

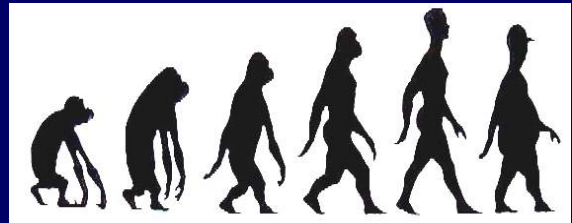
腰椎微創手術治療新趨勢

傅再生

林口長庚醫院 骨科部 脊椎科

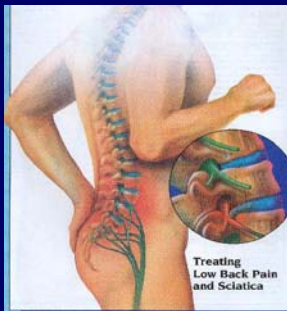
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Low Back Pain



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LBP & Sciatica



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Incidence



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Prevention



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Traditional Treatment

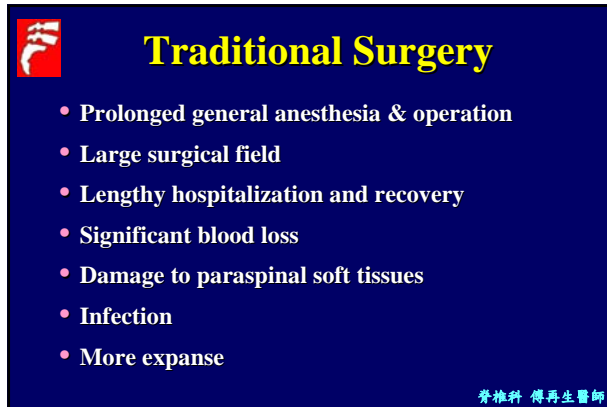


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Traditional Surgery

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Traditional Surgery

- Prolonged general anesthesia & operation
- Large surgical field
- Lengthy hospitalization and recovery
- Significant blood loss
- Damage to paraspinal soft tissues
- Infection
- More expense

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內視鏡 vs 通水管

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New technological advances usher us into a newer and higher standard of spinal surgery:

Minimal Invasive Spine Surgery

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Minimal Invasive Surgery

- Less wound size
- Less traumatic (physically and psychologically)
- Less surgical & anesthesia risk
- Same-Day surgery or Less hospitalization
- Early recovery & rehab
- Less cost

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Stanford Medical Center

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Trip to Phoenix

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Minimally Invasive Posterior Lumbar Surgery in CGMH

- Since 2000
- Intradiscal Electrothermal Therapy (IDET)
- Transforaminal Nerve Block
- Percutaneous Endoscope Discectomy (PED)
- Microendoscopic Discectomy (MED)
- Endoscope Assisted PLIF, TLIF
- Percutaneous Vertebroplasty

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InterVertebral Disc

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After Excessive Stress

- Matrix protein loss
- Loss of hydrostatic pressure
- Bulking of annular lamellae
- Annulus wall shear stress ↑, Tear
- Axial back pain & dysfunction

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Degenerative Disc Disease without Sciatica

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Treatment


- Aggressive non-operative cares
- Fusion (potential complications)
- IDET

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IntraDiscal ElectroTherapy (IDET)


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- 85-90 °C
 - Raised to 90 °C over 13 minutes
 - Maintained at 90 °C for 4 minutes

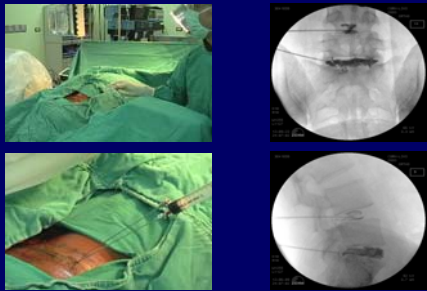


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- 
- ## Indications
- back pain > 6 months
 - Poor response to conservative treatment
 - No psychosocial problems
 - SLRT (-)
 - MRI: no compressive lesion
 - Provocative discogram (+)
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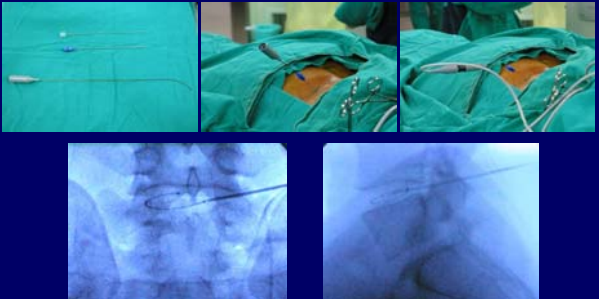


Provocative Discogram




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- 
- ## Results of IDET
- 70% satisfied result Saal JA. Spine. 2000
 - 50% were dissatisfied Davis TT. Spine. 2004
 - Not effective Spruit M. Eur Spine J. 2002
 - Potentially beneficial in carefully selected patients Biyani A. Spine. 2003
 - Worthwhile in a small proportion of strictly defined patients Pauza K.J. Spine J. 2004
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Complications

- Discitis
- Nerve root injury
- Catheter breakage
- Cauda equina syndrome

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General Concept of IDET

- IDET should be considered as “Experimental Procedure”
- Maybe useful in highly selected patient

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HIVD with Sciatica



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Radiculogram & Transforaminal Nerve Block

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Indications

- Radicular pain resistant to other therapeutic means
- Radicular pain for which operation is contraindicated

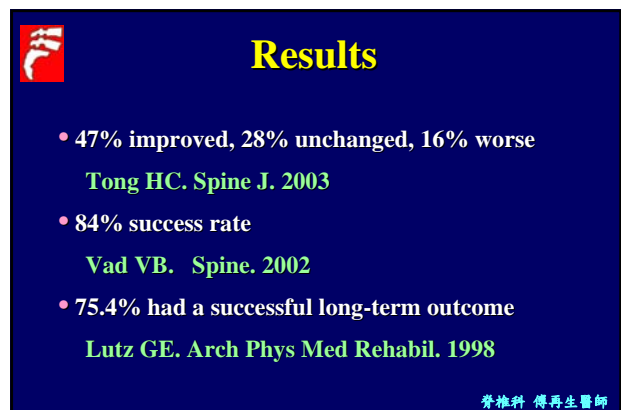
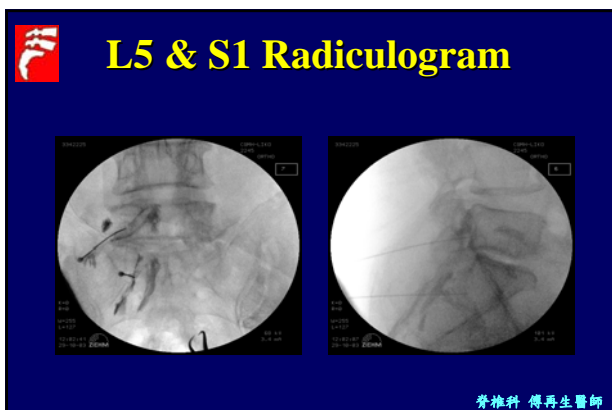
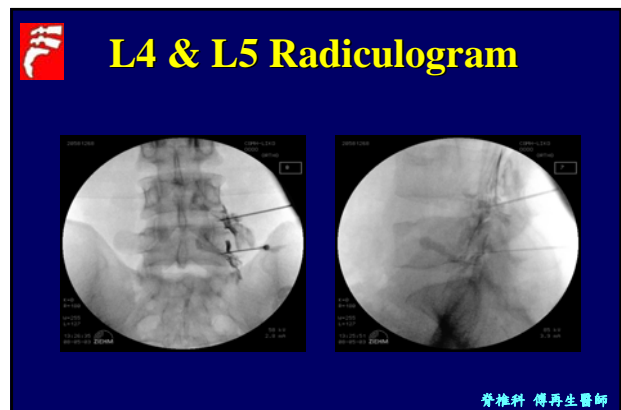
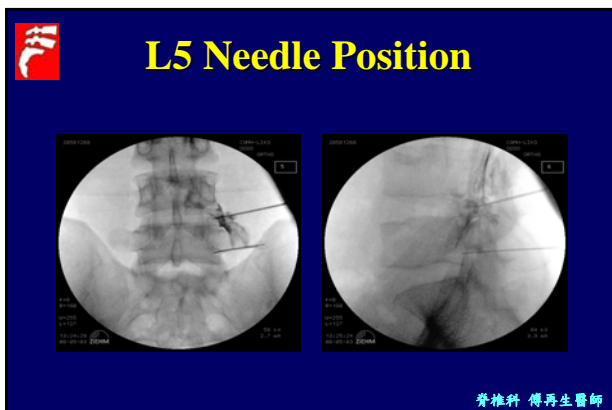
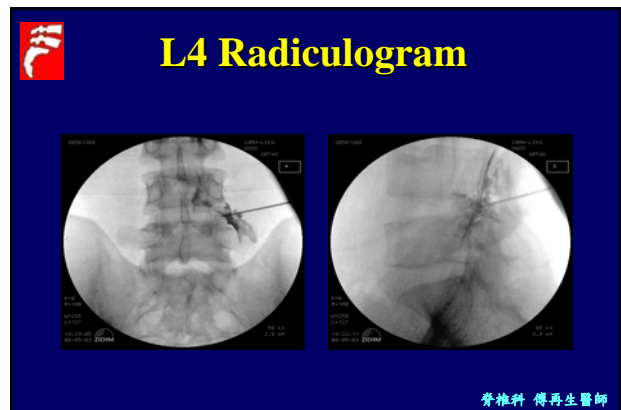
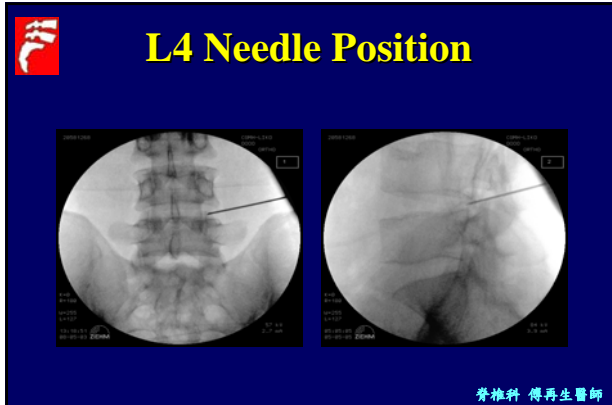
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Contraindications

- Infection
- Disturbed consciousness
- Emotional instable
- Lack of understanding of the procedure

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Original article

Transforaminal Epidural Steroid Injection for Discectomy Candidates: An Outcome Study with a Minimum of Two-Year Follow-up

Shih-Chieh Yang, MD; Tai-Sheng Fu, MD; Po-Liang Lai, MD; Chu-Chin Niu, MD; Li-Hsueh Chen, MD

Background: The efficacy of percutaneous closed approaches for herniated disc is controversial. This study evaluates the therapeutic effect of an alternative technique that uses a modified approach of tubular retractor systems for the above mentioned disease. The aim was to determine whether this procedure could reduce the need of surgery among discectomy candidates.

Methods: The study included patients who had suffered from chronic, acute, unilateral symptoms for 2 to 24 months received injections of betamethasone in combination with epidural steroid. The treatment outcome was evaluated by three questionnaires and estimation using the VAS score (the criteria for low back pain) at baseline and 2, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100 weeks after the procedure and at the last follow-up visit. The last analysis comprised 19 patients with a minimum of 24-week follow-up.

Results: The overall VAS score improved significantly from 14.20 (0.27) before injection to 22.08 (2.48) after injection showing improvement in terms of subjective pain. The VAS score for surgery decreased significantly from 4.00 (2.00) before injection to 2.12 (2.72) after injection and the VAS score for daily activity increased from 2.12 (2.07) after 24 weeks to 2.15 before injection to 2.19 (2.22) after injection. In the end, 16 patients achieved complete or partial remission of their symptoms.


Conclusion: Transforaminal epidural steroid injection is a relatively simple, effective and minimally invasive to surgical discectomy for the treatment of herniated disc herniation in selected cases. The procedure significantly alleviates the severity of radicular pain in herniated disc and improves the patient's daily activity; this reduces the need for surgical discectomy.

Key words: epidural steroid injection, vertebra, lumbar disc herniation, discectomy.

Footnote: Percutaneous closed discectomy has been emphasized as a less-invasive technique for treating the herniated disc in the last 10 years. However, the therapeutic effects remain controversial in a number of cases. Studies have demonstrated that fluoroscopically guided transforaminal epidural steroid injection (TFESI) is an important tool in the non-surgical management of the lumbar disc herniation. This is a minimally invasive technique that is a

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Percutaneous Endoscope Discectomy

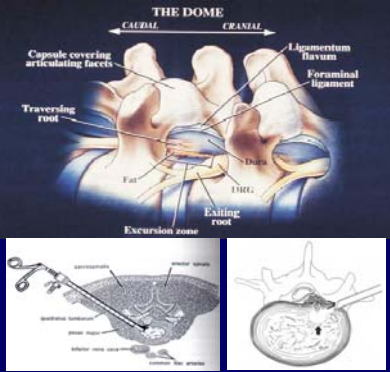


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Indication

- HIVD with radicular pain
- Positive root tension sign
- Correlate image findings
- 6 weeks of proper treatment → fail

Keywords: 脊椎科 傅再生醫師



Keywords: 脊椎科 傅再生醫師

YESS Instruments



Keywords: 脊椎科 傅再生醫師

Laser **Radiofrequency**



Keywords: 脊椎科 傅再生醫師

PED Procedures (Marking)

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Needle Insertion

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Working Sheath Insertion

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Fluoroscope-guide Discectomy

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Endoscope-guide Discectomy

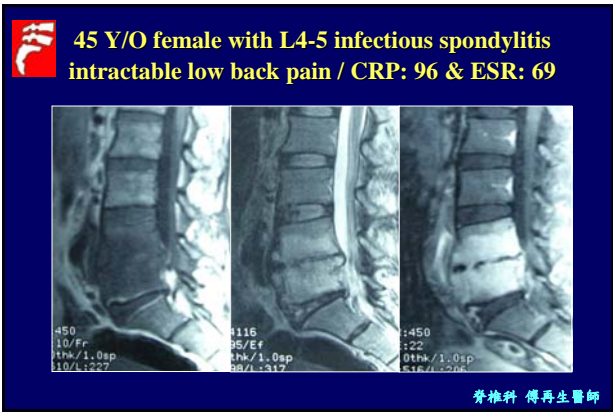
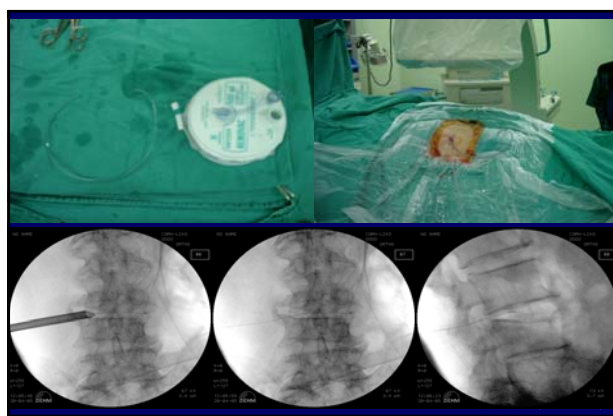
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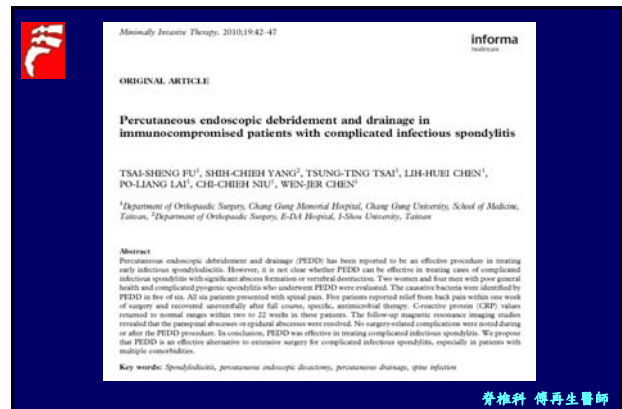
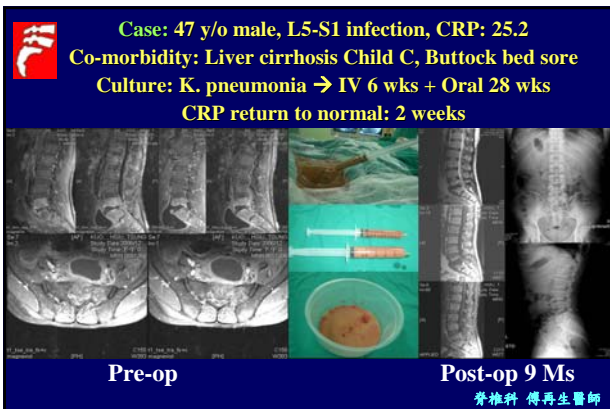
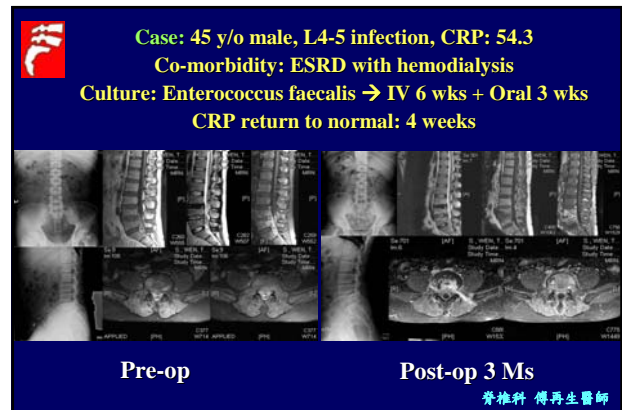
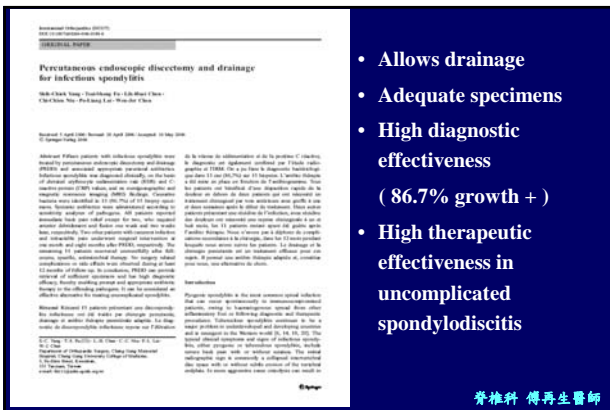
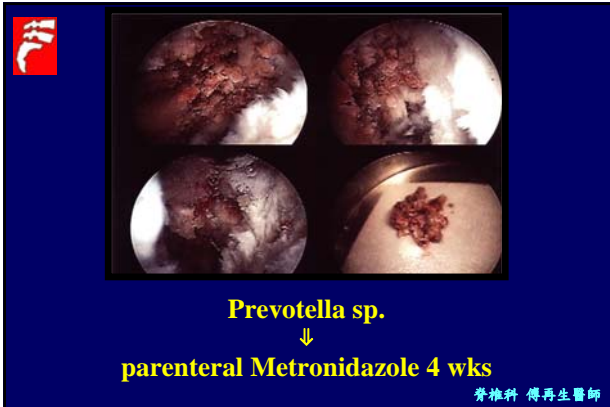
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Percutaneous Endoscopic Discectomy and Drainage (PEDD) in Spine Infection

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MED

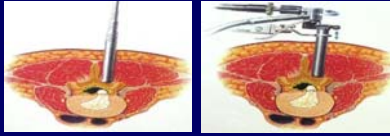
(MicroEndoscopic Discectomy)

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MED


- 1997 , Smith & Foley
- Minimal damage & Direct visualization by
 - Muscle-splitting dilators
 - Endoscope and Video monitor




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METRx System




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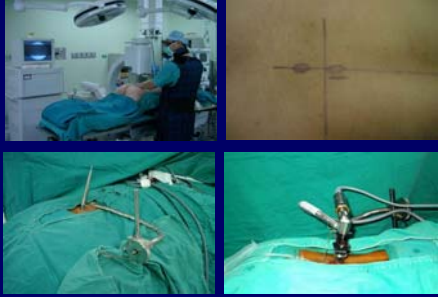
Instruments & Scope




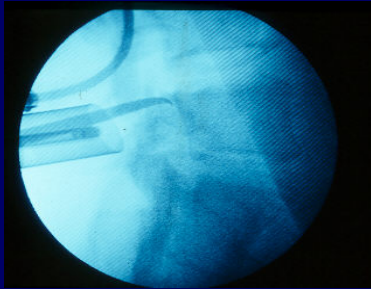
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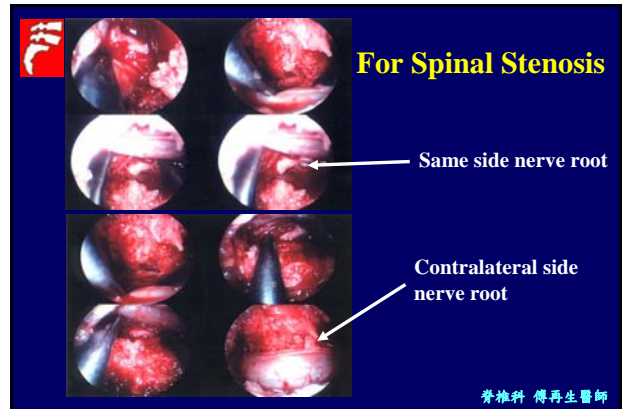
MED Procedures



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Review of 43 cases F/U > 2 years

- 38 MED completed
 - E & G: 86.9%
- Complications:
 - 3 dural tear
 - 2 loss orientation → open
 - 1 wrong level (scoliosis)
 - 2 superficial wound infection
 - 1 seroma
- An effective procedure

Score	Count
Excellent	21
Good	12
Fair	2
Poor	3

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Conclusions

- MED is an effective procedure
- High satisfactory rate
- No major complication
- Early mobilization and recovery

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Results of Microendoscopic Discectomy Performed in the 26 Cases with a Minimum 3 Years Follow-up

Shih-Sheng Chang, MD, Tsai-Sheng Fu, MD, Yen-Chiu Liang, NP, Po-Liang Lu, MD, Chi-Chen Niu, MD, Li-Hsiu Chen, MD, Wen-Jen Chen, MD


Background: Microendoscopic discectomy (MED) is less invasive than conventional open discectomy, but the long-term benefits of this technique are still debated. Controversy also remains regarding the surgical indication, patient selection, effectiveness, timing, nerve root, and straight-shave.

Methods: From Dec 2003 to Dec 2005, 26 patients with lumbar lumbar disc disease received MED. The surgical indication included the following: (1) lumbar disc extrusion, (2) lumbar disc protrusion, (3) lumbar disc extrusion with the involved nerve root, (4) lumbar disc extrusion, (5) lumbar disc extrusion with the involved nerve root, (6) lumbar disc extrusion, (7) lumbar disc extrusion with the involved nerve root, (8) lumbar disc extrusion with the involved nerve root, (9) lumbar disc extrusion with the involved nerve root, (10) lumbar disc extrusion with the involved nerve root, (11) lumbar disc extrusion with the involved nerve root, (12) lumbar disc extrusion with the involved nerve root, (13) lumbar disc extrusion with the involved nerve root, (14) lumbar disc extrusion with the involved nerve root, (15) lumbar disc extrusion with the involved nerve root, (16) lumbar disc extrusion with the involved nerve root, (17) lumbar disc extrusion with the involved nerve root, (18) lumbar disc extrusion with the involved nerve root, (19) lumbar disc extrusion with the involved nerve root, (20) lumbar disc extrusion with the involved nerve root, (21) lumbar disc extrusion with the involved nerve root, (22) lumbar disc extrusion with the involved nerve root, (23) lumbar disc extrusion with the involved nerve root, (24) lumbar disc extrusion with the involved nerve root, (25) lumbar disc extrusion with the involved nerve root, (26) lumbar disc extrusion with the involved nerve root.

Results: Treatment in two cases was changed to open discectomy because of persistent disc extrusion during surgery. For the remaining 24 cases, the average intraoperative blood loss was 93.4 mL. The average operation length was 130.3 minutes and the average postoperative hospital stay was 2.4 days. At 12 weeks after the operation, 22 achieved excellent or good results. The satisfactory rate was 91.7%. On final follow-up, 22 patients had excellent or good results. The satisfactory rate was 87.3%. Complications included one incomplete dural tear, two superficial wound infections and one postoperative seroma.


Conclusions: Our data indicate that MED is an effective procedure for lumbar disc herniation. The result is satisfactory under adequate surgical indication and patient selection. Despite the low complication rate, dural tear still remains a concern during the learning stage.

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Endoscope Assisted TPS Instrumentation and Fusion

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Challenges for Posterior Endoscopic Spinal Surgery

- No physiologic potential working space
- Need cannula to create a working space
- Small working space for instruments

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Surgical Procedures

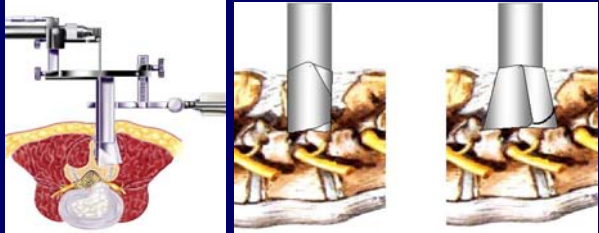
Step Dilators and FlexPosure™ Endo Retractor



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FlexPosure Retractor



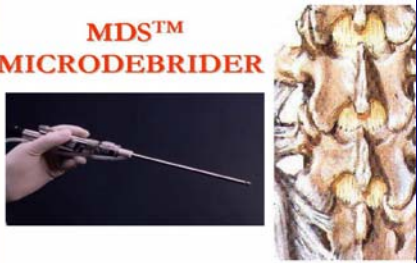
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Soft Tissue Dissection




**MDS™
MICRODEBRIDER**



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FlexPosure Retractor FlexArm Endoscope



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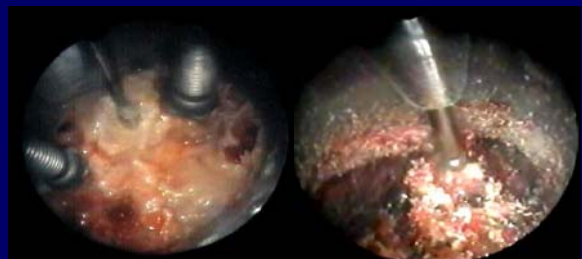
Adjust Endoscope



Two side-by-side photographs showing a surgeon in a blue scrub suit and cap, focused on adjusting an endoscope in an operating room. The background is dark, with the surgical field illuminated.

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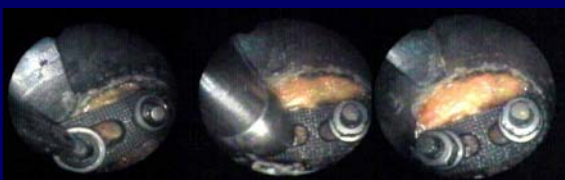
**Pedicle Screw Insertion
Burr Decortication**



Two circular endoscopic views showing the surgical process. The left view shows a pedicle screw being inserted into the vertebral pedicle. The right view shows a burr being used for decortication on the vertebral surface.

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**Bone Grafting
Plate Assembly**

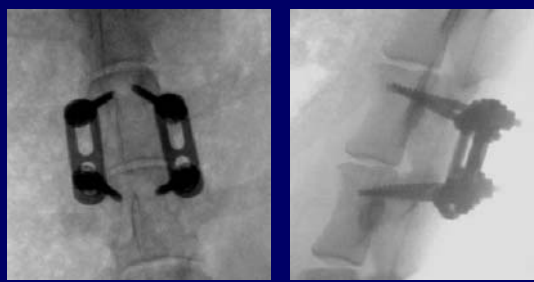


Three circular endoscopic views showing the assembly of a plate. The first view shows a washer being placed on a screw. The second view shows a nut being placed on the screw. The third view shows the final assembly with the plate secured.

Posterior washer and nut placed on each screw

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Fluoroscope Imaging



Two fluoroscopic images showing the placement of a plate and screws on a vertebra. The left image shows the plate being positioned. The right image shows the plate secured with screws.

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Wound Size



Two photographs comparing the wound size. The left image shows the wound size seen through an endoscope, which is significantly smaller. The right image shows the wound size for an open surgical approach, which is much larger.

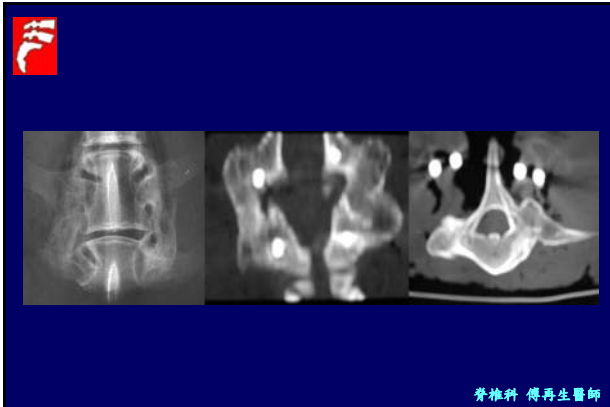
Endoscope Open

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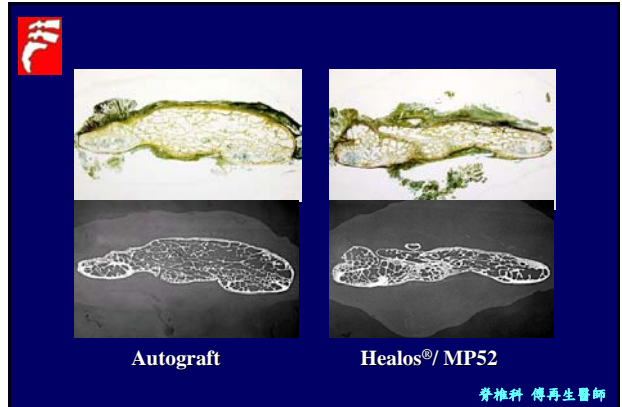


Two photographs showing the surgical site after the procedure. The left image shows the plate and screws in place. The right image shows the surgical site after the plate and screws have been removed.

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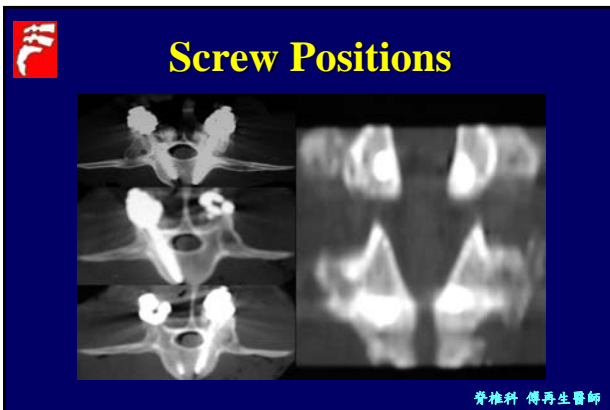
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Autograft

Healos®/MP52

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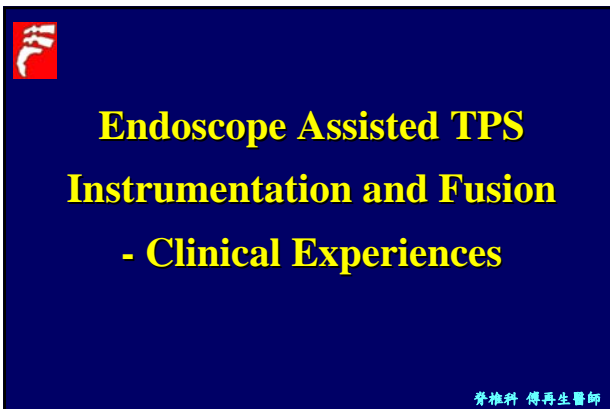


Screw Positions

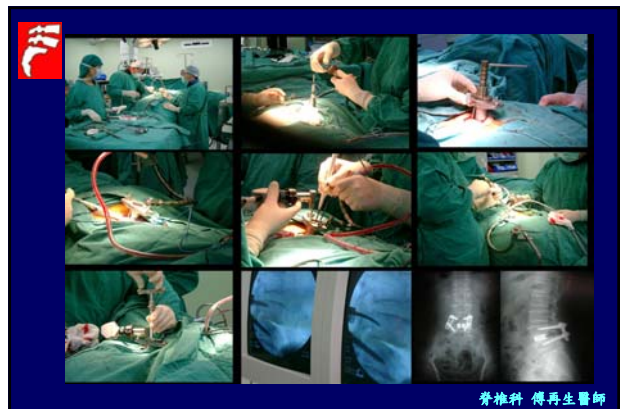
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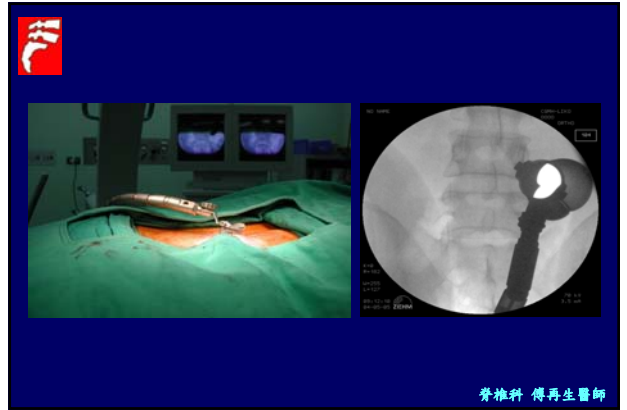
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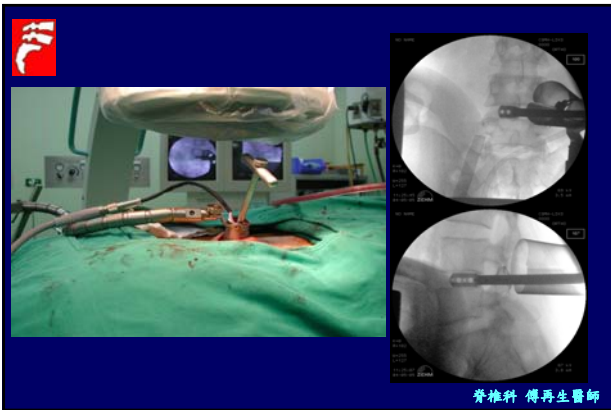
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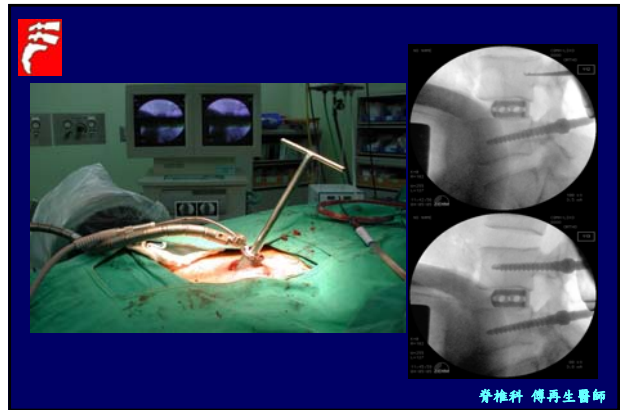
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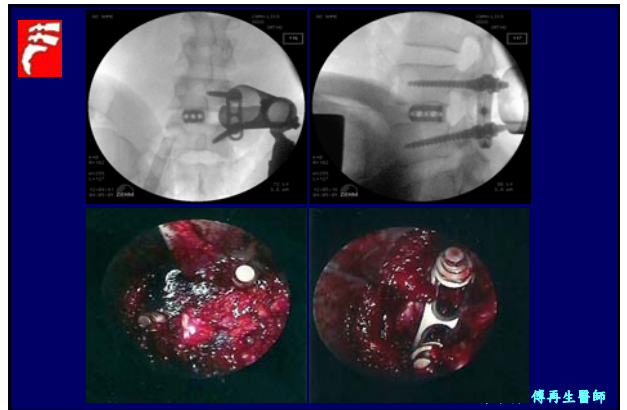
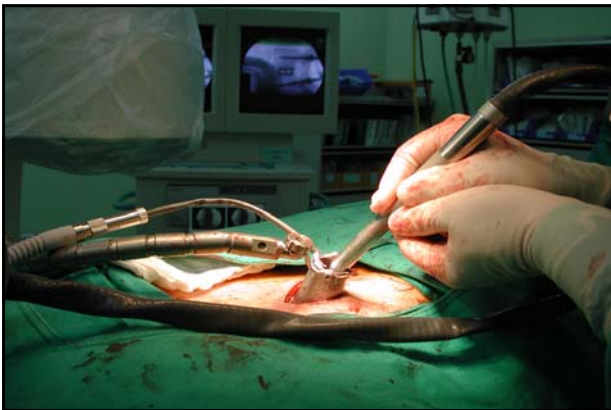
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Discussions

- A feasible technique
 - Safe and reliable implants insertion
- Blood loss and OP time
 - Decrease after learning stage
- With more experiences & practices
 - Offer promise in the future

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Vertebroplasty for osteoporotic vertebral compression fracture

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Osteoporosis Prevalence in Taiwan

(2005年國民健康訪問調查)

台灣	65歲以上人口	65歲以上骨鬆人口
男性	114萬	14萬 (12.55%)
女性	118萬	36萬 (30.84%)
合計	232萬	49萬 (21.12%)

Hip fracture incidence per year in Taiwan:
 • Female: 7000
 • Male: 5000

資料來源: 國民健康局, 內政部

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Ignore Osteoporosis: Fracture ↑

50歲以上婦女之骨折發生率

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Management of VCF

- Medical treatment first
 - Bed rest
 - Narcotic analgesics
 - Braces
- Medical therapy to minimize on-going bone loss
- About 70% improves

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Painful VCF

- 260,000 patients/yr (30%) refractory to medical therapy
- No treatment may lead to long-term increased morbidity, mortality
- Surgical treatment

Cooper et al, J Bone Min Research, Vol 7, No 2, 1992

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A+P long instrumentation

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Vertebral vacuum cleft

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Kyphoplasty

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Vertebroplasty

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CGMH experience

- Pain, assessed by VAS : 80 to 36 mm
- 86% quickly returned to the pre-injury activity level
- PV is effective in pain reduction for painful vertebral compression fracture

Year	Number of Procedures
2001	63
2002	243
2003	248
2004	262
2005	356
2006	381
2007	375

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Less could be better
Less could be more

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Thanks

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