Trans-Kambin Oblique Lateral Lumber Interbody Fusion (OLLIF): A truly MIS Spinal Fusion

- Fusion through 10mm incision
- Approach without visualization: Fluoroscopy & Electrophysiology
- Access disk via Kambin’s triangle
METHODS

Study Design: Retrospective cohort study OLLIF vs. TLIF

- All surgeries done by single surgeon.
- All TLIFS done before the surgeon started offering OLLIFs
- Recorded surgery time, blood loss, hospital stay, fluoro time, oswestry

Study Population: 292 OLLIF procedures on 538 levels

- All patients undergone full course of conservative therapy
- Indications: Degenerative Disk Disease, Disk Herniation, Listhesis
- Exclusion: bony obstruction, significant spinal canal stenosis, large facet hypertrophy, Grade II Listhesis, and other gross deformities
- 54 TLIF controls with same inclusion criteria

<table>
<thead>
<tr>
<th>Count</th>
<th>Mean Age</th>
<th>Mean BMI</th>
<th>% Male</th>
<th>Number of Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>OLLIF</td>
<td>292</td>
<td>58</td>
<td>32</td>
<td>50</td>
</tr>
<tr>
<td>TLIF</td>
<td>54</td>
<td>61</td>
<td>32</td>
<td>37</td>
</tr>
</tbody>
</table>
TECHNIQUE (1)

1 Approach
- The incision point is located to give a 45° approach angle
- Access portal is inserted through Kambin’s triangle aided by electrophysiology and biplanar Fluoroscopy

2 Discectomy
- Remove disk using drill, rotating curette and disk cutter
- Pack disk space with tricalcium phosphate soaked in autologous bone marrow aspirate

Incision points for common spinal fusions:
1 DLIF
2 OLLIF
3 Far Lateral
4 TLIF
5 PLIF
**TECHNIQUE (2)**

**3 Cage Placement**
- Replace K-wire, remove access portal
- Insert cage over K-Wire, gently pushing it through muscle and fascia with bullet nose
- Nerve root is pushed away gently. OLLIF cages can usually be larger than in TLIF

**4 MI Pedicle Screw fixation**

**Top Right**: Cage  
**Left to Right**: Probe, K-Wire, Dilator, Access Portal, Drill, Rotating Cutter, Disk Cutter, Pituitary, Cage Inserter
Highlights: 1 Level OLLIF (compared to TLIF)
- Surgery time cut in half
- Blood loss reduced by 87%
- Hospital stay reduced 1.4 days

**PERIOPERATIVE RESULTS**

- **Bloodloss (ml)**
  - OLLIF: [Graph]
  - TLIF: [Graph]

- **Surgery Time (min)**
  - OLLIF: [Graph]
  - TLIF: [Graph]

- **Hospitalization (days)**
  - OLLIF: [Graph]
  - TLIF: [Graph]
Inspired Spine - Clinical And Radiological Outcomes Of Trans-kambin Posterior Oblique Lateral Lumbar Interbody Fusion.

CLINICAL RESULTS AT ONE YEAR POST OP

10-Point Pain Scale

Oswestry Disability Index
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<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with imaging ≥ 300 days post op</td>
<td>166</td>
</tr>
<tr>
<td>Total levels amongst patients with imaging</td>
<td>307</td>
</tr>
<tr>
<td>Interbody Fusion (%)</td>
<td>303 (98.7)</td>
</tr>
<tr>
<td>Right Postolateral Fusion (%)</td>
<td>212 (69.1)</td>
</tr>
<tr>
<td>Left Postolateral Fusion (%)</td>
<td>204 (66.4)</td>
</tr>
<tr>
<td>Number of screws placed amongst patients with imaging</td>
<td>946</td>
</tr>
<tr>
<td>Screw Fracture (%)</td>
<td>15 (1.6)</td>
</tr>
<tr>
<td>Screw Loosening (%)</td>
<td>23 (2.4)</td>
</tr>
<tr>
<td>Screw Breach (%)</td>
<td>23 (2.4)</td>
</tr>
<tr>
<td>Screw Bicortical (%)</td>
<td>32 (3.4)</td>
</tr>
</tbody>
</table>
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## COMPLICATION RATES OF OLLIF

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>303</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perioperative Complications</strong></td>
<td></td>
</tr>
<tr>
<td>Wound infection (%)</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Bleeding (%)</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Nerve Irritation (%)</td>
<td>22 (7.2)</td>
</tr>
<tr>
<td>Neuropraxia (%)</td>
<td>13 (4.3)</td>
</tr>
<tr>
<td><strong>One-year Complications</strong></td>
<td></td>
</tr>
<tr>
<td>Patients seen for one-year follow-up</td>
<td>204</td>
</tr>
<tr>
<td>Reoperation (%)</td>
<td>14 (5.3)</td>
</tr>
<tr>
<td>Screw Failure</td>
<td>6</td>
</tr>
<tr>
<td>Fall or MVA</td>
<td>5</td>
</tr>
<tr>
<td>Continued Stenosis</td>
<td>4</td>
</tr>
<tr>
<td>Nerve Irritation (%)</td>
<td>12 (4.0)</td>
</tr>
<tr>
<td>Neuropraxia (%)</td>
<td>1 (0.3)</td>
</tr>
</tbody>
</table>

Perioperative and one-year complications. The one year follow up was at least 300 days after surgery. Amongst the 12 patients with nerve root irritation at one year follow-up, three patients had only a non-limiting sensory deficit. Amongst patients with reoperation, one patient had 2 re-operations, all other patients had one re-operation.

**Neuropraxia:** Weakness 3/5 or worse; **Nerve Root Irritation:** Paresthesia, Dysesthesia, Weakness 4/5 or better;
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**DISCUSSION**

**Technical Notes**
- Minimal damage of muscles and soft tissue during approach
- Disk space can be packed with TCP as it is completely sealed
- Possible to correct for Scoliosis through “strategic” cage placement
- Fusion in thoracic spine with similar technique: MIS-DTIF

**Learning Curve: Not hard to learn**

**Financial Considerations**
Economic study shows savings over $11,000 per surgery due to reduced OR time and hospital stay

**Continuing Study**
Detailed health economic assessment
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TECHNIQUE & OUTCOMES

- OR Time: 59min
- Hospital stay: 2.7d
- Bloodloss: 44ml
- Trans-Kambin approach
- Truly MIS: No visualization
- Technically straightforward
- 18% Reduction in Oswestry
- 5.6 Point reduction on 10 point pain scale
- 0.3% Wound infection
- 0.3% Neuropraxia
- 99% Interbody Fusion

OLLIF is the first truly MIS spinal fusion with the potential to become the next standard of care

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