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MEDICAL

ENSIGHT™
BIPORTAL



TRANSFORMING ENDOSCOPY.
CHANGING LIVES.

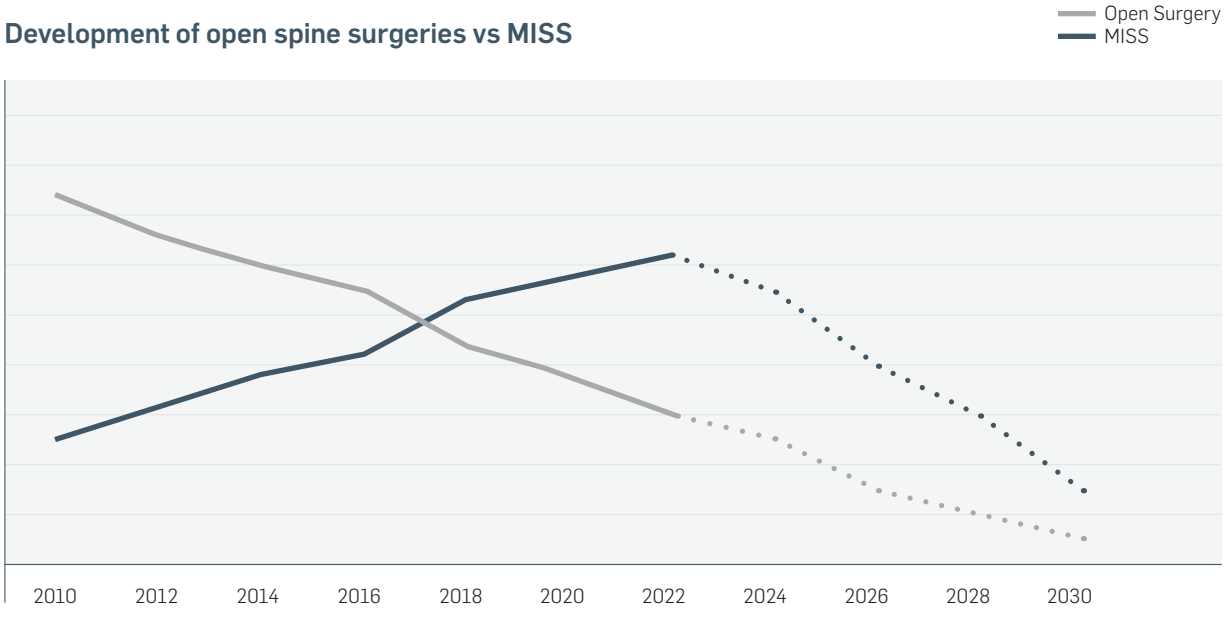
EVOLVING A NEW SPINE SURGERY MINDSET

Open spine surgery, as the name suggests, involves making a large incision in patient's back to access the spine.

While this approach was needed for treating complex spinal conditions in the past, it commonly resulted in significant tissue damage (e.g., muscle, ligaments and nerve), blood loss and consequently raised the risks of infection, the level of pain and extended the length of hospital stay and the patient's rehabilitation time.

As a result, for the past twenty years there has been a gradual trend and focus on developing minimally invasive spine surgery (MISS) techniques.

Development of open spine surgeries vs MISS



These new MISS techniques were pioneered from the early 2000s by a new generation of spine surgeons, the likes of Sang Ho Lee (South Korea), Kevin Foley (USA), and Michael Meyer (Germany).

While the pioneers were often ridiculed because MISS's limited indications, the long learning curve, and need for specialized tools, the concept itself made total sense.

MISS surgeons approached the same spinal problem, but with a different rationale. The goal was to preserve the muscles and tissues through smaller incision and techniques that go through or around the muscles without stripping them off.

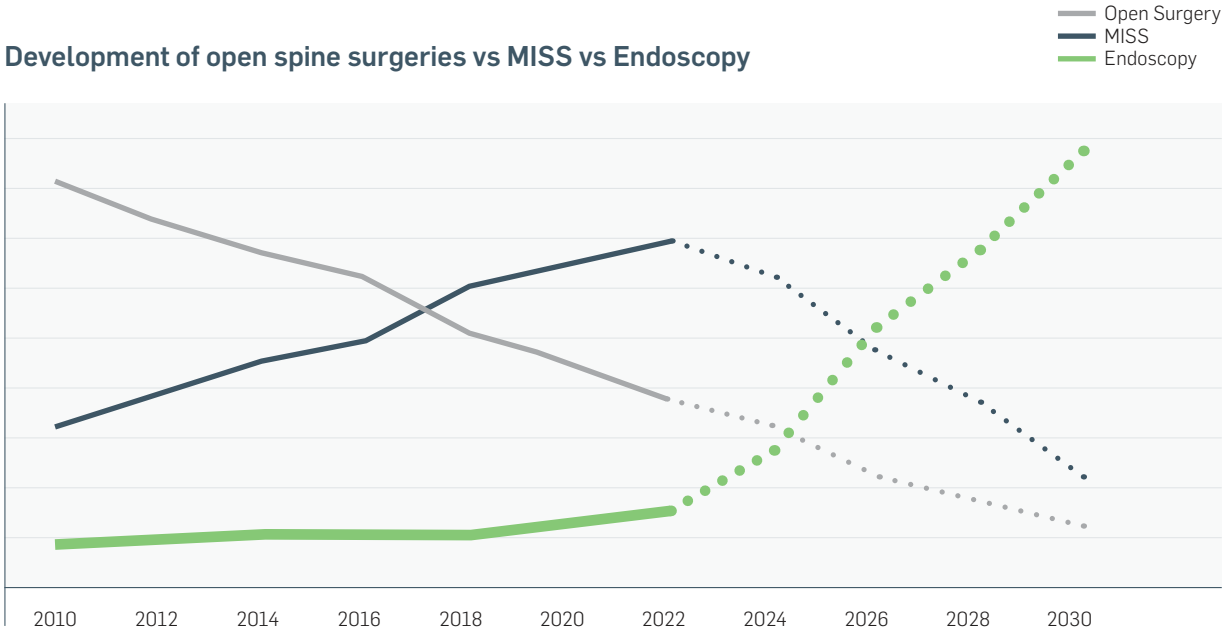
MISS is performed using much smaller incisions than open surgery. Small tube shaped retractors, rather than large muscle dissecting ones, are used to create a narrow opening to accesses the spine. X-ray fluoroscopy and a microscope allow me to visualize the area of interest in the spine.

Very small instruments are used to remove pieces of damaged vertebral bone, cartilage, and/or spinal disc. This type of minimally invasive approach resulted in less damage to the muscles and soft tissues that surround the spine, which led to less post-operative pain and faster recovery.

The popularity of MISS grew from 2010 as medical device companies launched MISS-product ranges that widened possible MISS indications, and coupled to this was a change in hospital productivity drivers, which aimed to lower the average length of stay (ALOS), which MISS supported.

There are now several different types of minimally invasive spine surgery, including percutaneous discectomy, microdiscectomy, and endoscopic-assisted techniques.

Development of open spine surgeries vs MISS vs Endoscopy



Endoscopic spine surgery is the latest development in minimally invasive spine surgery.
It involves using an endoscope, which is a thin tube with a camera attached, to visualize the spine and perform the surgery through small incisions.

Endoscopic spine surgery offers several advantages over traditional MISS – even smaller incisions, even less muscle damage, reduced complication risks, and even faster recovery times.

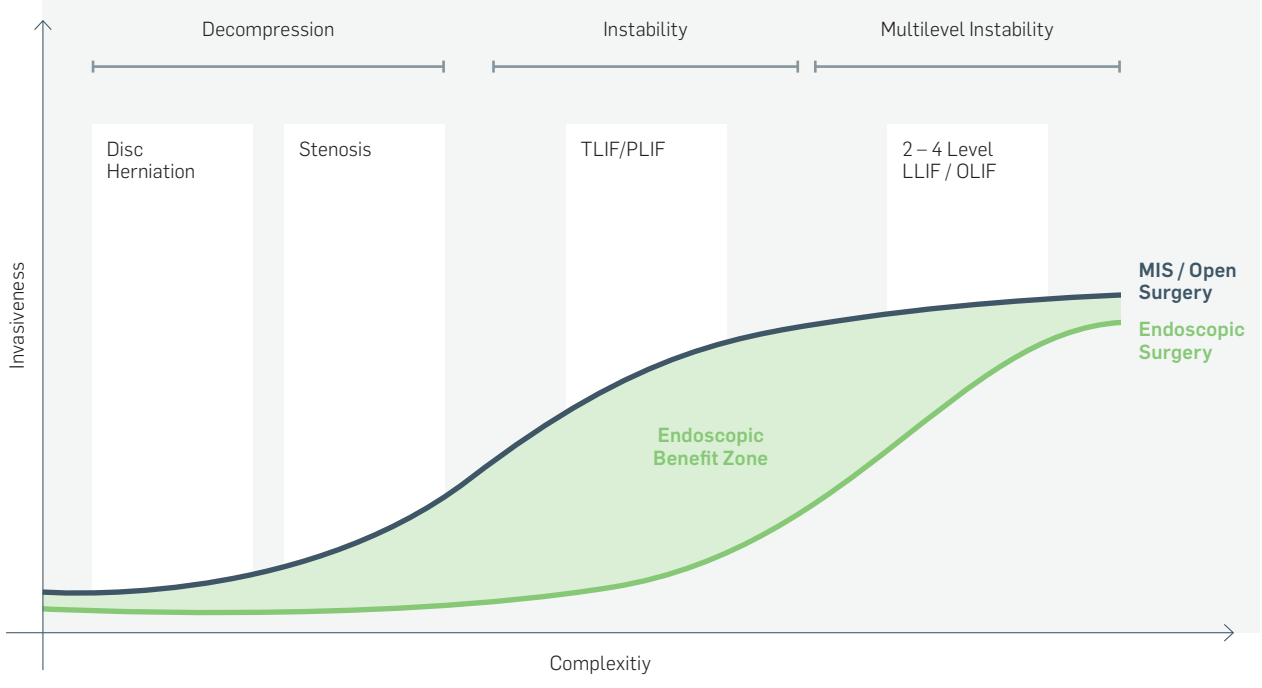
Overall, the trend in spine surgery has been towards less invasive techniques, resulting in improved patient outcomes and faster recovery times. While each approach has its own unique advantages and disadvantages, the shift towards endoscopic spine surgery represents a significant advancement in the field of spinal surgery.

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MISS CHANGED OPPORTUNITIES IN SPINE SURGERY – ENDOSCOPY IS SET TO TAKE THINGS TO A NEW LEVEL

Dr. Roger Härtl's initial concept of the Benefit Zone offers a comprehensive framework for assessing the potential advantages and optimizing outcomes in minimally invasive procedures, e.g. endoscopic surgeries, compared to open spine surgeries. The benefit zone for less invasive surgeries is increasing from herniated disc treatment to stenosis and highest for single level instabilities. Dr. Härtl's concept remains a cornerstone for surgeons seeking to deliver superior care and improved patient outcomes.

The key levers to drive patient outcome



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

«MISS changed opportunities in spine surgery; however, Endoscopy is set to take things to a new level.»

Roger Härtl MD

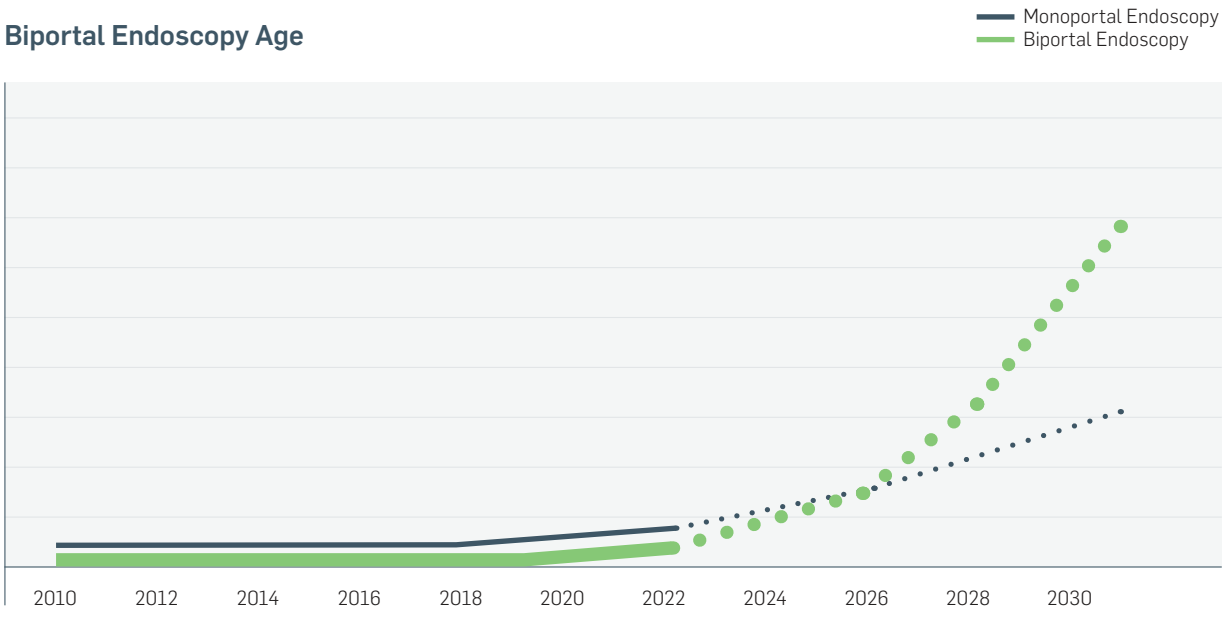


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ENDOSCOPIC SPINE SURGERY

MICRO-ENDOSCOPIC BLENDING

Biportal Endoscopy Age



Uniportal or monoportal endoscopic spine surgery involves the use of a single portal or incision point to access the spine.

In this technique, the surgeon inserts an endoscope through the small incision and navigates it to the affected area of the spine.

This method requires less soft tissue dissection, as well as less bone removal, resulting in a smaller surgical scar and reduced postoperative pain.

On the other hand, biportal endoscopic spine surgery uses two working portals or incisions to gain access to the spine. The first incision is used to insert the endoscope, while the second incision is used for surgical instruments. Compared to monoportal endoscopy, biportal endoscopy provides better visualization of the surgical site and allows for more complex surgical procedures.

Both monoportal and biportal endoscopic spine surgery are minimally invasive techniques that offer several advantages over traditional open and minimally invasive spinal surgeries.

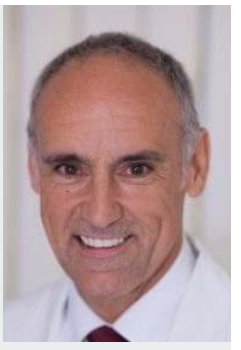
However, the choice between the two techniques depends on the patient's specific condition and the surgeon's preference and experience with each approach.

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«The Future: today we are in a stage which I call ‚micro-endoscopic blending', where the dynamics of technical improvement of endoscopic techniques suggests that the overlap of indications for this technology vs. microsurgery will step by step convert into a scenario where endoscopic techniques replace microsurgery.

The challenge is the learning curve and training of young surgeons. The acceptance of this technology will be high among young surgeons, but it is the task and duty of the protagonists of the older generation, the hospitals and the academic societies to develop learning – and training – concepts to shorten learning curves and to improve technical quality and clinical outcomes.»

Michael Mayer MD



NOMENCLATURE FOR ENDOSCOPIC SPINE SURGERY

Endoscopic Spine Surgery

Full Endoscopic Decompression

Cervical

Anterior

Anterior Endoscopic Cervical Descectomy (AECD)

Posterior

Posterior Endoscopic Cervical Foraminotomy (PECF)

Posterior Endoscopic Cervical Discectomy (PECD)

Cervical Endoscopic Unilateral Laminotomy for Bilateral Decompression (CE-ULBD)

Thoracic

Inter/Trans Laminar

Thoracic Endoscopic Unilateral Laminotomy for Bilateral Decompression (TE-ULBD)

Transforaminal

Transforaminal Endoscopic Thoracic Discectomy

Lumbar

Full Endoscopio Lumbar Discectomy
Transforaminal Endosopio Lumbar Discectomy (TELD) Interlammar Endoscopic Lumbar Discectomy (IELD) Lxtraforaminal Lndoscopic Lumbar Discectomy (LLLD)

Full Endoscopio Foraminotomy
Transforaminal Endosopio Lumbar Foramnotomy (IELD) Interlammar Contralateral Endosopio Lumbar Foraminotomy

Full Endoscopio Lumbar Lateral Recess Decompression
Transforaminal Endosopio Lateral Recess Decompression (TELRD) Interlammar Endosopio Lateral Recess Decompression (IELRD)

Full Endoscopio Laminotomy for Bilateral Decompression
Lumbar Endosopio Unilateral Laminotomy for Bilateral Decompression (LE-ULBD)

Endoscopic Assisted Surgery

Decompression

Micro Lindoscopic Discectomy **(MED)**

Micro Endosopic Laminotomy **(MEL)**

Destandau

Unilateral Biportal Endoscopic **(UBE)**

Fusion

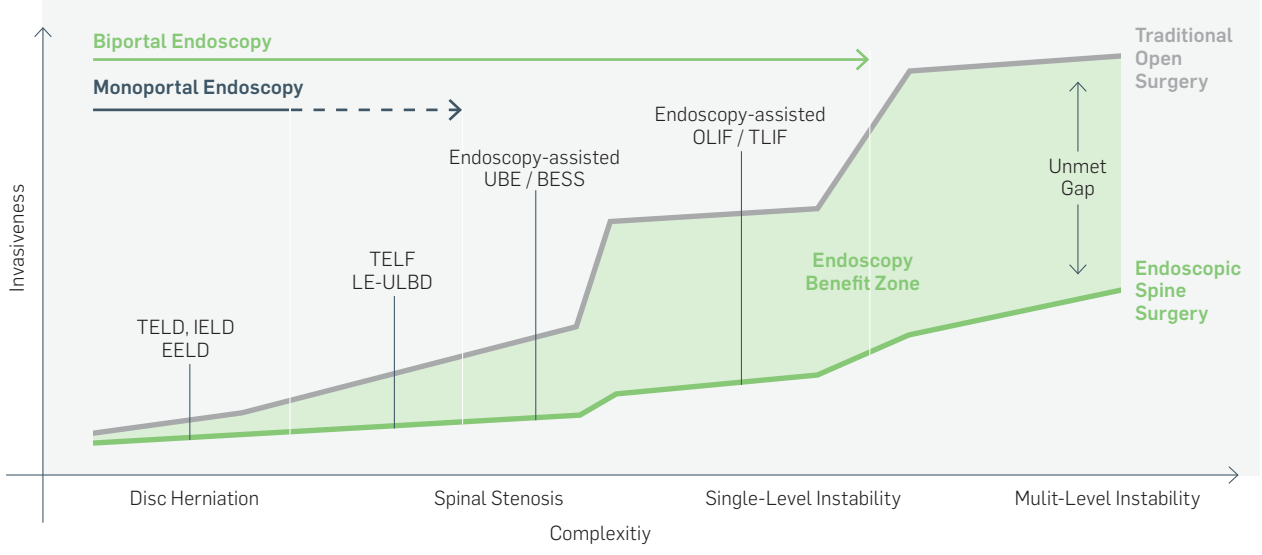
Transforaminal Lindoscopic Lumbar Interbody Fusion

Unilateral Biportal Endoscopic Fusion

Endosopic Oblique Lateral Interbody Fusion **(OLIF)**

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Where Mono- & Biportal fit in the benefit zone



*Based on: Prof. Dr. Jin-Sung Luke, minor adaptations by Nexon

INFLUENCING THE SPINE DISEASE PATHWAY

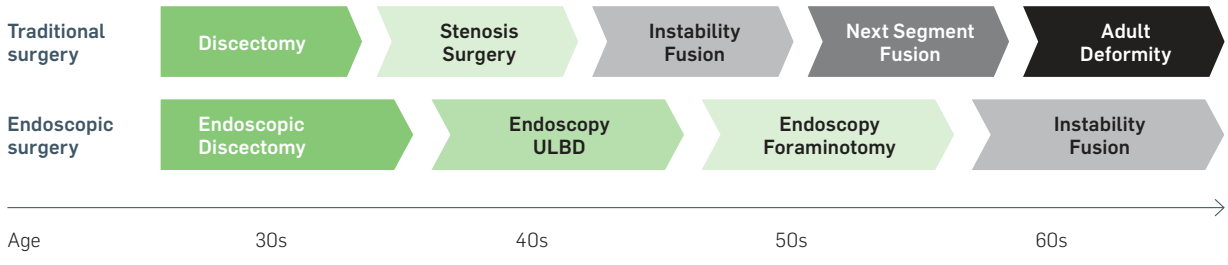
It is generally accepted that endoscopic spine surgery reduces the level of tissue damage compared to open spine surgery and even judged against MISS.

It has therefore been proposed that due to the drastically reduced muscle damage and need for bone resectioning, there will be less post-operative instability. It has been argued that if this is in fact the case, it may reduce the need for more invasive stabilization-like surgeries in the future.

If we agree that endoscopic spine surgery can...

- Preserve soft tissue e.g., multifidus muscle and ligaments,
- Safeguard core stability and improve sagittal alignment,
- Conserve bone lowers risk of creating instability which may lead to early fusion surgery,
- reduce scar tissue, pain and complexitiy of a future surgery due to saline flow,
- speed up mobilisation and patient recovery,

... then there is a chance that it will influence the normal «surgery-induced» progression of certain degenerative spinal diseases.



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