

Gait Analysis of Metal-on-Metal Surface Arthroplasty: A Matched Comparison Study

Michael A. Mont, MD
Phillip Ragland, MD
Gracia Etienne, MD

Anil Bhawe, PT
Roland Starr, MS
Jochen Erhart, MD

Introduction:

The purpose of this study was to compare gait parameters of patients who have undergone metal-on-metal surface arthroplasty (MOMSA) with normal gait, gait in patients with osteoarthritic hips, and gait in patients who have undergone standard total hip replacement (THR). Parameters studied included abduction moment, extension moment, and walking speed.

	Speed m/sec (SD)	Affected Side Max Abduction Moment in Loading Response (nm/kg)	Affected Side Max Extension Moment in Loading Response (nm/kg)
MOMSA	1.26 (18.2)	0.777 (0.129)	1.048 (0.278)
THR	0.96 (13.2)	0.583 (0.250)	0.703 (0.257)
OA	0.99 (13.7)	0.589 (0.183)	0.658 (0.262)

Results:

- Superior hip kinematics and functionality were noted in the MOMSA group in comparison with the standard total hip arthroplasty group.
- MOMSA had kinematics (abduction moments, extension moments, walking velocity) that approached those of the normal control group of patients without hip osteoarthritis.
- Deficits of patients who had undergone MOMSA were small for the three parameters tested (abduction moment, extensor moment, and walking speed).

Methods:

Using a 3D gait analysis laboratory, the authors compared temporal-spatial parameters and hip kinematics during walking in patients with unilateral osteoarthritic hips, unilateral standard total hip replacements, and unilateral total hip resurfacing arthroplasty.

Inclusion Criteria

- Complication-free surgery
- Pain-free full weight bearing without assistance
- Modified Harris Hip Scores >90 points
- Satisfaction with functional outcome of respective surgical procedures
- Minimum 12 months postoperative

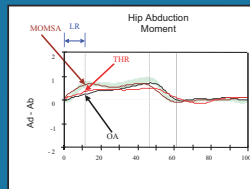


(THR)

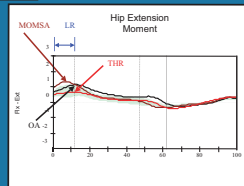
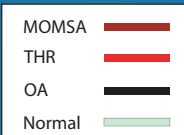
(MOMSA)

MOMSA patients were matched to THR patients and to 11 patients with unilateral osteoarthritis. All 41 patients were subjected to gait analysis and the data compared with those of matched age and gender normal hip population.

41 patients were recruited from clinic	No. of Patients
Standard total hip replacements	15
Resurfacing total hip replacements	15
Unilateral hip osteoarthritic patients	11



- Hip abduction and extension moments are near normal for the MOMSA group, compared with the OA and THR groups.



Conclusion:

- Patients who underwent MOMSA had gait characteristics that were comparable to normal hips.
- Patients who underwent standard hip replacements had markedly improved gait parameters compared to those with osteoarthritic hips, but they never approached the gait parameters of those who had undergone MOMSA or normal controls.