The anatomical restored femoroacetabular offset does not correlate with clinical results of a short-stem in combination with a monoblock pressfit cup for THA

RS Camenzind, MO Schär, A Antoniadis, N Helmy
Disclosure

- N Helmy
  - Consultant for
    - Mathys Ltd, Switzerland
    - Medacta International, Switzerland
    - Bayer
  - Royalties
    - Medacta International, Switzerland

- Other authors
  - none
Introduction: Total offset

- Perpendicular distance between true floor of acetabulum and femoral long axis

- Offset alteration influence hip joint biomechanics

Frain P, Rev Chir Orthop, 1978
McGrory B, JBJS Br, 1995
Widmer KH, Clin Biomech, 2005
Surgical goal

- Reconstruction individual joint biomechanics

- Radiological parameters
  - leg length (LL)
  - total offset (TO)
    - femoral offset (FO)
    - acetabular offset (AO)
  - height of centre of rotation (COR)
Objectives

- Restoration of radiological parameters
  - a monoblock pressfit cup
  - an uncemented short hip stem
- Correlation of radiological results with short-term clinical outcome
Patients

- prospective clinical follow-up multicenter study
- 119 patients (56 female, 63 male)
- mean age 66 years (range, 43 – 87)
- median follow-up (FU) of 24.5 months
Methods

- measured on standardized antero-posterior x-ray
- compared to non-operated, healthy hip

Dastane M, CORR, 2011
Waldstein W, Int Orthop, 2014
Clinical outcome

- Harris hip score (HHS; 0 – 100)
- Rest pain, visual analogue scale (VAS; 0 – 10)
- Load pain (VAS; 0 – 10)
- Satisfaction (VAS; 0 – 10)

Harris WH, JBJS Am, 1969
Radiological results

<table>
<thead>
<tr>
<th></th>
<th>Result [mm]</th>
<th>p-value*</th>
<th>Acceptable differences [mm]</th>
<th>Restoration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leg length</td>
<td>+ 1</td>
<td>0.045</td>
<td>+/- 10</td>
<td>89.2%</td>
</tr>
<tr>
<td>Total offset</td>
<td>- 1.2</td>
<td>0.145</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Femoral offset</td>
<td>- 5.8</td>
<td>&lt;0.0001</td>
<td>+/- 4.6</td>
<td>43.3%</td>
</tr>
<tr>
<td>Acetabular offset</td>
<td>+ 4.6</td>
<td>&lt;0.0001</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Centre of rotation</td>
<td>- 4.4</td>
<td>&lt;0.0001</td>
<td>+/- 6.3</td>
<td>68.3%</td>
</tr>
</tbody>
</table>

*Wilcoxon signed rank test

Krishnan SP, J Arthroplasty, 2006
McWilliams AB, Hip Int, 2013
O’Brien S, Hip Int, 2010
Clinical results

<table>
<thead>
<tr>
<th></th>
<th>Last FU</th>
<th>Improvement</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHS</td>
<td>100 (66 – 100)</td>
<td>+ 45 (-9 – 86)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Rest pain</td>
<td>0 (0 – 8)</td>
<td>- 4 (-10 – 1)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Load pain</td>
<td>0 (0 – 10)</td>
<td>- 6.5 (-10 – 2)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>10 (2 – 10)</td>
<td>+ 7 (-1 – 10)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

*Wilcoxon signed rank test
Clinical results

- 96.7% good to excellent (HHS ≥ 80)
- 90.8% no rest pain (VAS = 0)
- 81.5% no load pain (VAS = 0)
- 79.0% very satisfied (VAS = 10)

Marchetti P, J Arthroplasty, 2005
Univariate logistic regression

- No influence by any radiological parameter
  - Rest pain
  - Load pain
  - Limping (out of HHS)
Univariate logistic regression

- Decrease of acetabular offset leads to decreased probability not being satisfied ($p = 0.0127$)

- OR 1.15 (95% CI: 1.03 – 1.30)
Discussion

- Short hip stems in combination with a monoblock pressfit cup safely restore
  - leg length
  - total offset

- femoral offset is decreased
- acetabular offset is increased
Conclusion

- Implantation of a monoblock cup and an uncemented short-stem
  - shows good to excellent short-term clinical results
  - restores radiological parameters within a given threshold (leg length +/- 10 mm, femoral offset +/- 4.6 mm, center of rotation +/- 6.3 mm)

- Restoration of radiological parameters do not correlate with short-term clinical outcome
Thank you for your attention