsilateral and contralateral access are possible under full endoscopic view (over-the-top technique).

The iLESSYS® Delta instrument set can also be used on the cervical spine to treat dorsal and foraminal pathologies. Access and indications are the same as for the Frykholm access.

Alternatively, the special instrument set CESSYS® Dorsal with a smaller endoscope is available.

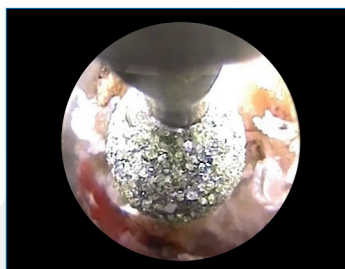


Lateral (l.) and axial (r.) MRT images of a spinal stenosis in the lumbar area of the spine

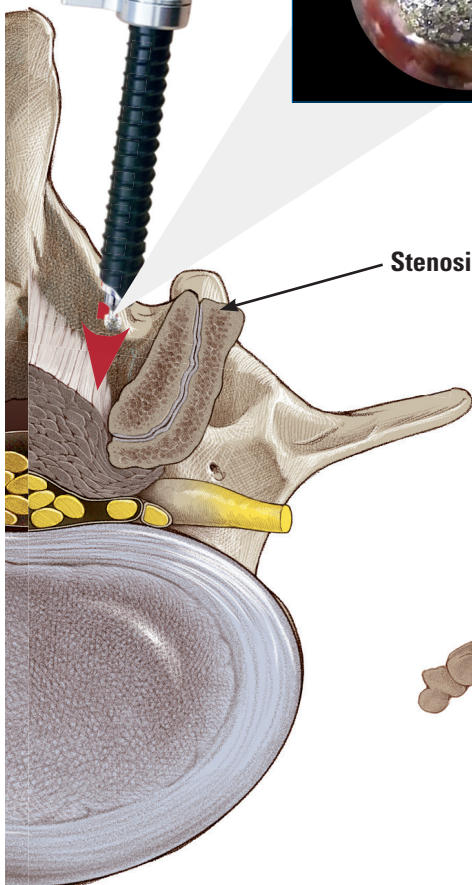


Axial MRT image of a spinal stenosis in the area of the cervical spine

## iLESSYS® Delta



Stenosis of the facet joint

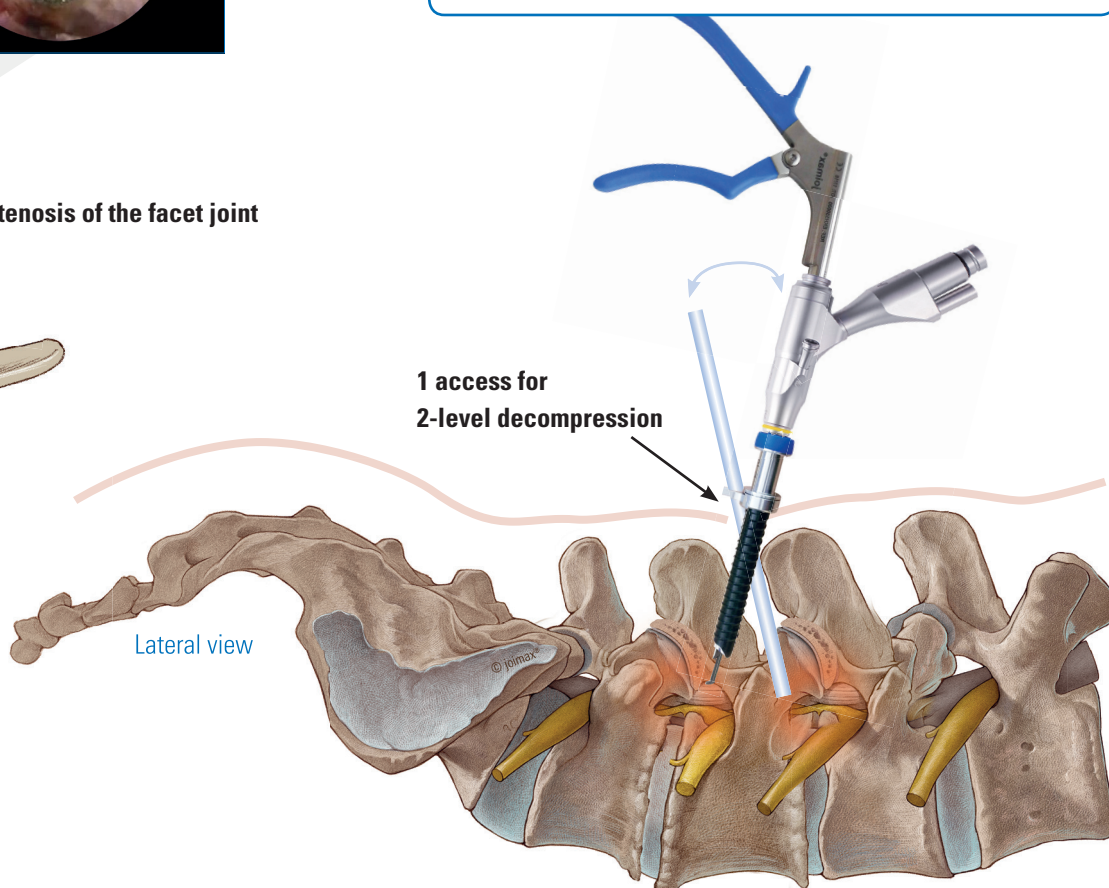


### iLESSYS® Delta: Main indications

- Lumbar central stenosis and recessus stenosis
- Spinal stenosis of all grades (A-D)
- For massive bony decompression
- Cervical foraminal herniated discs and dorsal stenosis with radiculopathies

1 access for 2-level decompression

Lateral view

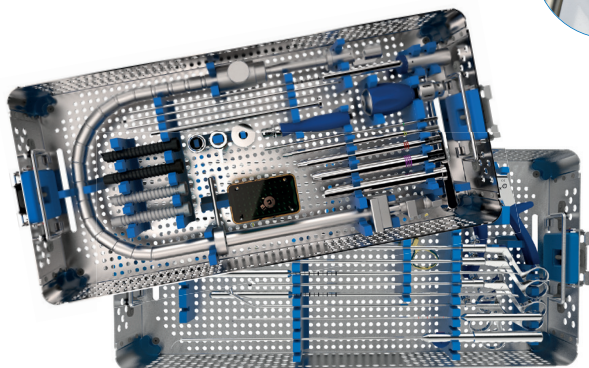
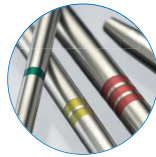






**iLESSYS® Instrument set**

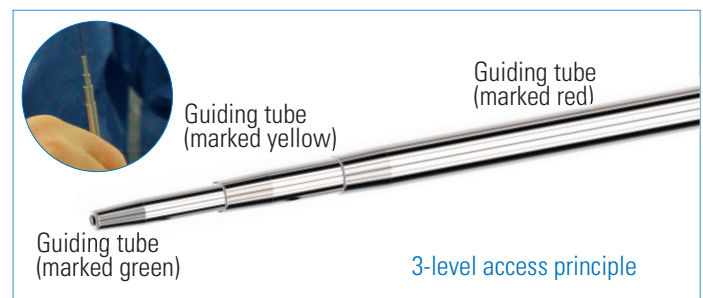
Color-coded instruments



**iLESSYS® Delta Instrument set**

The iLESSYS® Instrument set contains all the instruments required for safe, interlaminary, minimally invasive access to the spinal canal and for removal of disc tissue, bone spurs, or scar tissue (gripping, cutting, and punching forceps). The access instruments are color-coded for easier handling.

Access is via a 3-level dilation principle. Under X-ray control, the soft tissue is gradually dilated as far as the ligamentum flavum. Under endoscopic view, the ligamentum flavum is opened and disc tissue removed. If necessary, bony substances of the lamina can be removed using reamers.



iLESSYS® Delta was specially developed for more extensive decompressions. The larger working tube allows the use of more powerful punches and large shaver blades for the bone resection.

## For a perfect view: joimax® Full HD Laminoscopes

The laminoscopes are available in a modern C version with single-cable technology (combo) or a D version with ocular technology.

**C version:** User-friendly combined camera cable adapter for camera and light source using single-cable technology. Designed for all generations of joimax® C-cameras.

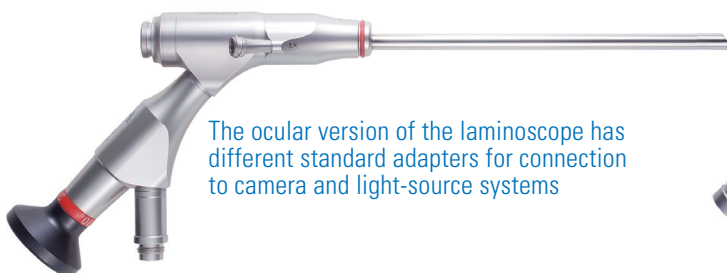
**D version:** Two-cable technology; camera and light source have separate cables; developed for connection to most standard camera and light-source systems.



**iLESSYS® Laminoscope 30°**  
 6.3 mm outer diameter  
 3.7 mm working channel  
 1.5 mm irrigation and suction channel  
 125 mm working length



**iLESSYS® Delta Laminoscope 15°**  
 10 mm outer diameter  
 6 mm working channel  
 1.5 mm irrigation and suction channel  
 125 mm working length



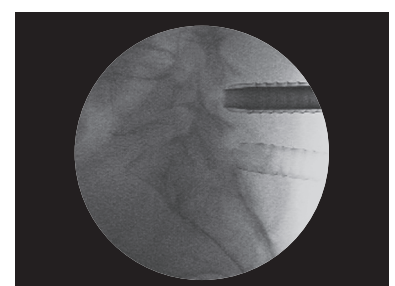
The ocular version of the laminoscope has different standard adapters for connection to camera and light-source systems

The iLESSYS® Delta **Working Tubes** are available in two materials and two tip configurations (90° and 45° opening):

- stable, durable stainless steel or plastic (PPSU)
- Working tube with thread for optimum fixation in the tissue



Comparison of the iLESSYS® Delta Working Tubes in the X-ray image (top stainless steel, bottom PPSU)





## RF probes Vaporflex® and Legato®

Using the bipolar Vaporflex® and Legato® RF probes, tissue (e. g. scar tissue) can be removed and bleeding stopped. Annular



ruptures up to 3 mm long are easy to seal by means of tissue shrinking. The ergonomic handles can be reused and are connected with the bipolar disposable probes.

### Endovapor® 2 Multi Radio Frequency System

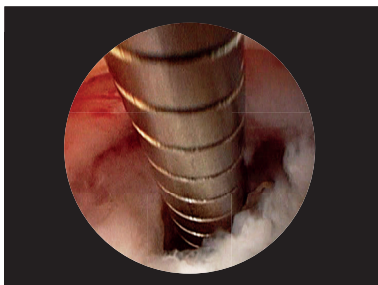


**Combines variety of different electro-surgical modes and effects**

- Specially integrated programs for spinal cord surgery
- All-in-one RF generator with interdisciplinary application
- 4 sockets: 2 x monopolar, 2 x bipolar

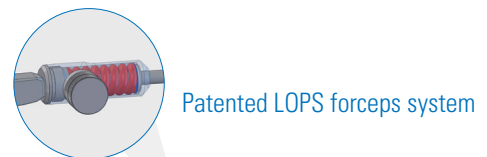


## Precise and durable: iLESSYS® Forceps

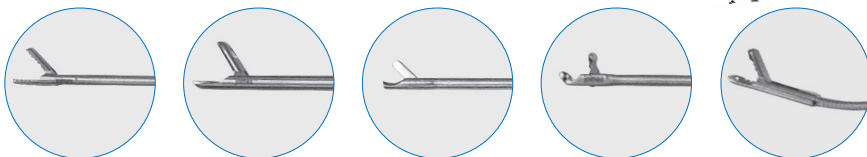


The forceps are equipped with the patented „Luer Overload Protection System – LOPS“. This prevents over-tensioning of the forceps and guarantees a longer service life.

Working with the semi-flexible forceps under endoscopic view

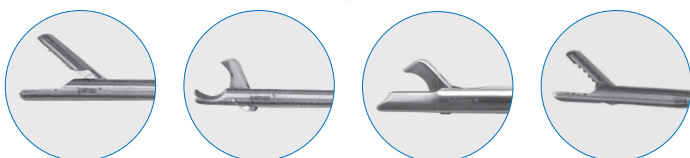


### iLESSYS® forceps



The various forceps in the iLESSYS® Instrument set are especially suited for the effective removal of soft tissue such as herniations.

### iLESSYS® Delta forceps



The powerful iLESSYS® Delta forceps enable the removal of large fragments under endoscopic view.



## Shrill® Shaver Drill System

The Shrill® multi-functional milling and resection system was developed for removal of soft tissue and bone, especially when working near to the spinal column. It ensures safe and tissue conserving work in the immediate vicinity of the nerve, with optimal visibility. Different shaver blades are available that can be attached to the handpiece with an easy-to-use, quick-connect system.

### Color coding of attachments for easy identification:

**Yellow:** for working on bone close to the nerve, e.g. a Diamond Abrasor

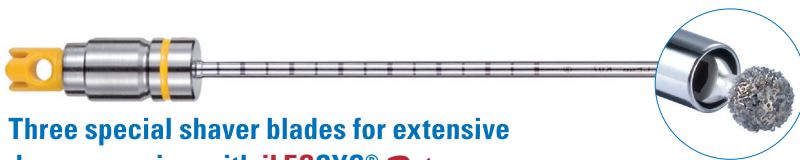
**Red/Purple/Blue:** for removal of bone, e.g. an Acorn Trimmer

**Green:** for removal of soft tissue, e.g. a Tissue Resector

**Shrill®**  
Shaver Drill System

### Multi-functional milling and resection system

- Handpieces and shaver blades specially developed for spine surgery
- Safe removal of soft tissue and bone in cases of stenosis
- Suction function ensures an unobstructed and clear view of the operating field
- Vacuum effect due to specially protected design

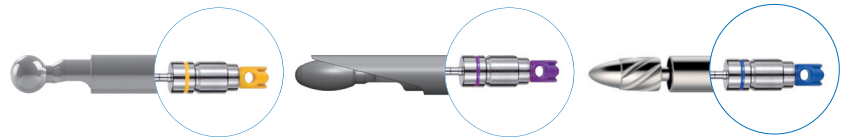
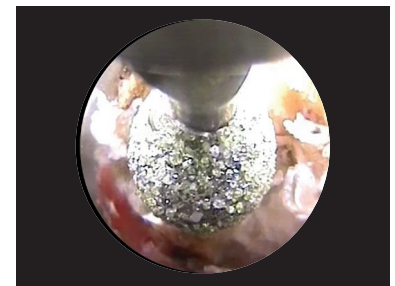


### Three special shaver blades for extensive decompression with iLESSYS® Delta

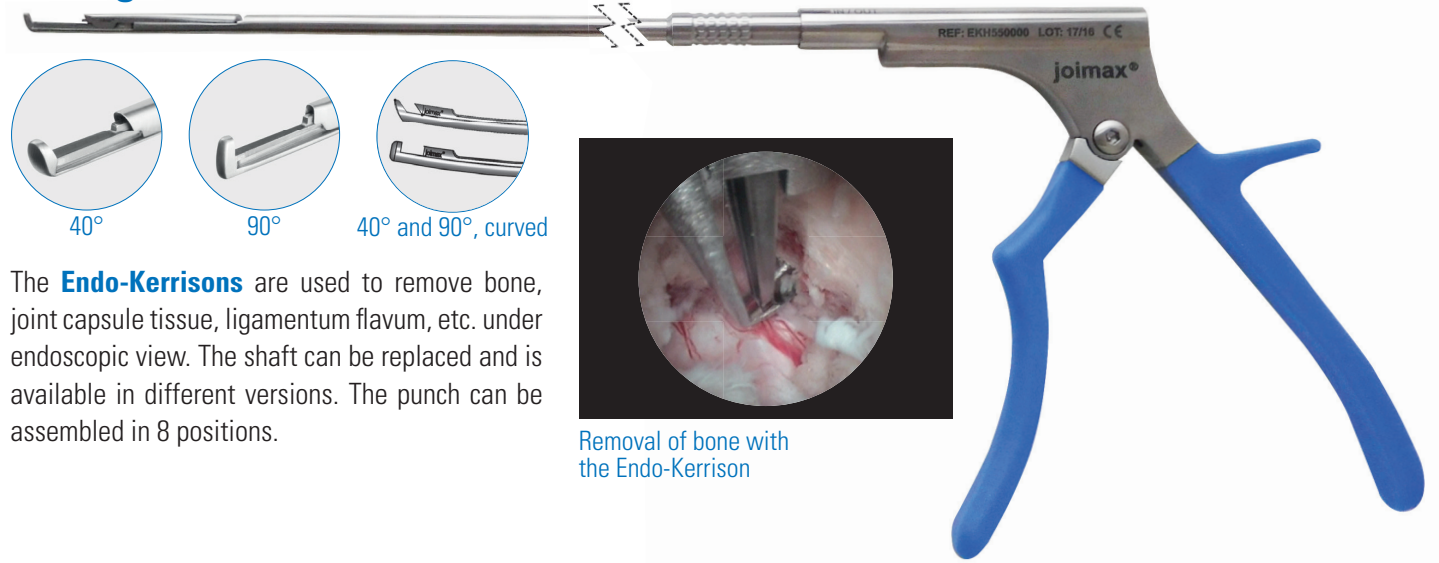
For extensive removal of osseous structures under endoscopic view, three larger Shrill® Shaver Blades (milling cutters) with 4.5 mm outer diameter are available:

- Diamond abrasor for bone resection
- Olive cutter (reamer) for bone resection, with protective lip on one side
- Bullet-Tip Cutter (milling cutter) for bone resection

Bony decompression with the Shrill® diamond shaver blade



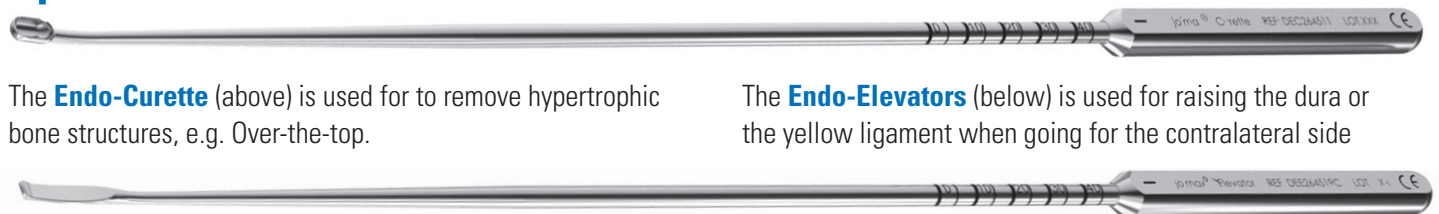
## Strong and variable: iLESSYS® Endo-Kerrison Punches



The **Endo-Kerrisons** are used to remove bone, joint capsule tissue, ligamentum flavum, etc. under endoscopic view. The shaft can be replaced and is available in different versions. The punch can be assembled in 8 positions.

Removal of bone with the Endo-Kerrison

## Special instruments for the contralateral use

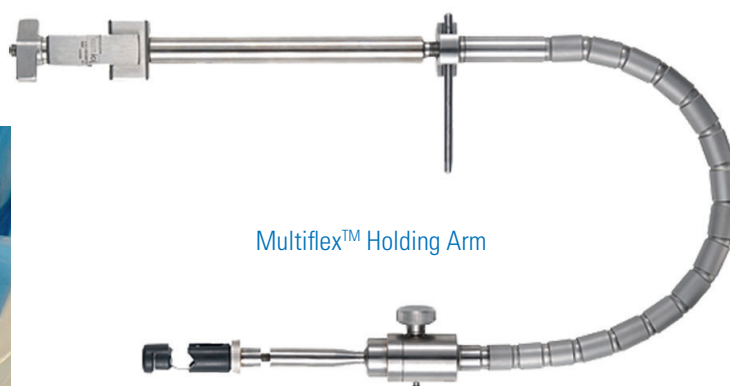


The **Endo-Curette** (above) is used for to remove hypertrophic bone structures, e.g. Over-the-top.

The **Endo-Elevators** (below) is used for raising the dura or the yellow ligament when going for the contralateral side

### Securely fixed with the Multiflex™ Holding Arm

The Multiflex™ Holding Arm enables the Full HD Laminoscope and/or working tubes to be fixed reliably and easily.



Multiflex™ Holding Arm

### Practical and consistent: the Disposable Access Kits

Disposable products are required in all operations. Aiming to make work easier, joimax® has developed a special disposable sterile instrument set so the instruments needed are guaranteed to be available while simultaneously saving time and simplifying the process of endoscopic surgery. The set contains all the disposable products you need during surgery: puncture needles, needles, reamers, syringes, dishes, skin marker, scalpel, guide wire and a sealing cap for the endoscope.



Disposable access set with color-coded reamers in different sizes



Various reamers and drills are available for the removal of bony structures.

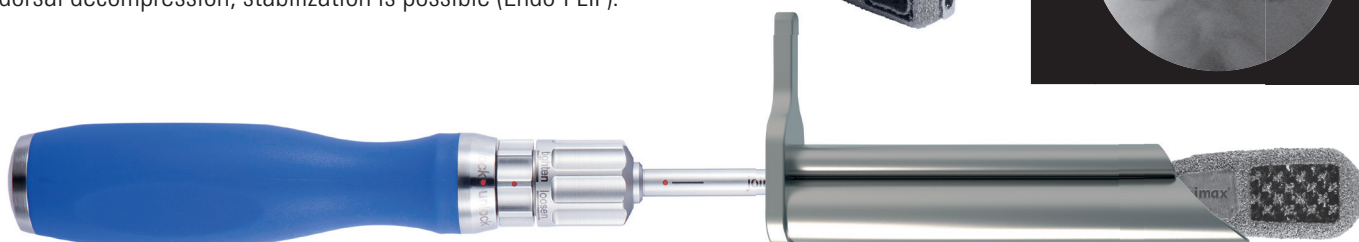
The needle-wire-set contains a siliconized needle for an easy access through the tissue and a NiTiNol wire which functions as a guide wire during the surgery.



Individually packed sterilized needle-wire set

### Ideal access technology, including for stabilization

The iLESSYS® Delta system can also be combined with EndoLIF® instruments to incorporate joimax® Cages. Thus, in addition to dorsal decompression, stabilization is possible (Endo-PLIF).





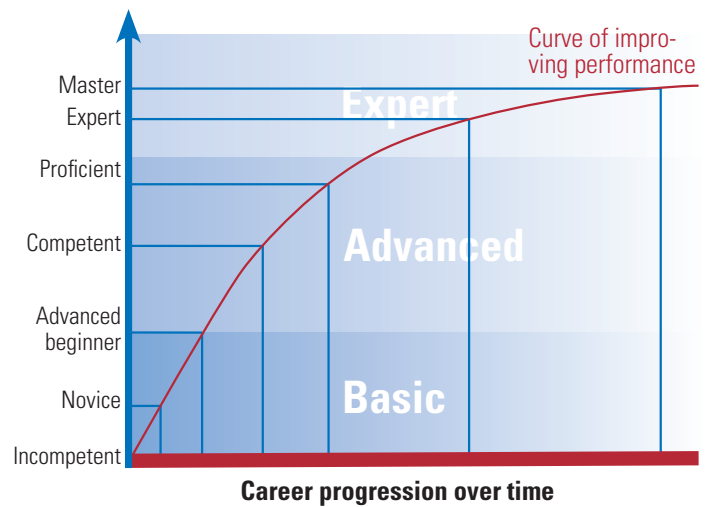
## joimax® TRAINING PROGRAM

The goal of the 3-step Continuing Medical Training Program is to provide the best possible learning process as well as outcome for both the surgeon and the entire surgical team.

Participants of the joimax® Training Program will become familiar with the surgical techniques while visiting at reference centers in the first place. Theoretical and practical training of the endoscopic techniques in joimax® workshops will follow, and finally the newly acquired skills will be transferred and refined with our professional support during participant's own first endoscopic procedures.



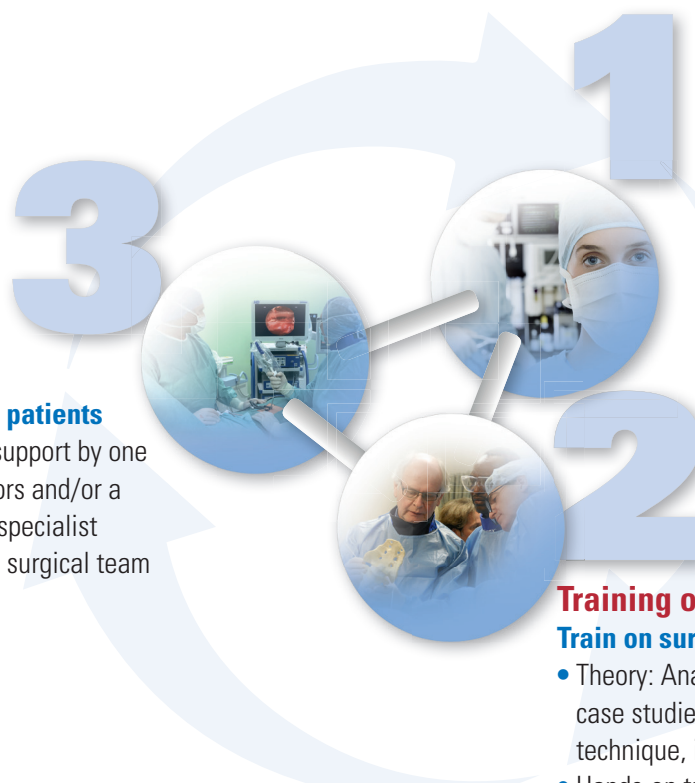
Experts explain the special aspects of the surgical technique and allow the workshop participants to benefit from their experience



### First Surgery

#### Operate on your own patients

- Safe and competent support by one of our reference doctors and/or a joimax® applications specialist
- Training for the entire surgical team



### Visitation

#### Experience live procedures

- Participation in surgical operations at our reference centers
- Share experiences with surgeons, anesthesiologists, the surgical staff and speak to patients

### Training on anatomical specimens

#### Train on surgical techniques – Step-by-Step

- Theory: Anatomy, indications/contraindications, case studies, anesthesiology, step-by-step surgical technique, instruments
- Hands-on training, tips and tricks

## joimax® Endoscopic Tower | Generation 4

The expert solution for spinal surgery and neurosurgery. All devices work in unison with one another and are specifically designed for the treatment of sensitive structures.

The image shows one of various mounting options.

### 1 Vitegra®

Visual Integration System

#### Fully integrated digital documentation system

- Wireless tablet to control the system from everywhere
- Video and snapshot function via camera head buttons
- Multiple video inputs for different signal sources like endoscopic camera, X-Ray, ultrasound, microscope, OR camera
- Voice control and voice-over video function
- Easy export of all patient data via Blu Ray, USB, LAN, DICOM



### 2 Camsource® LED

Camera & Light Source System

#### Brilliant images up to 4K

- Latest CMOS technology
- Full HD resolution via DVI, HD-SDI and 3G-SDI
- Integrated LED long-life light source, maintenance-free
- Combo and Ocular camera heads available

### 3 Intracs® em

Integrated Navigation Tracking & Control System

#### Simple and safe electromagnetic navigation

- Electromagnetic based tracking and guidance
- Instrument navigation directly at the tip
- Intuitive workflow and improved usability

### 4 Shril®

Shaver Drill System

#### Multi-functional milling and resection system

- Handpieces and shaver blades specially developed for spine surgery
- Safe removal of soft tissue and bone in cases of stenosis
- Suction function ensures an unobstructed and clear view of the operating field
- Vacuum effect due to specially protected design

### 5 Endovapor® 2

Multi Radio Frequency System

#### Combines variety of different electro-surgical modes and effects

- Specially integrated programs for spinal cord surgery
- All-in-one RF generator with interdisciplinary application
- 4 sockets: 2 x monopolar, 2 x bipolar
- Easy, intuitive touchpad operation
- Arc control for secure application
- Easy neutral electrode monitoring

### 6 Versicon®

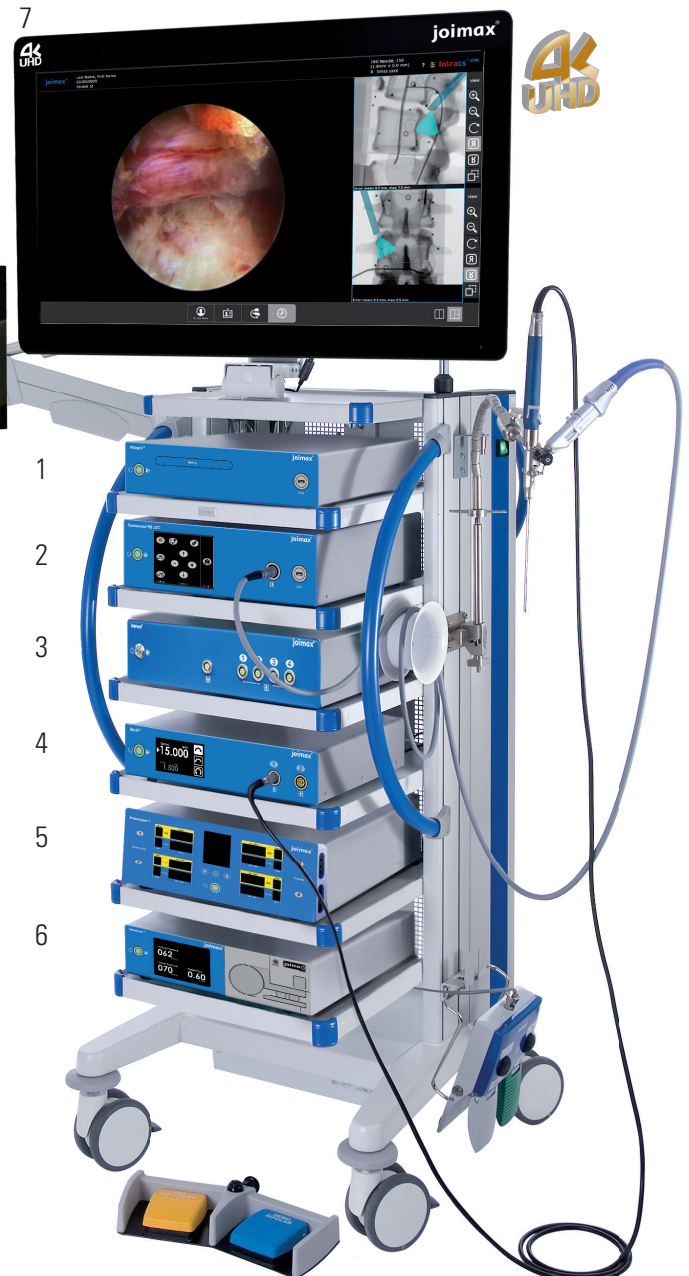
Versatile Irrigation Control

#### Multi-range irrigation pump

- Integrated spine mode for low flow and pressure
- Permanent control of flow and pressure
- Rapidly insertable, disposable tube set
- Replaceable patient line with check valve

### 7 JFMS 2620 | 3220 | 4K31

High Definition Medical Displays FHD and 4K UHD





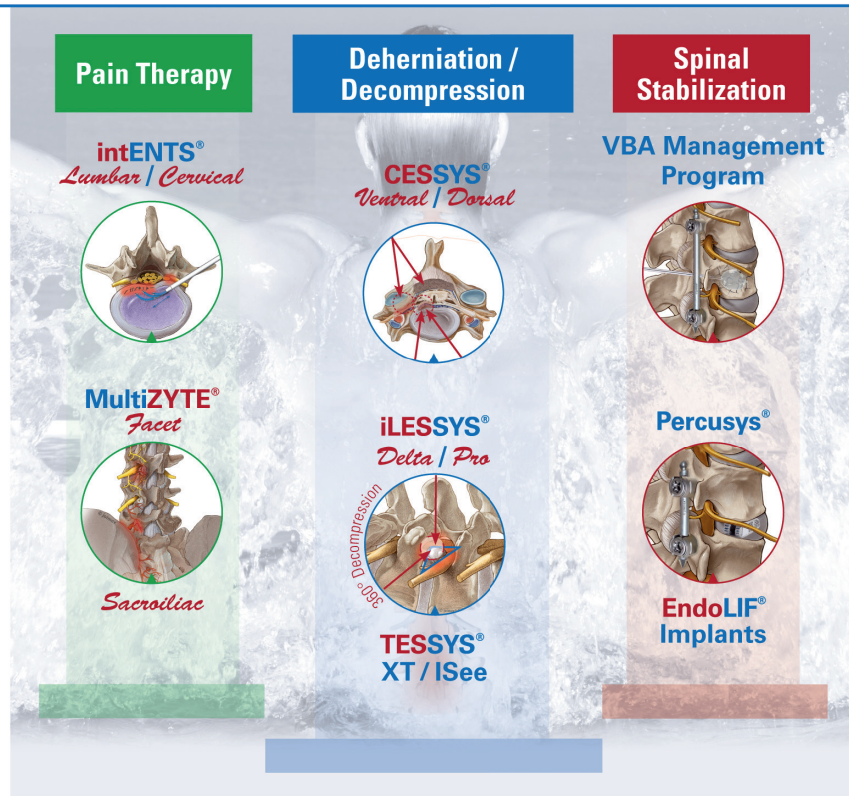
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joimax® GmbH  
Amalienbadstrasse 41, RaumFabrik 61  
76227 Karlsruhe, Germany

Phone +49 (0) 721 255 14-0  
Fax +49 (0) 721 255 14-920  
E-Mail info@joimax.com  
Net www.joimax.com

joimax®, Inc.  
140 Technology Drive, Suite 150  
Irvine, CA 92618, USA

Phone +1 949 859 3472  
Fax +1 949 859 3473  
E-Mail info@joimaxusa.com  
Net www.joimax.com