Comparative Prospective
Randomized Study Comparing
Conservative Treatment and
Percutaneous Disk Decompression
for Treatment of Intervertebral Disk
Herniation

Introduction - HNP

- 80-90% success rate with medical Rx
- 4 to 6 week course of analgesics, muscle relaxants, NSAIDs, immobilization, bed rest, and physical therapy.
- 1%–1.5% complication rate (NSAID)

- Surgery 80-95% success rate
- Complication rate of 1- 10%

- Less invasive options?
HERNIATED DISC BEFORE PROCEDURE

Disc hernia pinches spinal cord or nerve root, causing pain

Cannula
- Rotating probe tip
  - Device is as thin as a dime

1. Cannula is inserted through the back

Tough outer disc wall remains intact

Disc nucleus
Pressure relieved from nerve root

Disc material removed

Tough outer disc wall remains intact

Empty space draws the disc wall herniation back in place

HERNIATED DISC AFTER PROCEDURE
(a) Anteroposterior and (b) lateral views of the L5-S1 intervertebral disk during decompression.
(a) Anteroposterior and (b) lateral views of the L5-S1 intervertebral disk during decompression.

The Dekompressor (Stryker) has a high rotation speed and two spiral formations that ensure aspiration of disk material during rotation.

Benefits of disc decompression include:

- 15-30 min
- Significant pain relief [6][7]
- Maintained annular integrity [6][8][9]
- Reduced use of analgesics [6][7]
- Improved quality of life [6][7]
- Quantifiable disc material removal [7]
- Less epidural scarring
- Quick recovery: generally 3 to 5 days
- Low complication and morbidity rates [10][11][12][13][14][15][16][17][18]
- Outpatient procedure requiring only local anesthetic alleviates possible complications of open surgery and general anesthesia
Compared to surgery, percutaneous discectomy provides:

- Possible reduction in:
  - Perineural scarring
  - Postoperative fibrosis
  - Permanent structural alterations
  - Spinal instability

- Decreased complication rate: 0.5% vs. 3% with open surgical discectomy[19][20]

- Lower re-herniation rate: 5% vs. 10-15% compared to open lumbar discectomy[21]

- No incision required

- Decrease in:
  - Anesthesia
  - Procedure time
  - Recovery time
Intervertebral disk fragments that have just been removed with the Dekompressor (Stryker).

Approximately 1cc -3 cc removed.


Inject 1cc into the nucleus proplusus

Pressure increases by 2340 mmHg
Sagittal reconstructed T2-weighted MR images of a female patient (not included in our study) who presented with back pain and sciatica.

Sagittal reconstructed T2-weighted MR images of a female patient (not included in our study) who presented with back pain and sciatica.

Randomized Control Study
Prior to randomization – failed “conservative Rx”

Inclusion Criteria

1. Small to medium HNP, less than 1/3 canal
2. Symptomatic HNP (Pain at corresponding level)
3. PDD group underwent provocative discography to prove that the disc was symptomatic disc

Exclusion Criteria

disc height was less than 50%, no PDD
coaugulopathy, nonsymptomatic disc, large disc (>1/3 canal)
Randomized Study
4 years
31 patients
Control Group (antiinflammatory drugs, muscle relaxants, physotherapy for 6 weeks. )
Pain Scale (0-10)
PDD performed by **Interventional MSK Radiologist**

<table>
<thead>
<tr>
<th>Time</th>
<th>Decompression Group</th>
<th>Control Group</th>
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<tbody>
<tr>
<td>Baseline</td>
<td>7.4</td>
<td>6.9</td>
</tr>
<tr>
<td>3 Months Follow-up</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>12 Months</td>
<td>1.7</td>
<td>4.0</td>
</tr>
<tr>
<td>24 Months</td>
<td>1.6</td>
<td>4.0</td>
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Graph shows results of the two methods were similar during the first 3 months; however, follow-up showed that conservative treatment (group A) failed in the long run, whereas results achieved with PDD (group B) were sustainable.


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Takes less than 1 hour

Same day procedure

0.2 % diskitis
Implication for Patient Care

PDD yields significant and long-lasting pain reduction in patients with a small, symptomatic disk herniation.
Percutaneous Laser Disc Decompression
(Schenk, AJNR Jan 2006)

1986  Choy did first PLDD on human
1997  FDA approved
2002  35,000 PLDD worldwide

Laser
    evaporates water in NP (decreased volume and pressure)
    heat denatures protein (NP no longer attracts water)
    permanent reduction in pressure by < 57%

No randomized trial

75-87% success rate
0-1.2% diskitis (aseptic or septic)
Plasma Radio-Frequency–Based Diskectomy
(Bonaldi AJNR 27 Nov-Dec 2006)

Electrodes into the disc
Bipolar voltage pulses at 100 KHz

Sodium ion vaporizes (Plasma field)
Ionized particles fragments the disc into liquid and gas
Minimal damage to adjacent tissue

A  B  C
7 wks 9 months