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

Giovanni Micera

THR

- 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 advise 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 Relat 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.

HIP RESURFACING SERIES

- 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 $3,6 \pm 2,6$ years (max 12,4 years)
- Cr $1,8 \mu\text{g/l} \pm 1,4$ (n.r.-6,8)
- Co $1,6 \mu\text{g/l} \pm 1,5$ (n.r.-10,8)

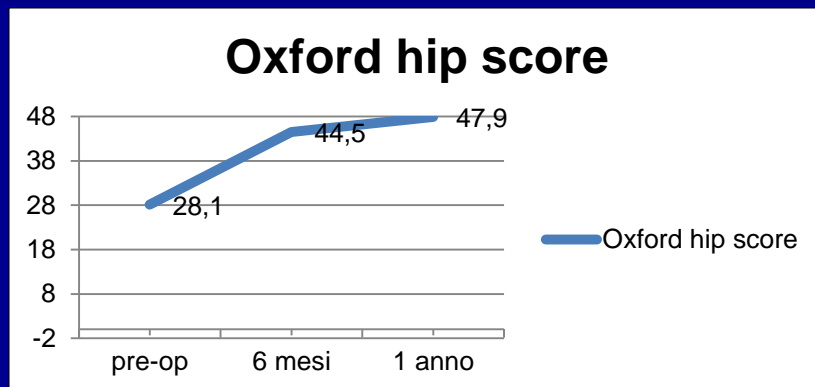
MATERIAL AND METHODS

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

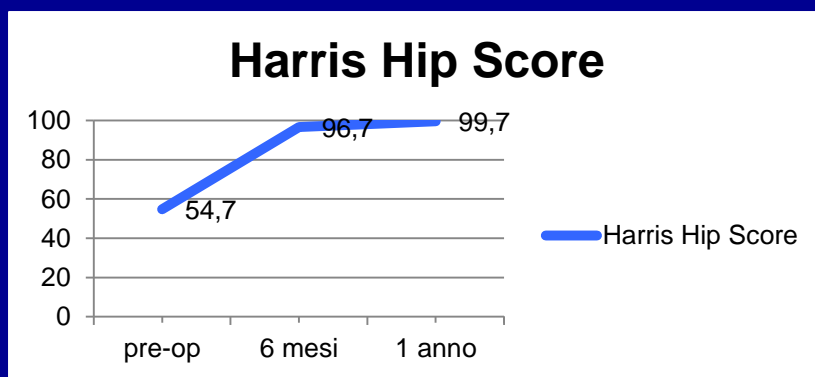


FUNCTIONAL RESULTS

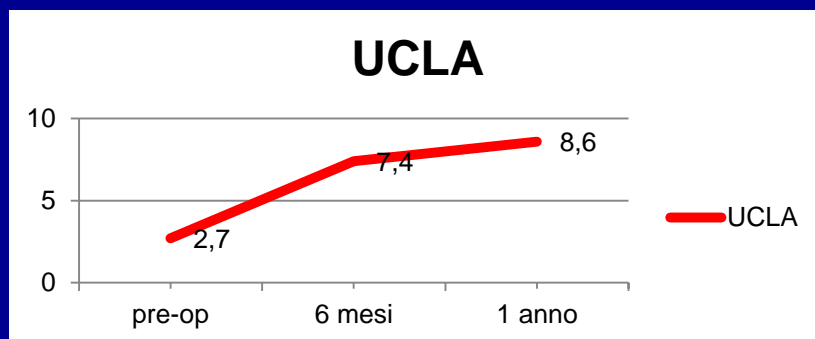
- OHS Pre-op 28.1 (15.8 – 38)
- OHS 6 months 45.5 (44 – 48)
- OHS 1 years 47.9 (47 – 48)



- 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)



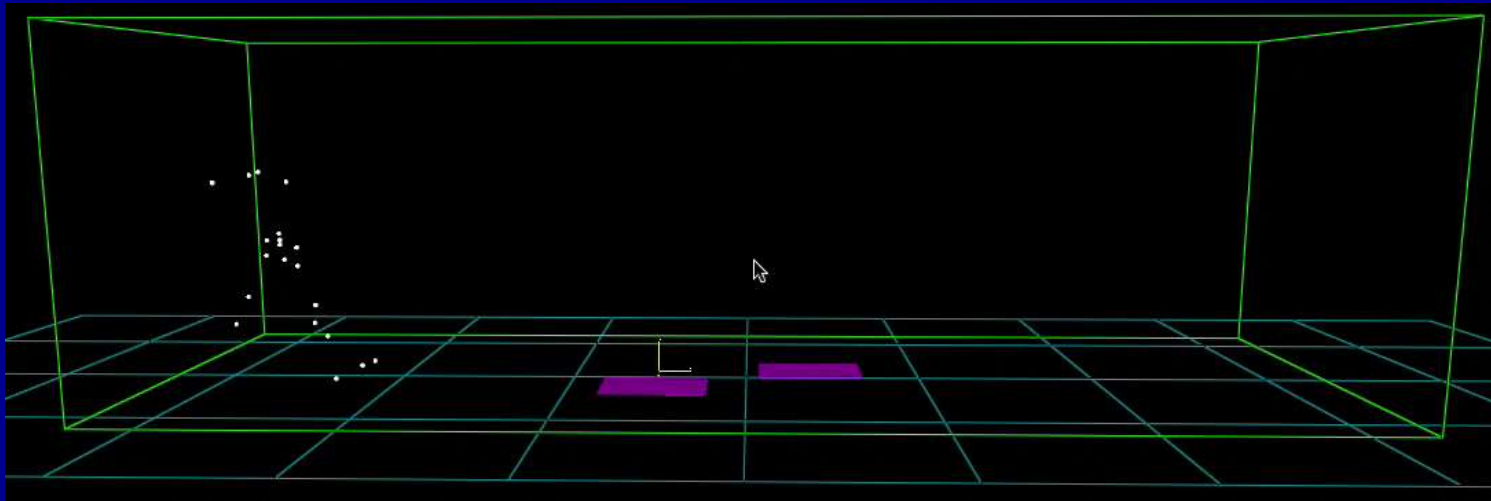
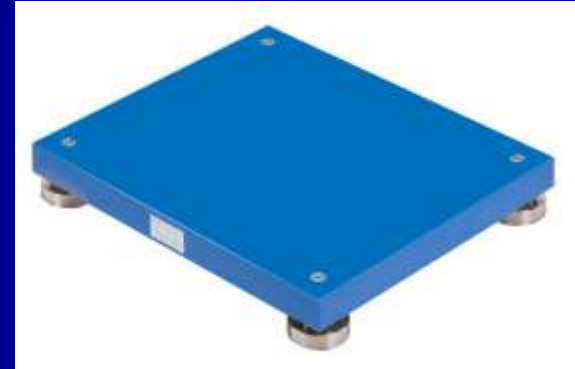
- UCLA Pre-op 2.7 (2 – 4)
- UCLA 6 months 7.4 (5 – 10)
- UCLA 1 years 8.6 (7 – 10)



P < 0.05

GAIT ANALYSIS

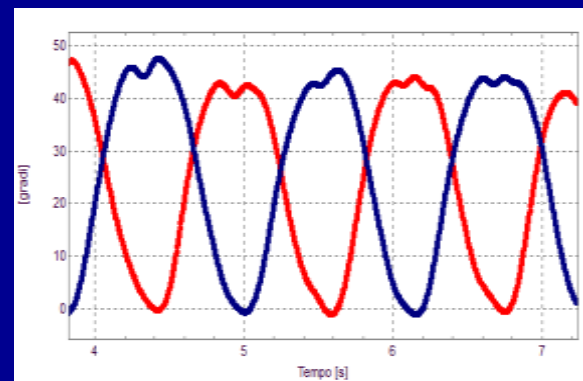
- Lower limbs markers standard procedure
- Stereophotogrammetric System (Smart-DX, BTS, 10 Cameras 250 Hz)
- Strength platform (9286 BA Kistler Instrumente)



RESULTS

Hip flexion/extension during walking

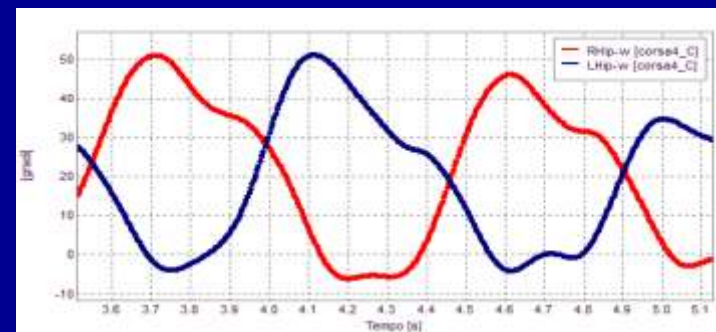
- No ROM differences between operated and contralateral hip



1 year

Hip flexion/extension during running

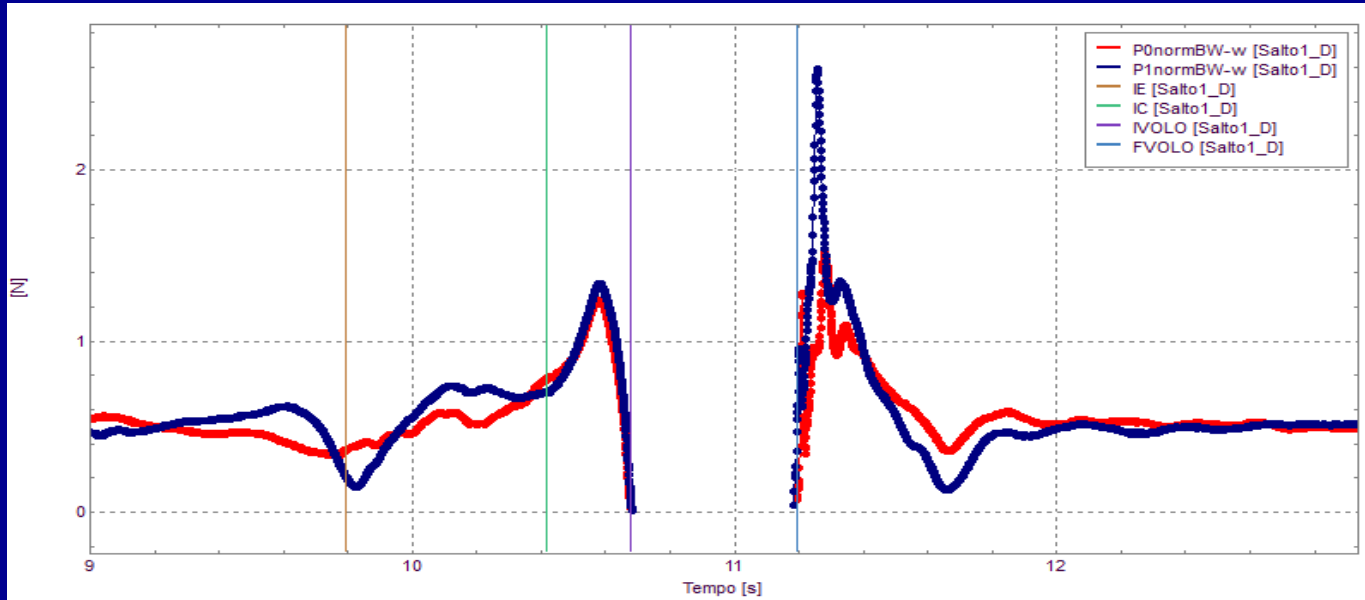
- No ROM differences between operated and contralateral hip
- Physiological hip ROM



1 year

RESULTS

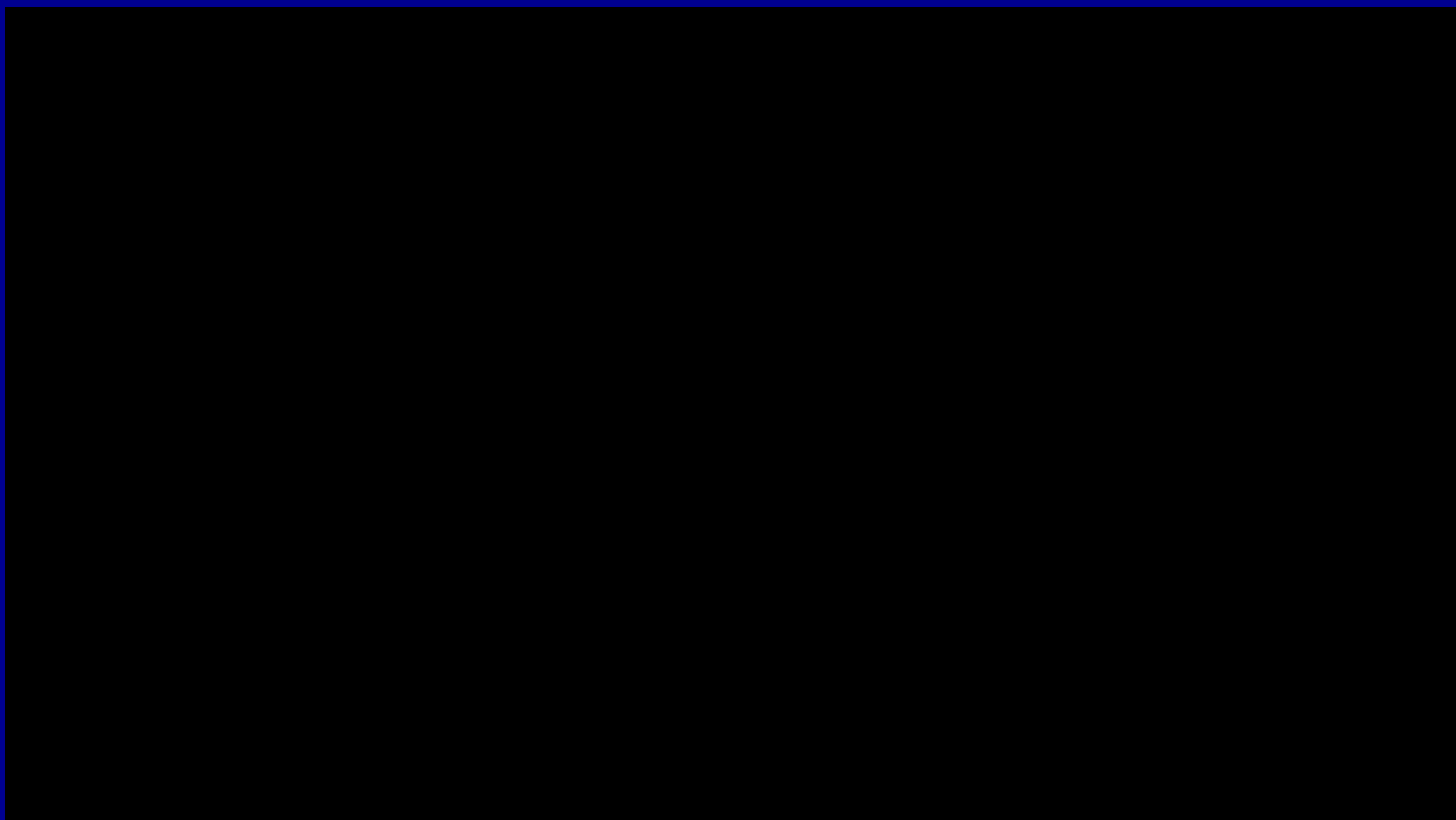
Counter-Movement-Jump



1 year

- Same loading strength
- Landing force higher in the operated hip

RESUME HIGH-IMPACT SPORT



46 years



6 months

HR

Clin Orthop Relat Res (2012)

2011 Marshall Urist Young Investigator Award: when to release patients to high-impact activities after hip resurfacing.

Bedigrew KM et al.

- 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

HR AND HIGH IMPACT SPORTS

Am J Sports Med. 2012 Apr

Running activity after hip resurfacing arthroplasty: a prospective study.

Foulleron et al.

International Orthopedics (SICOT) 2013

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

J Girard et al.

15 Papers (5578 BHRs) Follow up: 10-15 years Survival rate: 92-100%

Paper	Country	n	Survival rate (%)	Follow-up (anni)
Carrothers et al, JBJS 2010	Oswestry, UK	5,000	96.4	10
Treacy et al, JBJS 2011	Birmingham, UK	144	93.5 (M: 98)	10
Coulter et al, JBJS 2012	Melbourne, Australia	230	94.5 (M: 97.5)	10
Holland et al, JBJS 2012	Newcastle, UK	100	92.0 (M: 94.6)	10
Murray et al, JBJS 2012	Oxford, UK	379	95 (M only)	10
Shimmin et al, JBJS 2012	Melbourne, Australia	230	94.5 (M: 97.5)	10
Treacy et al, Int Orthop 2013	Birmingham, UK	180	96.4 ≥65 years (M: 98.9)	10
Mehra et al, J of Arthr 2015	Wolverhampton, UK	120	94.2 (M: 96)	10
Moroni et al, Hip Int 2017	Milano, Italy	100	96 (M: 100)	10
De Smet, ISTA 2011	Ghent, Belgium	149	93.1	12
McMinn et al, Int Orthop 2011	Birmingham, UK	3,095	96 (<55 years with OA: 99)	13
McMinn et al, JBJS 2014	Birmingham, UK	1000	95.8 (M: 98)	13.7
DeSmet et al, JBJS 2013	Ghent, Belgium	202	92.4	13.2
Treacy et al, JBJS 2013	Birmingham, UK	447	94.1 <50 years	14
Moroni et al, Hip Int 2017	Milano, Italy	100	96 (M: 100)	10

CONCLUSIONS

- Good indication for patients that want to join high impact sports
- Gait Analysis showed normal hip function during sport activities



Thanks