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Short Communication

Endoscopic Transforaminal Discectomy and Decompression, Inside-Out Technique

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Bayan medical (local UAE company) Medical representative of Joimax company (Not Anymore).

Endoscopic transforaminal discectomy and decompression.

Is basically using an endoscope inserted through Kambin triangle to reach the offending disc and remove its compressive effect on nearby neural tissue aiming to decrease or eliminate its pain.

Kambin is an American surgeon who first described the existent of a safe corridor to go directly from skin to nucleolus pulposus of lumbar discs with reasonable safety and remove it.

It takes more than decades for other to be persuaded and for invention of other instruments and improve techniques and verifying its effectivity.

Kambin introduced his concept of indirect decompression of spinal canal via posterolateral, extracanal approach using a Craig cannula in 1973, using limited nucleotomy in combination with a transcanal approach.

In 1975, Hijikata reported first standalone none-visualized percutaneous nucleotomy.

Hermantin., *et al*. reported satisfactory results from video-assisted arthroscopic microdiscectomy in 97% patients in comparison of 93% in traditional microdiscectomy in 31 months follow up with less postop narcotics use and less time off from work in a prospective and randomized study, 30 patients in each group.

Parviz Kambin is an American medical doctor and orthopaedic surgeon-1931. He is a Professor of Orthopaedic Surgery and has established an Endowed Chair of Spinal Surgery Research at Drexel University College of Medicine) described a subway to reach the disc without jeopardizing the excite nor the traversing nerves.

Alternative approaches, such as the posterolateral or foraminal approach, may address the problem of invading and destabilising the spine.

This alternative surgical portal may limit the paradoxical effects of traditional surgery.

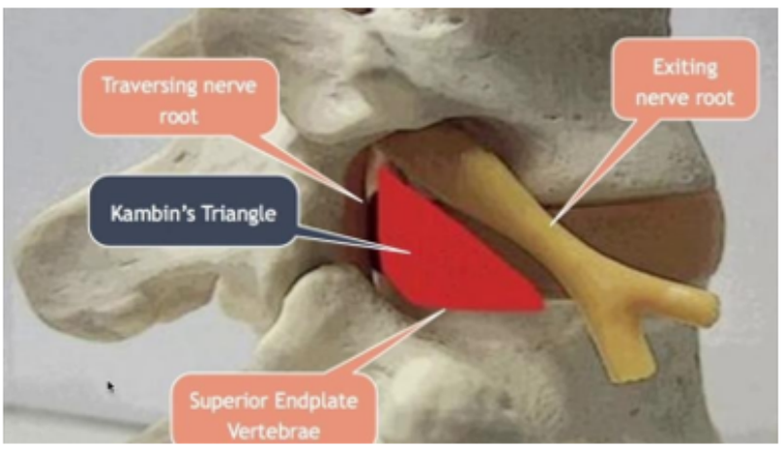


Figure 1

The spinal structures accessible via the posterolateral portal include the facet joints, the pedicles of the superior and inferior vertebra, the traversing and exiting nerve roots and the disc annulus. The epidural space is also accessible with flexible instruments and special cannulas.

This approach can avoid the spinal canal, if desired, and does not require the stripping of muscle or ligament to access the disc.

Anthony T Yeung is the first surgeon who draw attention and invent special Yeung Cannula to approach the transcanal herniated disc through transforaminal approach along with other great concept and practice.

This is bringing us to concept of inside out approach and outside in approach in Transforaminal discectomy.

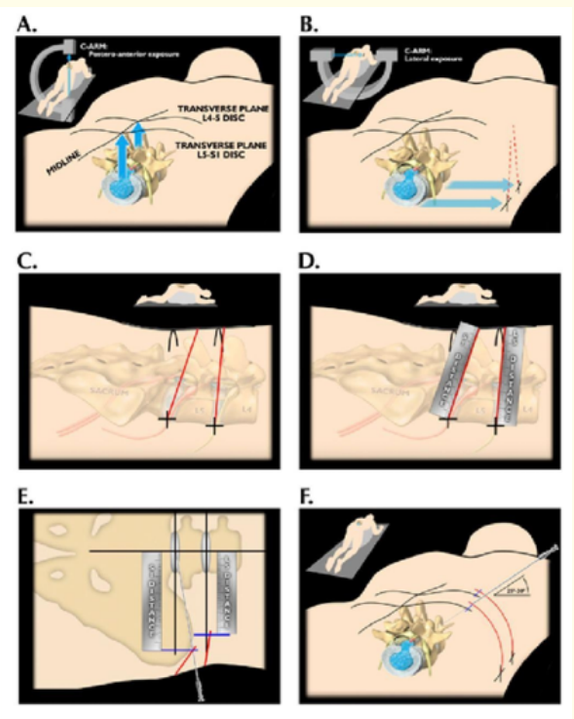
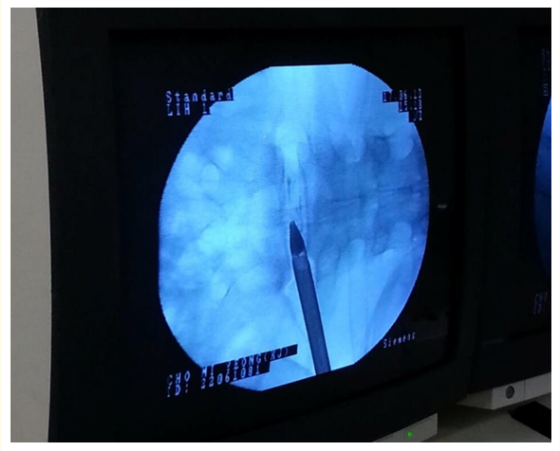


Figure 2

Inside-out

- Inside out means you go first directly inside the disc nuclopulposus.
- This can be achieved using fluoroscopy, discography including indigocarmine blue visible dye, muscle dilatation, and pushing a blunt tip trocar over cannula to central part of the disc through Kambin triangle in one step in semi-conscious patient under local anesthesia, Or General anesthesia with nerve monitoring.
- Next step is to replace trocar by endoscope and start nucleotomy to decompress the disc space and looking for any extra discal fragment and trying to pull it from within the disc itself.
- This is usually successful in most of Paracentral, Some Central, and lateral recess disc herniation. Coloring of the nucleus beforehand will facilitate the process greatly.

Direct insertion of Blunted tip trocar inside the center of disc inside the center of disc.



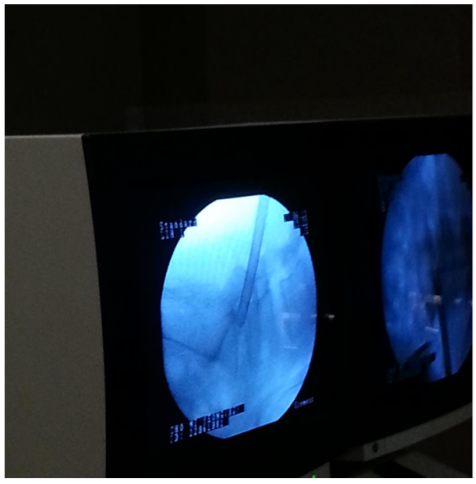


Figure 3

Tube retractor after removal of blunt trocar Lateral view.

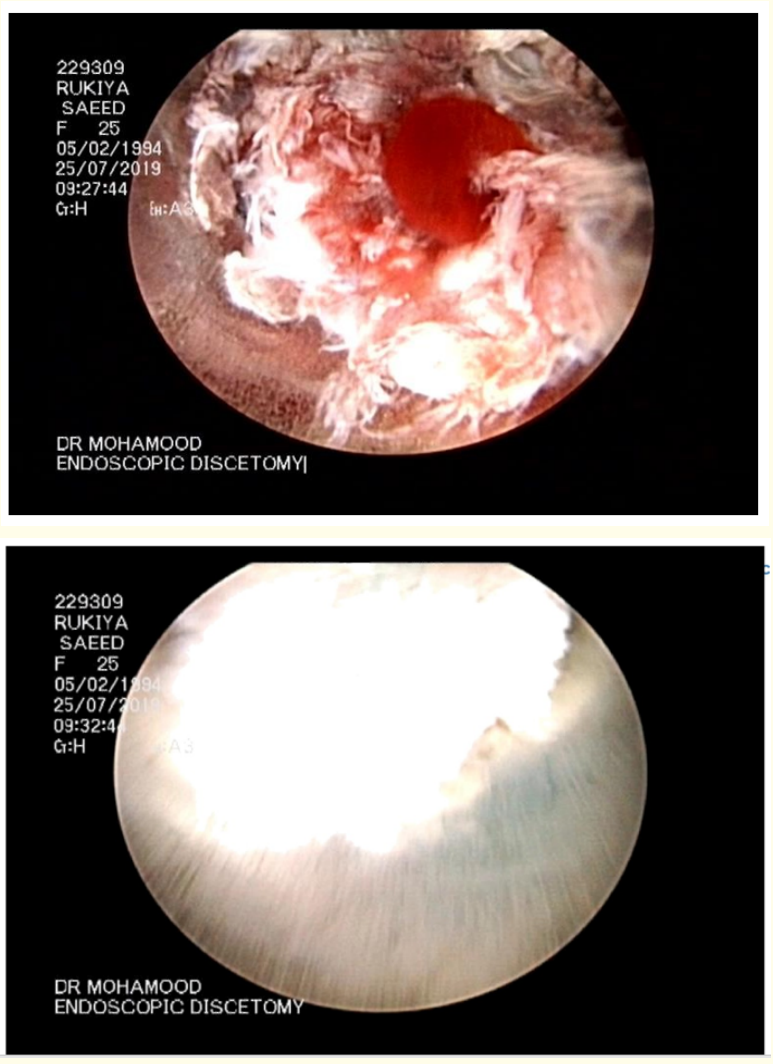


Figure 4

What is outside-in?

- "Outside-in" technique, in which the working sheath is placed into the lower portion of the neuroforamen, thus, retracting and avoiding the exiting nerve root. No part of the cannula tip or the endoscope is positioned in the disc space initially (Red Line).
- The surgical technique is a variation of the Thessys technique popularized by Hoogland and Schubert., *et al*. which employs a foraminoplasty in patients with or without lateral stenosis for the treatment of herniated disc. For the foraminoplasty, reamers and drills are deployed inside the working cannula to lessen the risk of dysesthesia and irritation of the exiting nerve root and its dorsal root ganglion. In some instances, where access to the L5-S1 neuroforamen is difficult due to a high riding ilium, patients are positioned in the lateral decubitus position. Techniques to define the skin entry point are generally laterally at 7-9 cm at the L3-4 level, 8-10 cm at the L4-5 level, and 10-12 cm at the L5-S1 level.

- It is also needed in Central Disc Grade 2 and 3 bulges.
- Blue line: Rutteen far lateral approach or floating far lateral approach (1979).

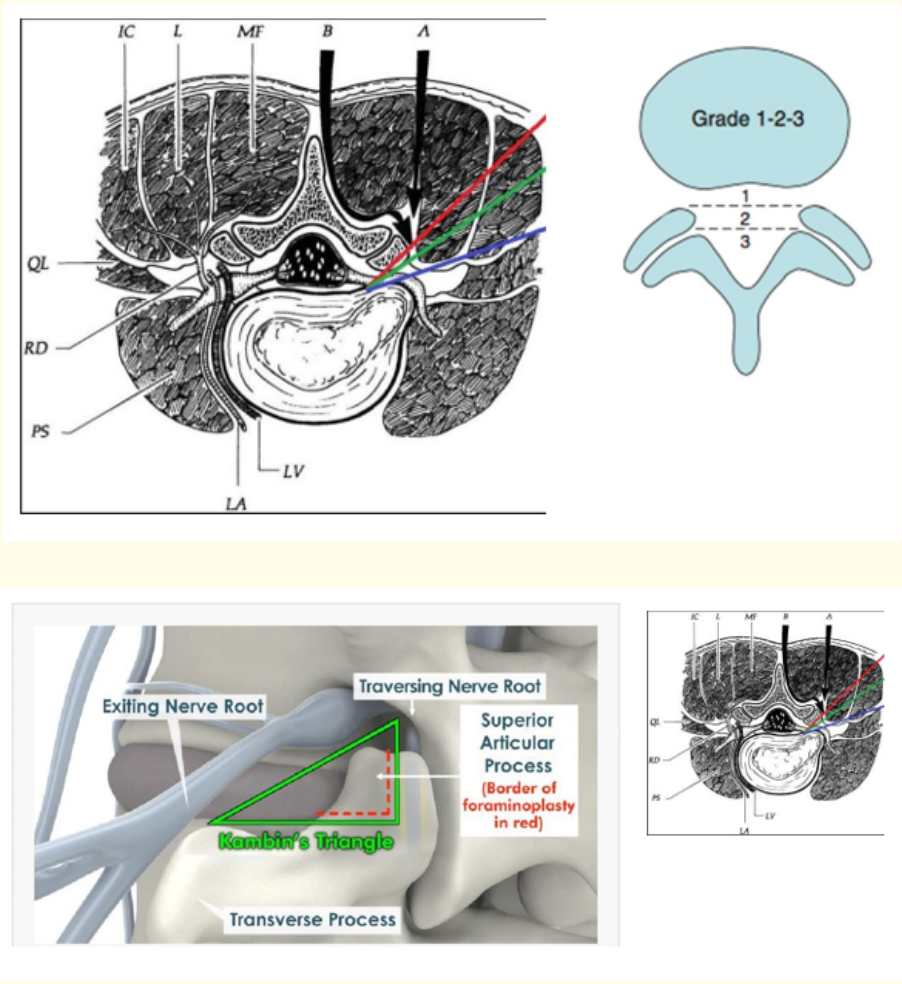


Figure 5

Endoscopic transforaminal discectomy and decompression

Inside-out:

- Essentially is a fluoroscopy procedure.
- Easy for beginners.
- Decompression started inside the disc.

- Using blunt instrumentations and dilators.
- In semi-conscious patient.
- Mainly used in South Korea System and manufactured by German company (Karl Storz), and A. Yeung (YESS system).
- It's mainly used for fresh, young people.
- Discectomy (Green Line).

Outside-in:

- Endoscopy is essential part of it, no procedure.
- Done without see first.
- It entails foraminoplasty to facilitate wider exposure. This is usually done fluoroscopically.
- Needs specially designed trocars and circular saw (one direction) and articulated burs and long Kerrison punch to remove bones and osteophytes.
- It can be used to remove extruded disc fragments inside spinal canal after softly mobilising dura away.
- Popularized by Joimax German company and others. (Red Line) and was started with prof. Thomas Hoogland of Max-more spine.

Docking position of tubular retractors

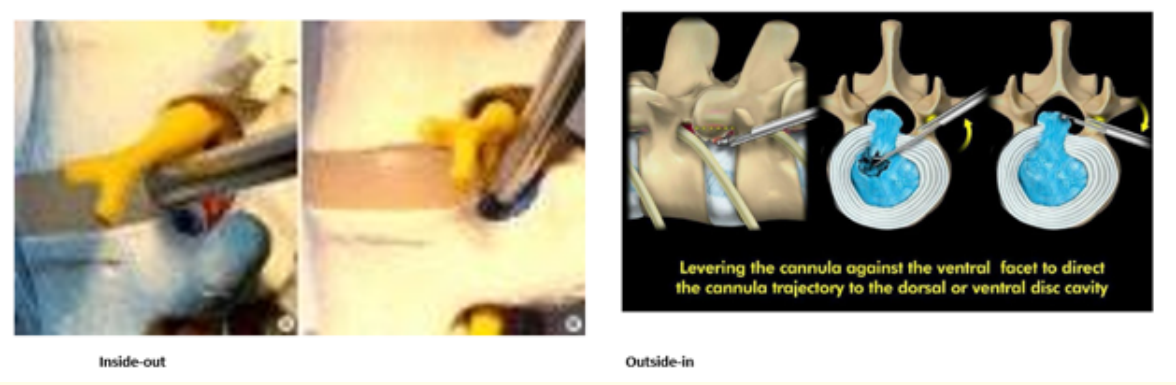


Figure 6

TFED: GPH 2018-2019, Outside-in

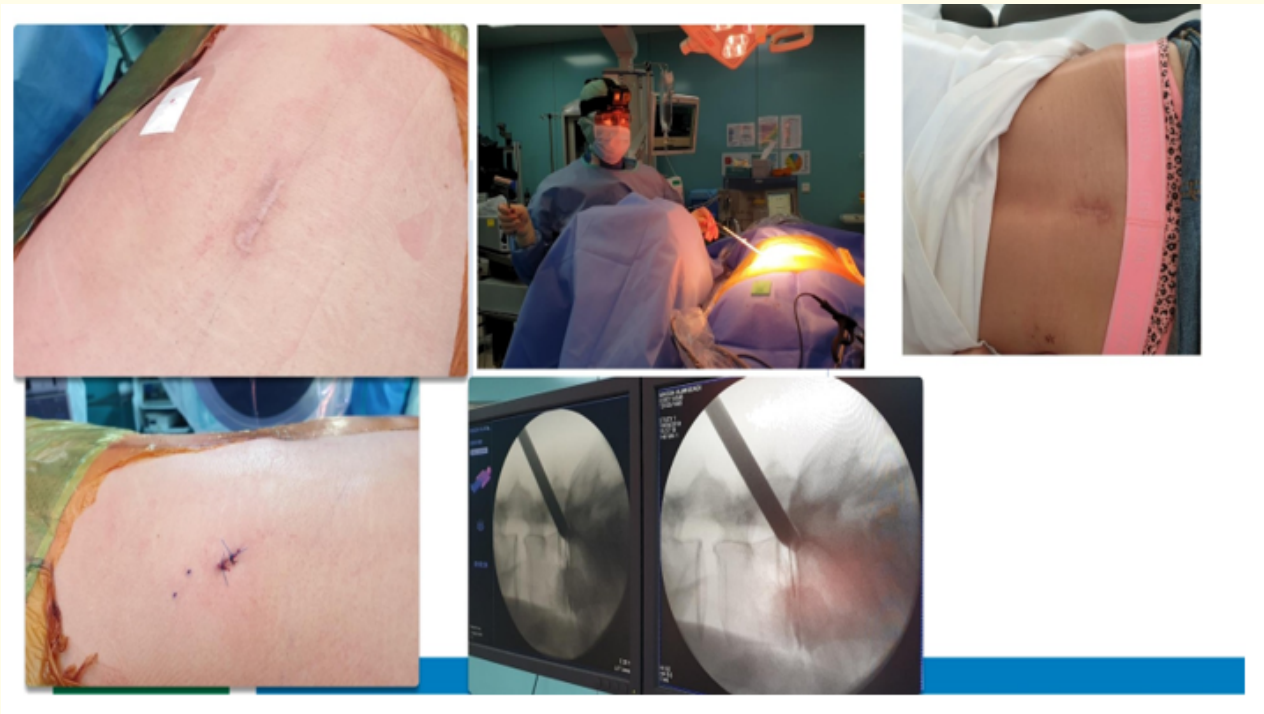


Figure 7

Its obvious from above discussion that:

- These 2 techniques are completing each other.
- In practice we have 2 types of disc bulge:
    - Young people disc bulge: this you can use inside-out technique with good expectation, adding to it Grade 1 Central Disc bulge.
    - And old people with Degen. Disc affection and foraminal stenosis, or in Grade 2 and 3 Central Disc bulge: this will need outside- in technique.
- Its better for beginners to use inside-out technique first after coloring of the nucleolus pulposus and try to remove every colored fragment till notice signs of neuronal decompression inside the disc, then with draw the cannula to outside disc position and change position of cannula peak to verify if any left fragment still seen inside the canal and try to negotiate with by using blunt instruments and radiofrequency hemostasis without jeopardizing the neural structures.

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