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# ENSIGHT™ BIPORTAL

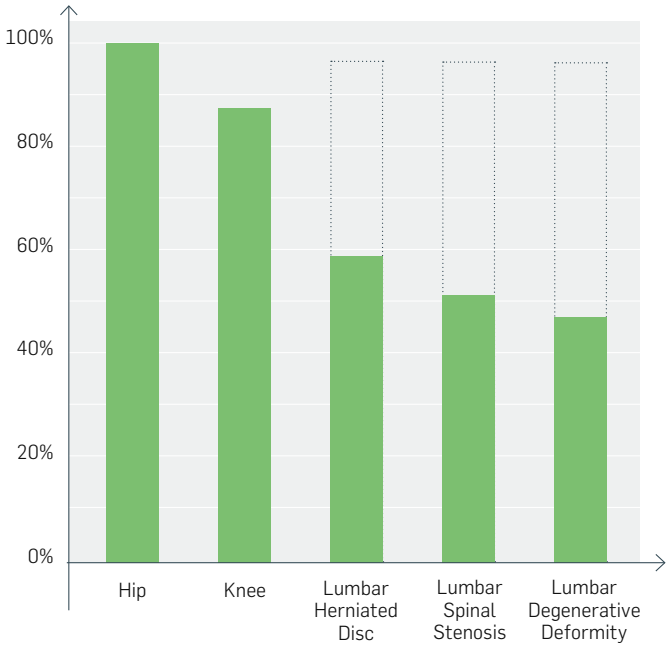
**Transforming Endoscopy.**
**Changing Lives.**

# Transforming Spine Surgery.
# The Benefits of Endoscopic Spine Surgery

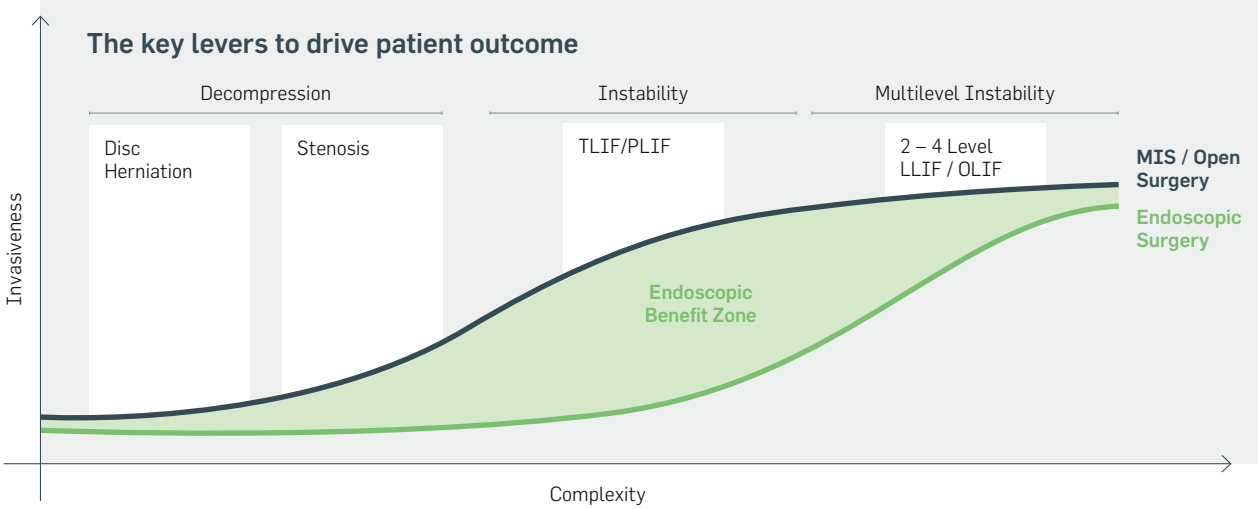
**Clear performance gap between spine, hip and knee surgery!**
Despite significant advancements in medical technology, we understand that there is considerable room for improvement.

A landmark study from the Schulthess Klinik (Zurich, Switzerland), and winner of the EUROSPINE best paper award, measured and compared a patient experience performance indicator – Patient Accepted Symptom State (PASS) for over 4500 patients undergoing lumbar spine, hip and knee surgery.

We therefore endeavour to address the existing challenges and provide innovative solutions to optimize patient care.




**Dr. Roger Härtl's concept of the benefit zones – Endoscopy is set to take things to a new level**
Dr. Roger Härtl's concept of the Benefit Zone offers a comprehensive framework for assessing the potential advantages in minimally invasive procedures. The benefit zone is increasing from herniated disc treatment to stenosis and highest for single level instabilities.




Based on Härtl Roger, Global Spine Journal, 2020, The 6 T's of Minimally Invasive Spine Surgery, graphically adapted by Nexon Medical

«MIS changed opportunities in spine surgery – Endoscopy is set to take things to a new level.»

**Prof. Roger Härtl, M.D.**
Director of Neurosurgery Spine, Weill Cornell Medicine



# Advantages of Endoscopic Spine Surgeries

### Enhanced Surgical Care

- Superior visualization[1]
- Minimal soft tissue and bone resection[1,3]
- Reduced bleeding and infection risk
- Less invasive, ideal for elderly and obese patients

### Faster Recovery and Higher Patient Satisfaction

- Less pain[2]
- Shorter hospital stay[2] or outpatient treatment[1]
- Quicker return to daily activities[1]
- Smaller scars for a better aesthetic outcome

### Long-Term Outcomes

- May reduce surgery-induced instability and thus delay spinal disease progression[4]
- Easier reoperation if needed

### Good to know: Socio-economic benefits

**99,9 %**
**less infection rate**
compared to other non instrumented spine surgeries[1]

**76,3 %**
**shorter hospital stay**
endoscopy vs microdiscectomy[3]

**10 %**
**less post-op pain**
endoscopy vs microsurgery[2]

**29 days**
**less work absence**[4]

[1] Simpson et al., 2021, The Spine Journal – [2] McGrath et al., 2019, JNS – [3] Hasan et al., 2019, JSS – [4] Lokhande et al., 2020, ISJ

«Biportal Endoscopy's preservation of soft tissue and reduced scarring may reduce complexity of a future surgery; it may even delay the spinal disease pathway.»

**Prof. Jin Sung Kim**
Seoul St Mary's Hospital, Seoul, South Korea



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# EnSight™ Biportal
# Advantage of Biportal Endoscopic Spine Surgery

### Main technologies for endoscopic spine surgeries:

Monoportal (also: uniportal or full-endoscopic) endoscopic spine surgery involves the use of a single portal or incision point to access the spine.

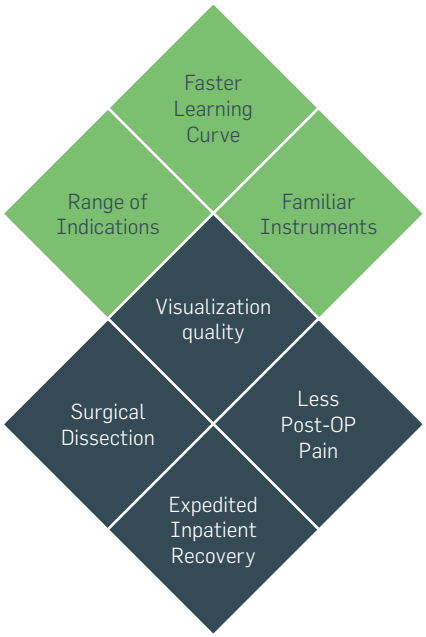
On the other hand, Biportal Endoscopic Spine Surgery (BESS) or Unilateral Biportal Endoscopy (UBE) uses two working portals. The first is used to insert the endoscope, while the second is used for surgical instruments. Compared to monoportal endoscopy, Biportal Endoscopy provides excellent visualization of the surgical site and allows for more complex surgical procedures.

Both Monoportal and Biportal Endoscopy techniques offer comparable patient benefits – superior to microsurgery – including low infection risk, minimal pain and fast recovery.

### What are the key advantages of Biportal endoscopic spine surgery for surgeons?

When patient experience and lower socio-economic costs are key drivers, then offering your patients endoscopic spine surgery makes common sense. And given Biportal Endoscopy has a faster learning curve and covers a wider range of indications it will become the technique of choice creating a new standard.

- General advantages of endoscopic spine surgery
- Additional advantages of Biportal endoscopic spine surgery (UBE only)

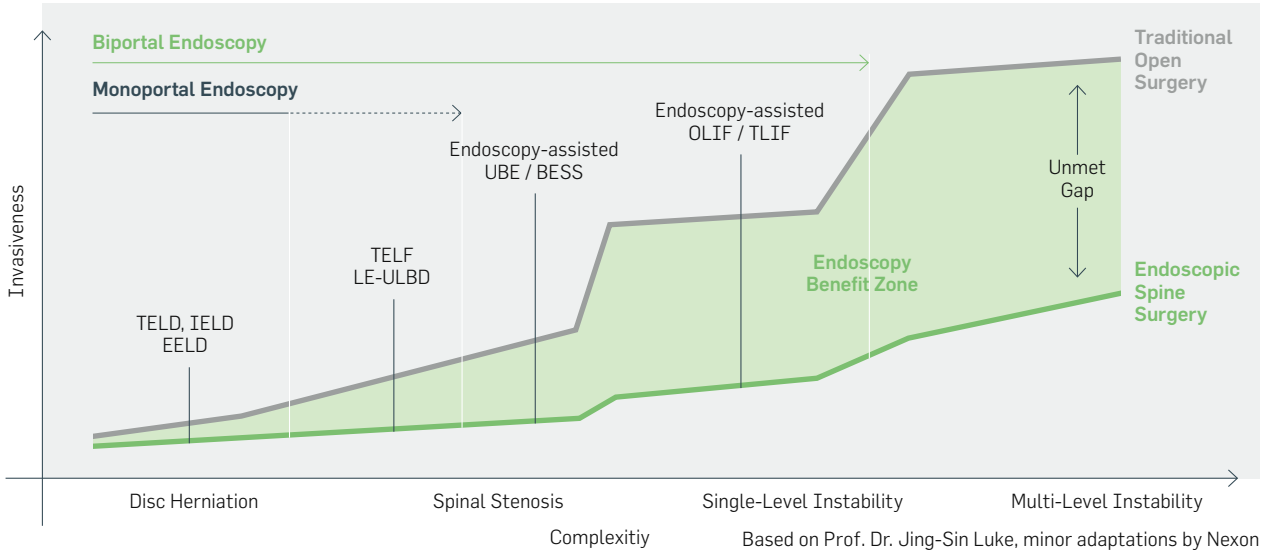



### Factors impacting the learning curve for Biportal Endoscopy:

- Independent instrument and camera control: More freedom of movement and helps avoid blind spots.
- Familiar instruments and working approach as in microsurgery (e.g., Kerrison punches, drill tips) allow faster adoption.
- Surgeons must adapt to eye-hand coordination, depth perception.
- Triangulation, irrigation and bleeding management need to be learnt.

### Learning curve depends on experience:

- Often < 20 cases for microsurgery-trained surgeons.
- Often < 10 cases for those experienced in monoportal endoscopy, endoscopy in brain or arthroscopy.
- Efficiency comparable to traditional techniques is often achieved within 30 – 40 cases.



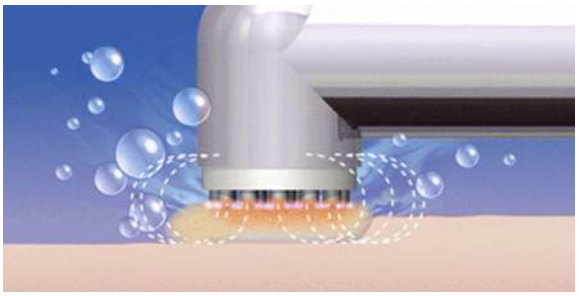

Based on Prof. Dr. Jing-Sin Luke, minor adaptations by Nexon

## How does Biportal Endoscopy compare to MIS and Monoportal Endoscopy:

| | Microsurgery (MIS with tube and microscope) | Monoportal Endoscopy | Biportal Endoscopy |
|---|---|---|---|
| **Indications** | All types of discectomy, stenosis, to short construct fusion; from lumbar to cervical. | Mainly simple lumbar discectomy. | The same as Microsurgery. |
| **Visualization** | Limited to a single and fixed orientation with a view from far above. Instruments obstruct vision. | Limited to single port through which instruments are guided. Instruments may obstruct vision. | Camera moves independently to perfectly visualize surgical site and instrument tips. Fusion possible under visualization. |
| **Instruments** | Large choice of instruments type and size. | Long and very thin instruments to enter into the small diameter shafts | Same size as microscopic surgery – same efficacy. |
| **Maneuverability** | Unlimited up-down instruments movement, but inclination is restricted by MIS tube . | Room for maneuverability limited to endoscopic shaft. | Higher than for microscopic surgery due to absence of tube and skin elasticity. |
| **Incisions** | One small incision, tissues are distracted during entire surgery time. | One small incision. | Two small incisions. |
| **Surgical time** | Highly variable depending on the patient pathologies, hospital setup and surgeon: generally from 40 min to 4 h. | Faster than biportal for interlaminar or foraminal simple hernia as no bone needs to be drilled. | Faster than monoportal for complex hernia, stenosis and fusion due to instruments size. |
| **Learning curve** | Current standard technique learned during a long and progressive process during fellowship/residency | Longer learning curve, easier for surgeons with experience in other monoportal surgeries. | Faster, especially for surgeons with experience in Arthroscopy. |
| **Investment** | Highly expensive microscope, plus tube retractor and instruments set. | Several sets for different accesses and target areas. Specific drills and generator needed. | Economic solution: 1 single set for all indications. |

# Plasma & Radiofrequency Technology: Revolutionizing Tissue Ablation and Coagulation

This advanced technology combines the unique benefits of Plasma and Radiofrequency (RF) energy for precise, safe and efficient tissue management. The automatic dynamic balance between plasma and RF coagulation adjusts with power settings, ensuring optimal surgical control.



### Plasma Ablation: Safe, Efficient Ablation and Resection

- Operates at low temperatures (40 – 70 °C), breaking down tissue into simple atoms – tissues are vaporized.
- Enables rapid, highly efficient ablation with minimal thermal damage.
- Irrigation efficiently flushes dissolved tissue, maintaining a clear surgical field.

### RF Coagulation: Effective Bleeding Control and Vessel Sealing

- Shrinks collagen fibers to seal vessels while preserving cellular integrity.
- Enhances healing and minimizes damage to surrounding tissues.

A patented electrical circuit continuously monitors power output to avoid burns and automatically pauses in case a current surge occurs.

### Benefits of Plasma & Radiofrequency System:

#### Safety

- Ensures moderated temperature thus supporting safe operation near neural structures.
- Maintains clear visualization with no carbonized tissue buildup.
- Automatically suspends power in case of peak current.
- Easy power setting and acoustic feedback for the different modes.

#### Precision and Control

- A precise and high energy plasma layer enables targeted ablation at low temperature, preserving surrounding tissues.
- Moderated RF energy application ensures safe and precise coagulation.
- Adjustable ablation and coagulation settings adapt to various surgical steps.
- Hands-free operation with foot-controlled activation for enhanced precision.

#### Enhanced Care and Necrosis Prevention

- Less scarring for faster recovery.
- Reduced infection risk.
- Minimized post-surgical pain for improved patient comfort.
- Allows easier re-operations.

# Plasma & RF Electrodes – Precision, Safety & Efficiency in Surgery

Each electrode delivers both **plasma and radiofrequency** energy for precise tissue ablation and coagulation. **Integrated temperature sensors** at the tip regulate output, preventing tissue burns and ensuring safe operation.

### EnSight™ Biportal Spinal 90° Electrode MC405A

- Usage outside of the epidural space.
- Suction for optimal visualization and plasma formation.



### EnSight™ Biportal Spinal 90° Ceramic Electrode BC405A

- Usage outside of the epidural space.
- Suction for optimal visualization and plasma formation.
- Protruding tip improves targeting control.
- Ceramic tip allows better thermal insulation.



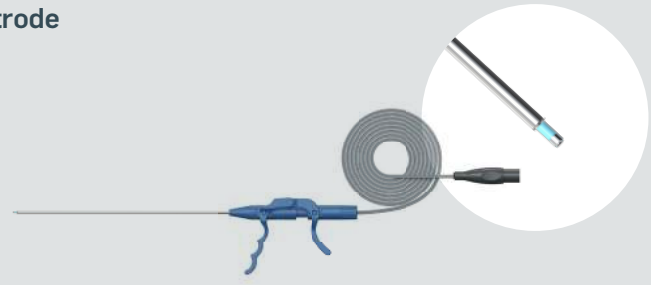
### EnSight™ Biportal Spinal Hook Electrode AC311A

- Usage: in the epidural space.
- Easy and targeted dissection of tissues.
- Easy retraction of soft tissue for safe ablation.



### EnSight™ Biportal Spinal Flexible Electrode MC301A

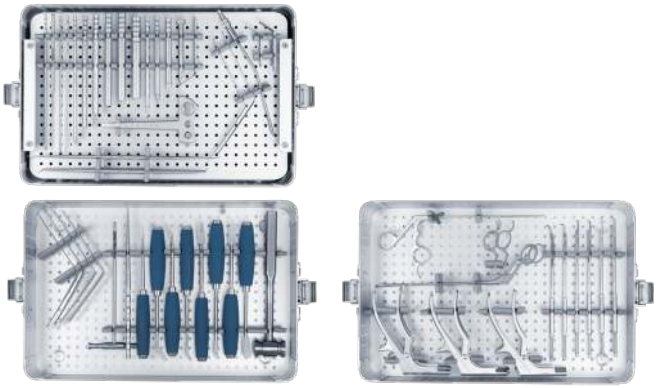
- Usage in the epidural space.
- Flexible and extendable tip to precisely reach target area.



# Instruments – Engineered for Biportal Precision

Achieve precision, control and efficiency with instruments specifically designed for Biportal Endoscopy (UBE).

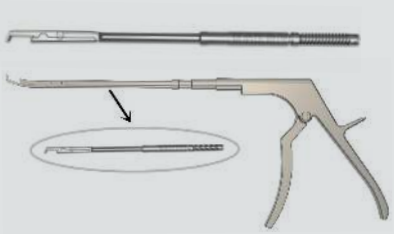
These two versatile sets cover **a wide array of spinal indications and the instruments are** optimized to enhance maneuverability, precision and surgical performance, empowering surgeons to operate with confidence, even in delicate spinal procedures.



ESSENTIAL INSTRUMENTS – specifically designed for Biportal Endoscopy

## Rotatable Kerrison Punch

- Versatile & Adaptable: Straight and Curved, 2mm and 3mm: They easily adjust to different anatomical structures.
- 360° rotation allows to reach difficult angles, improving surgical precision.
- Improved ergonomics reduces hand fatigue and strain, allowing a natural wrist position and minimizing unnecessary movements.
- The ability to rotate without repositioning enhances efficiency, streamlining workflow and procedure time.



## Semi-Tubular Retractors

- Precisely guides instruments to target positions while preserving freedom of movement.
- Ensures optimal water outflow for a clear surgical field.
- Minimizes soft tissue collapse for a clearer and more stable view.
- Gently retracts tissues without excessive pressure, reducing postoperative pain.



## Scope Retractor

- Retracts nerves with the endoscope.
- It enables the surgeon to operate on his own (without assistant).



### Muscle Detacher

- Ergonomic handle provides a secure grip, improving maneuverability during procedures.
- Smooth tip allows for gentle muscle detachment, minimizing tissue damage.
- Designed for efficient and controlled muscle separation, facilitating clear access.
- Minimizes unnecessary trauma, contributing to less pain and quicker patient rehabilitation.



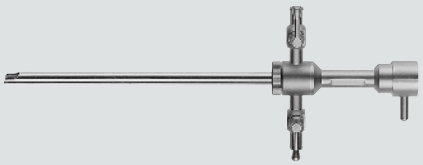
### Disc Knife

- Specifically engineered for Biportal Endoscopy, to ensure optimized maneuverability and performance.
- Smooth edges allow safe, controlled introduction with minimal tissue trauma.
- Efficient disc cutting.



### 0˚ or 30˚ Endoscopes and Sheath

- Compatibility for seamless connection with Wolf, Storz, Olympus, ACMI and others.
- Scratch-resistant sapphire glass window to ensure clarity, high resolution and contrast for an optimal view.
- Enhanced Efficiency – designed specifically for Biportal endoscopic procedures, for smooth maneuverability and minimal obstructions.



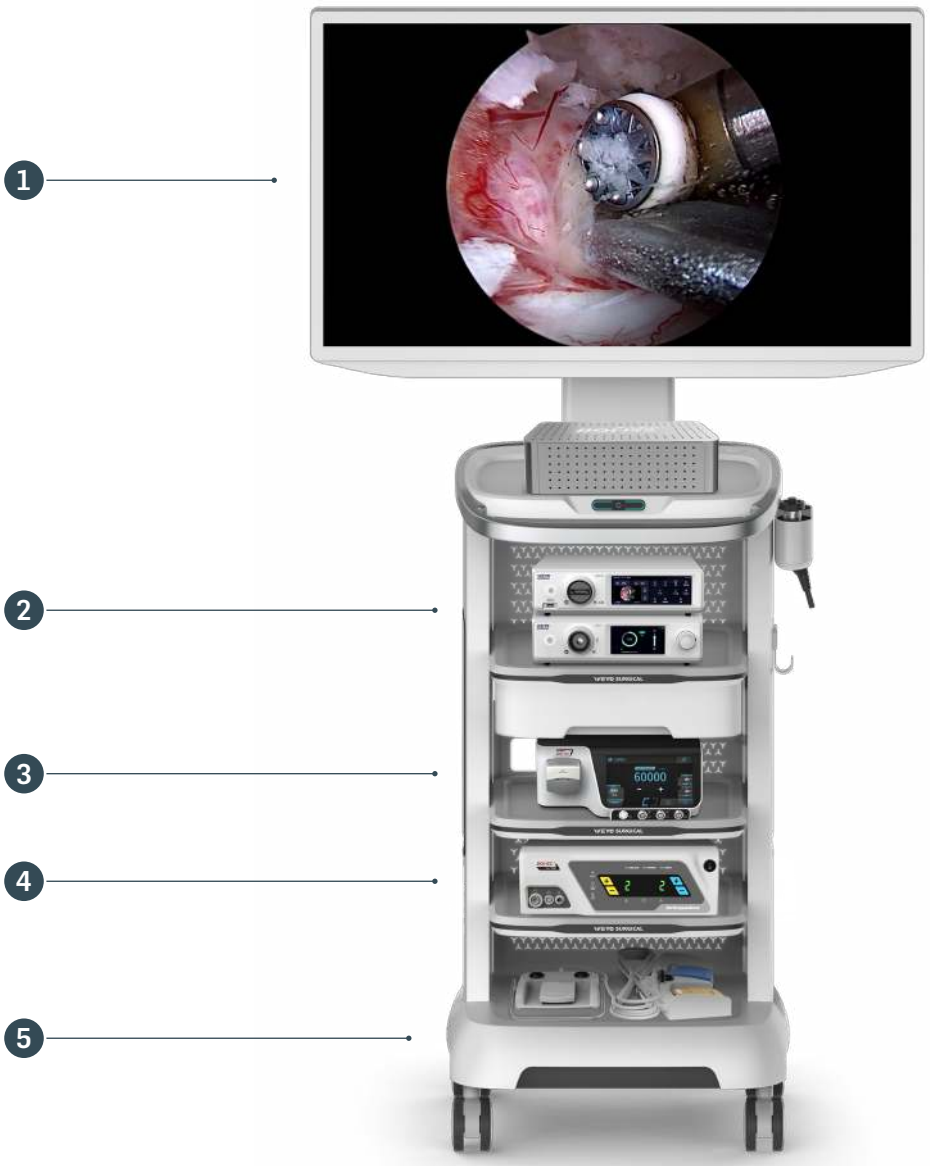
### Accessories: Endoscopic Drape Set – Optimized for OR Efficiency

Engineered specifically for endoscopic spine surgery, our EnSight™ Biportal Endoscopic Drape Set enhances workflow efficiency in the operating room for both surgeons and OR Team.
The Drape Set includes an endoscopic C-drape and a camera drape sleeve, along with additional single-use items for optimal preparation in Biportal Endoscopy surgery. More configurations coming.



Image: L'Hôpital de La Tour

# Nexon's EnSight™ Biportal Endoscopic Solution




**1 Camera Monitor 4K 32'' or 55'' Screen**
- Wide, precise and high-resolution view

**2 4K Camera with Integrated Light Source**
- Exceptional image quality
- Video and image recording capabilities
- Compact and efficient

**3 Spine Endoscopic Drill**
- Designed for Biportal access for free movement
- High speed drill ensures smooth and controlled drilling

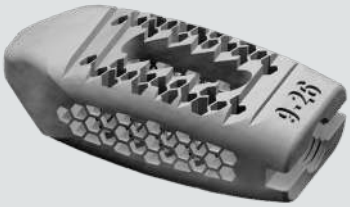
**4 RF Plasma System**
- Certified for Spine
- Efficient ablation and coagulation

**5 Endoscopic Trolley**
- Stable and robust
- Adjustable, compact shelves
- Rotatable screen holder for easy mobility

# EnSight™ Biportal: Fusion Solution System

### Oblique Hygro- L TLIF Cage

- Designed to restore spinal alignment in thoracic to lumbosacral spine.
- Versatile Fixation thanks to polyaxial and monoaxial 360° screws for enhanced stability.
- Reliable Fusion: Hygro-L TLIF implants facilitate inter-segmental fusion thanks to the patented capillary effect.
- Implanted via minimally invasive posterior approach for effective access and placement.



### Artemis MIS Pedicle Screw: Precision, Strength & Simplicity

Unlock the full potential of Biportal Endoscopy with instruments built for precision and success.

#### Versatile & Adaptable

- Polyaxial & Monoaxial 360° screws ensure optimal fixation and flexibility.
- Wide size range; available in 30 – 60 mm lengths and 4.0 – 10.0 mm diameters.



#### Streamlined & Efficient Design

- Intuitive use of instrumentation simplifies procedures for surgical efficiency.
- Reduced number of instruments and trays
- Reduced number of surgical steps.
- Easy screw insertion with self-tapping, dual-lead screw tips.
- Option for rod repositioning within the screw tabs.
- No need for tower/extension instruments, enhancing workflow.

#### High System Strength & Stability

- Dual & quadruple lead screws; maximize screw-bone stability, reducing pull-out risk.
- Reversed angle locking nut provides secure rod fixation with strong final locking.
- Reinforced instrument-implant connection (rods, screws, and locking nut drivers).
- Powerful compression-distraction tools enhance surgical control for precise spinal correction.

# The Nexon Way – A predictable journey to endoscopic excellence

### Nexon Mission – Empowering Recovery. Redefining Possibilities. Expanding Access.

- **Patient-centered Care** – Everyone deserves the highest standard of treatment and a swift return to a better quality of life after spinal surgery.
- **Transformative Possibilities** – The biportal technique delivers significant benefits to patients, surgeons, hospitals and the broader socio-economic landscape.
- **Our Mission** – To empower hospitals across Europe with biportal endoscopic solutions, making advanced spine care accessible to all.

### Transforming Spine Surgery through Swiss Precision and Training

- Nexon's EnSight™ Biportal Endoscopy (UBE) all-in-one solution.
- A **cost-effective** endoscopic solution.
- **Reliable, efficient and easy to work** with a lifelong commitment to professional growth through a comprehensive continuing professional development (CPD) program.

## EXPLORE

### Learn & Connect

- Engage in a collaborative, open community.
- Participate in primer and extender meetings and interact with experts.

## LEARN

### Skills & Expertise

- Personalized roadmap to adopt endoscopic surgery.
- Structured hands-on and competency-based training concept.
- Blended education experience with online platform (pre-/post trainings.

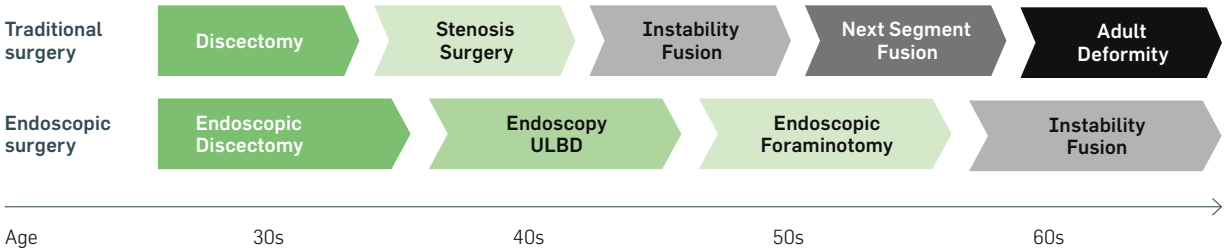
## MASTER

### Achieve Excellence

- Ongoing support through a strong Community of Practice.
- Advanced trainings, live surgery observations, mentorship and skill refinement.
- Be part of a growing network of experts leading the future of spine surgery.

### Influencing the spinal disease pathway with endoscopy

Endoscopic surgeries have the potential to reduce surgically induced instability, helping to preserve natural spinal function and thus delay the progression of the spinal disease pathway.




Based on concepts of Prof. Jin Sung Kim

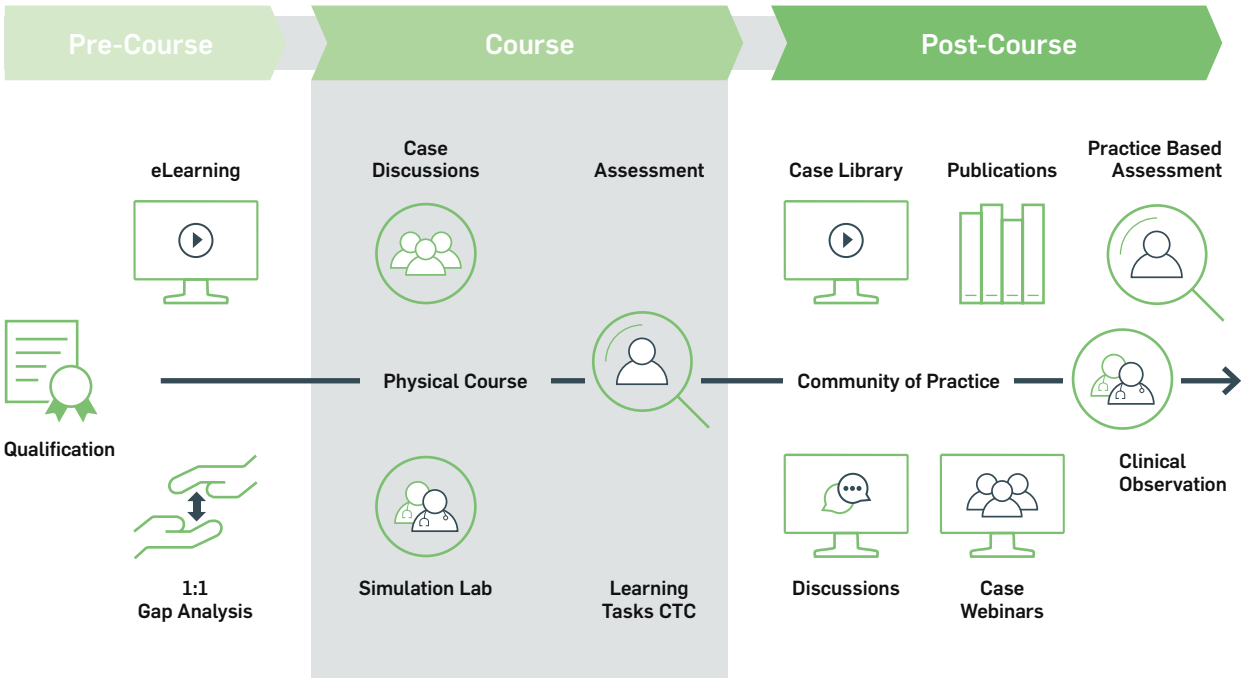
« The versatility of this technique is truly amazing. I honestly don't see any limits yet. »

**PD Dr. Antonio Faundez**
Orthopaedic Spine Surgeon Hôpital de La Tour, Meyrin, Switzerland



# Life-long Continuing Professional Development (CPD)

## Nexon's learning concept




- **Personalized Learning eXperience** – Tailored training based on individual goals and gap analysis.
- **Competency-based curriculum** for better clinical decision-making and skills development.
- **Hands-on surgical skill development** – Peyton's model with realistic simulations or cadaver practice.
- **Blended Learning** – Seamless integration of pre- and post online education via our learning eXperience platform.
- **Community of Practice & Mentorship** – Ongoing support through a strong Community of Practice.
- **Faculty Development** – Modern teaching methodologies to enhance education quality and outcomes.

«Nexon's CPD Mission: We aim to create smarter learning experiences that engage, motivate and inspire surgeons' learning the right competencies to deliver safe, reproducible and quality surgical outcomes in the most expedient and effective fashion.»

**Michael Piccirillo,** Professional Development Consultant



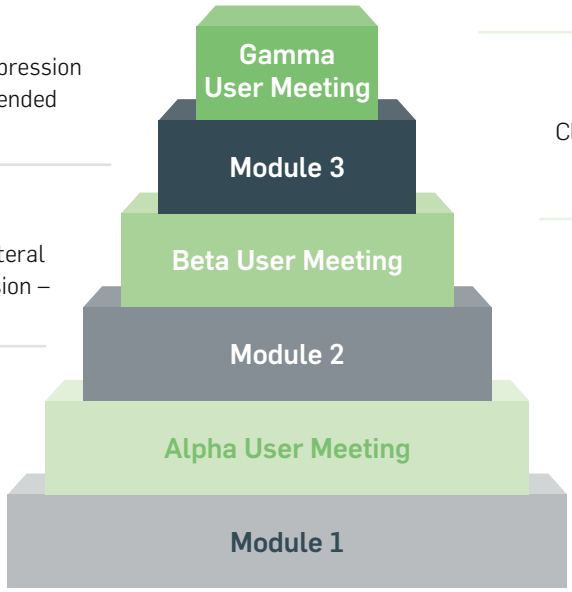
# Life-long Continuing Professional Development (CPD) curriculum

## Delivery of a continuous «Best-in-class» learning experience

**Module 3**
Foraminal Approach for Decompression and Transforaminal Fusion – Blended Learning Program

**Module 2**
Interlaminar Approach for Bilateral Decompression (ULBD) and Fusion – Blended Learning Program

**Module 1**
Interlaminar Approach for Unilateral Spinal Decompression – Blended Learning Program




**User Meeting 3 (Gamma)**
150 Club – Complex Case Discussion – Policy & Clinical Pathway Decision Making

**User Meeting 2 (Beta)**
12 months post surgery – Case Discussions: Barriers, Complication Management, Research Projects

**User Meeting 1 (Alpha)**
6 months post surgery – Case Discussions: Barriers, Complication Management

## Empowering Surgeons through innovative learning

At Nexon Medical we put the learner first, fostering a dynamic, hands-on training environment. Our expert surgeons serve as facilitators, using advanced education principles and adult learning techniques to enhance skill development and surgical mastery.

«This course offers a three-stage hands-on training: Basic eye-hand coordination, a realistic mushroom model for disc removal and an advanced anatomical model for complex procedures. Its efficient approach makes it ideal for mastering minimally invasive techniques. Given its success, more sessions will follow – maybe you'll join us next time!»

**Prof. Dr. Martin Stienen,**
HOCH Health Ostschweiz, Kantonsspital St. Gallen, Switzerland



### Knowledge Sharing & Networking

- Interactive Discussions – Exchange tips, tricks and experiences.
- Peer Learning – case discussions and insights from surgeons across Europe.
- Networking Opportunities – Build connections within the biportal surgical community.
- European Community of Practice for Biportal Endoscopy.
- Expert Collaboration – Gain insights and support for initial cases.
- European Reference Centers – Observe and train with leading professionals.
- Exclusive Resources and surgical videos.







«As a neurosurgeon specializing in UBE I have witnessed firsthand how Nexon's pedagogic program blends innovation with precision, making complex techniques accessible to surgeons worldwide. Their approach is unlike anything I have seen before – combining cutting-edge technology, expert mentorship and facilitation and a commitment to excellence that empowers professionals to push the boundaries of minimally invasive surgery.»



**Dr. Javier Santander**
Instituto Clavel, Hospital Universitario San Francisco de Asis, Madrid



For additional information
on trainings visit
nexonmedical.com/education

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