NEW DYNAMIC STABILISATION: CLINICAL AND BIOMECHANICAL OUTCOME AFTER 500 PATIENTS

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DYNESYS

Philipp Cathrein
Gilles Dubois
Review of 1250 own patients

Mean age: 69 years

Average segments: 2.4 (1 to 6)
DYNESYS 2002-2018

• Revisions within 1 year < than 3 %

• Revision of adjacent segment
  1-7 years 4 %
  8-16 years 17 %
DYNESYS 2002-2018

Reoperation at 1 - 7 years: 4%
  rarely fused

Reoperation at 8-16 years: 17%
  Fusion or lost of mobility in 90% of the reoperated segments
  tested during revision surgery
DYNESYS 2002-2018

Review of 1250 own patients

Conclusion Dynesys is too stiff

? How can we prevent fusion ?
Stiffness threshold for dynamic stabilisation

Overview posterior pedicular based rods after 1 million cycles

Schmidt, Heuer, Wilke (2009)
Principles of dynamic stabilisation

DYNESYS (state-of-the-art)

one stiffness
pretended cord and spacer

SpineShape (new)

three different stiffness
given by three different grades of PCU:
• stiff (low flex)
• medium (mid flex)
• elastic (high flex)
Dynamic stabilization with 3 different stiffness
Indications for optimal rod stiffness

- (Dynamic) stenosis ................................................................. X ...... X
- Facet joint syndrome / Spondyloarthritis ................................. X ...... X
- Osteochondrosis Modic Type I or III ........................................ X ...... X
- Discopathy (recurrent disc prolapse / herniation) .................... X
- Late adjacent segment syndrome .......................................... X
- Complement to disc prosthesis ............................................. (X)
- Osteochondrosis Modic Type II ............................................. X ...... X
- Degenerative spondylolisthesis (Meyerding <1) ....................... X ...... X
- (Degenerative) Scoliosis (early stage - non rigid) .................... X ...... X
- Instability * .............................................................................. X ...... X
- Complement to cage ................................................................. (X) ...... (X)

*) hypermobility with antelisethesis / hypomobility with retrolisethesis when decompressed
# Clinical Results since 7/2015

<table>
<thead>
<tr>
<th>Patients</th>
<th>295</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indications</strong></td>
<td></td>
</tr>
<tr>
<td>Discopathy / herniation</td>
<td>88</td>
</tr>
<tr>
<td>Adjacent segment</td>
<td>74</td>
</tr>
<tr>
<td>Facet joint / arthrosis</td>
<td>48</td>
</tr>
<tr>
<td>Degenerative stenosis</td>
<td>36</td>
</tr>
<tr>
<td>Degenerative scoliosis</td>
<td>24</td>
</tr>
<tr>
<td>Osteochondrosis</td>
<td>Complementary to TDP</td>
</tr>
<tr>
<td>Degenerative sp`listhesis</td>
<td>Complementary to cage</td>
</tr>
</tbody>
</table>
Clinical Results since 7/2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age</td>
<td></td>
<td>67 (28 – 89)</td>
</tr>
<tr>
<td>Average number of segments</td>
<td></td>
<td>2.3</td>
</tr>
<tr>
<td>Primary surgery</td>
<td></td>
<td>53 %</td>
</tr>
<tr>
<td>Revision surgery</td>
<td></td>
<td>47 %</td>
</tr>
<tr>
<td>Rod-Type</td>
<td>high flex</td>
<td>38 %</td>
</tr>
<tr>
<td></td>
<td>mid flex</td>
<td>62 %</td>
</tr>
<tr>
<td></td>
<td>low flex</td>
<td>1 patient</td>
</tr>
</tbody>
</table>
### Clinical Results since 7/2015

<table>
<thead>
<tr>
<th>VAS for low back pain</th>
<th>pre-op</th>
<th>post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary surgery</td>
<td>6.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Revision surgery</td>
<td>7.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Both</td>
<td>7.0</td>
<td>1.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VAS for sciatic back pain</th>
<th>pre-op</th>
<th>post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary surgery</td>
<td>7.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Revision surgery</td>
<td>8.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Both</td>
<td>8.0</td>
<td>1.4</td>
</tr>
</tbody>
</table>
Clinical Results since 7/2015

Patients satisfaction: overall pain | mobility
---|---|---
excellent (VAS 0-1) | 57 % | 2.8°
good (VAS 2-3) | 32 % | 2.6°
fair (VAS 4-5) | 11 % | 2.4°
poor (VAS > 6) | <1 % | -
Clinical Results since 7/2015

Patients walking time after 3 month

- no limitation due to spine: 51%
- 30-60 min: 36%
- 15-29 min: 11%
- <15 min: 2%

Patients made all a progress in walking time
Clinical Results since 7/2015

Post-operative medication after 3 months:

- none: 62 %
- mild: 14 %
- other: 24 %

Total: 76 %
Clinical Results since 7/2015

<table>
<thead>
<tr>
<th>Condition</th>
<th>Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev. surgery after spine shape</td>
<td>12</td>
<td>4.1%</td>
</tr>
<tr>
<td>device related</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>adjacent segment</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>disc herniation</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>infection</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Spine shape is a proven implant for true dynamic stabilisation, it maintains motion in all operated segments after 3 months.

Clinical results in the first 3 years are good, patients satisfaction is given.

Surgeons have the choice of different rod stiffness, also to respect the patients requirements.
Conclusions

Shorter operating time
Faster rehabilitation
Patients do not feel the implant
Rarely sacroiliac joint pain

Our philosophy
Bring the spine back to physiological degeneration especially in younger patients and preserve the sagittal balance.
60 years old woman, stenosis, rod high flex 3 month

reclination 11.3° neutral inclination 9.2°
60 years old woman, stenosis, rod high flex 12 month

reclination 10.7°  neutral  inclination 3.8°
45 years old man, epifusional stenosis, rod mid flex

reclination $10^\circ$  neutral  inclination $1^\circ$
68 years old man, recurrent stenosis, rod mid flex

reclination 40°  neutral  inclination 20°
Conclusions

Dynesys system is often ending in a spontaneous fusion of the facet joint 8 to 10 years after operation.

As Professor Wilke and team showed in their threshold for dynamic stabilisation: dynesys is too stiff for a true dynamic stabilisation.

Spine shape has the potential for dynamic stabilisation and seem to maintain mobility in the first 4 years.
SPINE SHAPE INI: outlook

Thank you