Reduction of muscular insufficiency by minimal invasive muscle preserving approach for spondylodesis in patients with degenerative lumbar instability and obesity (BMI >35).

T. Pfandlsteiner, MD, C. Wimmer, Prof., MD
Center for Spine Surgery with Scoliosis Center. Vogtareuth, Germany.
Department of the University of (PMU) Salzburg
Background

Obesity (BMI>35) and degenerative lumbar de novo scoliosis is often combined with muscular insufficiency of the M. erector spinae. One of the problems in spondylodesis is the muscle damage during operation in the preoperative insufficient M. erector spinae with further damage. Aim was the comparison of muscle strength after open conventional spondylodesis (group I) and percutaneous stabilization combined with spondylodesis (group II) in obese patients with degenerative scoliosis, Spondylolisthesis and degenerative instability.
Method

Indications: Degenerative Lumbar scoliosis, osteochondrosis, spondylolisthesis and FBSS.
Method

Pain level evaluation (Chatillon DFM-50) by pain threshold measurement with a digital dolorimeter at defined triggerpoints before and 6, 12 and 24 months after operation.

Pain on exertion was evaluated at the myofascial triggerpoints by structural and functional palpation and threshold measurement.

Rib dysfunction, vertebral blockage and hypermobilities have been excluded.
Method

First structural and functional palpation at the myofascial triggerpoints posterior and anterior (sternocostal) was done, next the pain level evaluation followed by threshold measurement with a digital dolorimeter (Chatillon DFM-50). The compression force was increased per 0.02kg/s continuously. When the pain level was reached, data were evaluated out of ten measurements per triggerpoint, whereby after 5 measurements a break of two minutes was adhered to. The average of the three lowest measurements was used for assessment.
Results

Follow up 28 (22-36) months, lost to follow up 1/65 and 0/58.

X-Ray or CT-scan of the lumbar spine after 6, 12, 24 months was done

Fusion rate in the dorsal group was 85% (Group I and II)

Fusion rate in the dorsoventral group was 92% (Group I and II)

Bloodloss ml

One segment: 50 (40 – 70)  Three segments: 85 (50 – 100 ml)

Two segments: 75 (50 – 90)  Four- or polysegmental 95 (90-120 ml)
Screw loosening combined with pseudoarthrosis in group I was found in 7/65 patients (19 screws) and in group II in 2/58 patients (3 screws).

Adjacent disc degeneration in group I 6/65 and in group II 1/58.

Infections
Group I: 2
Group II: 0
Screw breakage in group I 1/65 and in group II 0.
Results - MIS vs. open Triggerpoint measurement

The Compression force increase (kg/cm²) in the **MIS Group (II)** after operation was significant earlier, than in the **open Group (I)**.

<table>
<thead>
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<th>Pre Op</th>
<th>3Mo</th>
<th>6 Mo</th>
<th>12Mo</th>
<th>24 Mo</th>
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<tbody>
<tr>
<td>I:</td>
<td>1,7</td>
<td>1,8</td>
<td>2,4</td>
<td>4,7</td>
<td>5,0</td>
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<td>2,4</td>
<td>4,6</td>
<td>5,6</td>
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<td>I:</td>
<td>(0,7-2,3)</td>
<td>(0,8 – 2,1)</td>
<td>(1,6 – 3,9)</td>
<td>(3,0-6,7)</td>
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<td>(0,7-2,2)</td>
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Results - MIS vs. opengroup, muscle strength

The patient satisfaction score was much better in the MIS group, and the VAS score decreased significantly earlier.

![Graph showing patient satisfaction scores over time in MIS and Open groups.](image-url)

The length of walking distance improved in the MIS group 3 months earlier.

The load-carrying capacity and ability was reached 1.5 months earlier.

Demand for rehabilitation after fusion was significant lower in the MIS group (92% / 83%).
Conclusion

Rate of adjacent disc degeneration and screw loosening is significantly lower in the MIS group.

The preoperative existing muscular insufficiency in obese patients is not that much increased in the MIS group than in the conventional group after operation.

The minimal invasive, percutaneous instrumentation shows advantages especially in obese patients.