“Gait Analysis Evaluation Of The Ability To Resume High Impact Sports In Patients Treated With Hip Resurfacing Arthroplasty”

Giovanni Micera
• Young and active patients
• High expectations
• High impact sport activities
THR

- Is it possible to resume sport activities after THR?
- Does sport activity influence implant longevity?
GUIDELINES

With normal use and activity, the material between the head and the socket of every hip replacement implant begins to wear. Excessive activity or being overweight may speed up this normal wear and cause the hip replacement to loosen and become painful. Therefore, most surgeons advice against high-impact activities such as running, jogging, jumping, or other high-impact sports.

Realistic activities following total hip replacement include unlimited walking, swimming, golf, driving, hiking, biking, dancing, and other low-impact sports.

With appropriate activity modification, hip replacement can last for many years.

- Low-impact: allowed
- Medium-impact: allowed with limitations
- High-impact: discouraged
THR AND HIGH-IMPACT SPORTS

Clin Orthop Releat Res. 1991

Patient activity, sports participation, and impact loading on the durability of cemented total hip replacements

Klingus DJ et al.

Clin Orthop Relat Res. 2012

Does impact sport activity influence total hip arthroplasty durability?

Ollivier M. et al.
• Single surgeon, 3518 operations
• 10 Jan 2001 – 31 Dec 2016
• 2671 male, 847 female, mean age: 51.8 years old
• Survival rate: male 98.4%, female 95.3%
• Metal ion levels Cr and Co in 1073 patients
• Mean follow up 3.6±2.6 years (max 12.4 years)
• Cr 1.8 μg/l ±1.4 (n.r.-6.8)
• Co 1.6 μg/l ±1.5 (n.r.-10.8)
MATERIAL AND METHODS

- Single surgeon
- 30 young and active male patients
- Unilateral osteoarthritis
- Mean age $39.1 \pm 2$ (range 31 – 51)
- BHR (Birmingham Hip Resurfacing)
- Follow-up 1 year
- OHS, HHS, UCLA, Gait Analysis
FUNCTIONAL RESULTS

- OHS Pre-op 28.1 (15.8 – 38)
- OHS 6 months 45.5 (44 – 48)
- OHS 1 years 47.9 (47 – 48)

- HHS Pre-op 54.7 (33.1 – 73.4)
- HHS 6 months 96.7 (93.4 – 100)
- HHS 1 years 99.7 (95.7 – 100)

- UCLA Pre-op 2.7 (2 – 4)
- UCLA 6 months 7.4 (5 – 10)
- UCLA 1 years 8.6 (7 – 10)

P < 0.05
GAIT ANALYSIS

- Lower limbs markers standard procedure
- Stereophotogrammetric System (Smart-DX, BTS, 10 Cameras 250 Hz)
- Strength platform (9286 BA Kistler Instrumente)
RESULTS

Hip flexion/extension during walking
• No ROM differences between operated and contralateral hip

Hip flexion/extension during running
• No ROM differences between operated and contralateral hip
• Physiological hip ROM
RESULTS

Counter-Movement-Jump

1 year

- Same loading strength
- Landing force higher in the operated hip
RESUME HIGH-IMPACT SPORT

46 years

6 months
The majority of the patients return to join sport activities.

6 months after surgery there is an Increase of periprosthetic BMD.

High impact sport activities are allowed after 6 months.
Running activity after hip resurfacing arthroplasty: a prospective study.

Foulleron et al.

Can patients return to high-impact physical activities after hip Resurfacing? A prospective study.

J Girard et al.
## Survival Rate Analysis

<table>
<thead>
<tr>
<th>Paper</th>
<th>Country</th>
<th>n</th>
<th>Survival rate (%)</th>
<th>Follow-up (anni)</th>
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<tbody>
<tr>
<td>Carrothers et al, JBJS 2010</td>
<td>Oswestry, UK</td>
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<tr>
<td>Treacy et al, JBJS 2011</td>
<td>Birmingham, UK</td>
<td>144</td>
<td>93.5 (M: 98)</td>
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<td>Coulter et al, JBJS 2012</td>
<td>Melbourne, Australia</td>
<td>230</td>
<td>94.5 (M: 97.5)</td>
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<td>Holland et al, JBJS 2012</td>
<td>Newcastle, UK</td>
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<td>92.0 (M: 94.6)</td>
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<tr>
<td>Murray et al, JBJS 2012</td>
<td>Oxford, UK</td>
<td>379</td>
<td>95 (M only)</td>
<td>10</td>
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<tr>
<td>Shimmin et al, JBJS 2012</td>
<td>Melbourne, Australia</td>
<td>230</td>
<td>94.5 (M: 97.5)</td>
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<tr>
<td>Treacy et al, Int Orthop 2013</td>
<td>Birmingham, UK</td>
<td>180</td>
<td>96.4 ≥65 years (M: 98.9)</td>
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<tr>
<td>Mehra et al, J of Arthr 2015</td>
<td>Wolverhampton, UK</td>
<td>120</td>
<td>94.2 (M: 96)</td>
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<tr>
<td>Moroni et al, Hip Int 2017</td>
<td>Milano, Italy</td>
<td>100</td>
<td>96 (M: 100)</td>
<td>10</td>
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<tr>
<td>De Smet, ISTA 2011</td>
<td>Ghent, Belgium</td>
<td>149</td>
<td>93.1</td>
<td>12</td>
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<tr>
<td>McMinn et al, Int Orthop 2011</td>
<td>Birmingham, UK</td>
<td>3,095</td>
<td>96 (&lt;55 years with OA: 99)</td>
<td>13</td>
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<tr>
<td>McMinn et al, JBJS 2014</td>
<td>Birmingham, UK</td>
<td>1000</td>
<td>95.8 (M: 98)</td>
<td>13.7</td>
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<tr>
<td>DeSmet et al, JBJS 2013</td>
<td>Ghent, Belgium</td>
<td>202</td>
<td>92.4</td>
<td>13.2</td>
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<tr>
<td>Treacy et al, JBJS 2013</td>
<td>Birmingham, UK</td>
<td>447</td>
<td>94.1 &lt;50 years</td>
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<tr>
<td>Moroni et al, Hip Int 2017</td>
<td>Milano, Italy</td>
<td>100</td>
<td>96 (M: 100)</td>
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</table>
CONCLUSIONS

- Good indication for patients that want to join high impact sports

- Gait Analysis showed normal hip function during sport activities