

Dual Mobility versus Fixed Bearing Total Hip Arthroplasty in Patients Under 55 Years of Age: A Single Institution Matched Cohort Analysis

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INTRODUCTION

- Dislocation following total hip arthroplasty (THA) is the most common cause for revision surgery with significant morbidity and cost.
- Dual mobility (DM) was developed by Bousquet 40 years ago in France and refers to a small femoral head articulating within a polyethylene liner that articulates inside a larger acetabular shell. The two articulations increase the head-neck ratio thereby improving the range of movement before impingement and dislocation.
- DM bearings have been introduced in the US to mitigate complications such as instability, yet their performance in younger patients is unknown.
- The purpose of this study was to compare the results of patients under 55 years of age with DM versus fixed bearing (FB) primary THA.**

METHODS

Matched Groups

Cohort 1

- 136 THA with HXPLE DM bearings
- Mean follow up: 3.2 yrs
- Mean Age: 48.4

Cohort 2

- 136 THA with various fixed bearing systems
- Mean follow up: 3.4 yrs
- Mean Age: 48.57



(a) Anatomic Dual Mobility acetabular system (ADM® X3®, Stryker Orthopaedics, Mahwah, NJ); (b) Modular Dual Mobility acetabular system (Stryker Orthopaedics, Mahwah, NJ).

- All THAs were performed through a posterolateral approach with capsular and short-external rotator repair.
- Complications were evaluated & compared.
- PROMs using the Modified Harris Hip Score was available.
- T – test and Fisher’s Exact test were used by our statisticians to assess the data set

RESULTS

- There were **no dislocations or intraprosthetic dissociations (0%) in the DM group and 7 (5.1%) dislocations in the FB group (p=0.01)** at the mean follow up of 3 years postoperatively.
- 2/7 unstable patients in the FB cohort were revised for **recurrent instability**.
 - The first patient underwent THA for post-traumatic arthrosis. He dislocated 6 weeks following primary THA while bending and was revised to DM components.
 - The second patient underwent THA for hip dysplasia. She dislocated while bending and was revised to a constrained liner 5 weeks following index surgery. Subsequent locking ring failure required revision to a DM liner 7 months later.
- In the DM cohort there was one periprosthetic femur fracture following a fall that was treated with ORIF using a 4.5mm large fragment plate. Two stems were revised for aseptic loosening. Twenty four failed and recalled modular femoral stems (Rejuvenate®, Stryker Orthopaedics) were removed secondary to ALTR. **DM shells were not revised in any of the above cases and there were no episodes of instability following revision.**
- No difference** in mHHS between the DM (87.2 ± 16.6) and fixed cohort (87.9 ± 13.7) ($p=0.78$).
- Radiographs of the patients that dislocated in the FB group demonstrated that **6/7 patients’ acetabular components were within the Lewinnik “safe zone”**.

Sex	Female	Male	Female	Female	Female	Male	Female
Age at THA (years)	46	41	54	47	51	44	48
Indication for THA	OA	Inflammatory arthritis	Dysplasia	AVN	OA	Post-traumatic	OA
Elevated liner used	No	No	No	No	No	No	No
Femoral head size (mm)	32	36	28	32	36	32	32
Interval since THA (months)	20	24.5	1	0.03	25	1.5	24
Event leading to dislocation	Yoga	Fall	Bending	Fall	Bending	Bending	Bending
Direction of instability	Anterior	Posterior	Posterior	Posterior	Posterior	Anterior	Posterior
Shell inclination (degrees)	57.53	49.11	43.18	49.37	45.94	43.19	49.45
Shell anteversion (degrees)	28.57	11.89	16.51	25.31	17.29	28.16	15.82
Revised for instability	No	No	Yes	No	No	Yes	No

Patient details pertaining to those patients with fixed bearings that dislocated. OA: osteoarthritis; AVN: Avascular necrosis.

CONCLUSIONS

- We report **no dislocations or intraprosthetic dissociations of primary THAs in patients under 55 years of age using DM bearing systems** at a mean follow up of 3.2 years.
- This group out performed an age-matched cohort that underwent primary THA using FB at the same institution with similar follow-up for prosthetic stability.
- These early results are encouraging for an active, high demand set of patients and may mitigate concerns for instability in this patient population.**
- Contemporary DM bearings with HXLPE and ceramic heads may be beneficial for young patients; however, long term results are required before we can recommend DM acetabular systems in all primary THA despite these early compelling hip stability and economic benefits.

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