

Highly Cross-linked Polyethylene Liner Thickness In THA Does Not Influence Long-term Survival: A Retrospective Cohort Study Of 2565 Hips With Minimum 11 Years Follow-up

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INTRODUCTION:

Consensus exists amongst orthopaedic surgeons that the minimal acetabular liner thickness in total hip arthroplasty (THA) should be 6-8 mm, mainly due to the performance of conventional polyethylene (PE). Short to mid-term follow-up studies have not demonstrated a negative effect of using larger femoral heads at the cost of thinner highly crosslinked polyethylene (HXLPE) liners in modern THA. However, concern remains that these thinner liners may prematurely fail in the long-term. The aim of this study was to evaluate the long-term survival and revision rates of HXLPE liners in primary THA, as well as the effect of liner thickness on these outcomes.

METHODS:

We retrospectively identified all primary THA using HXLPE liners with a minimum 11-year follow-up performed at a single center from 2010 and earlier, including all head sizes and liner thicknesses. Fellowship trained arthroplasty surgeons performed all procedures. Patient characteristics implant details, death, and revisions were recorded. Patients were grouped for analysis for each millimeter of PE thickness (e.g. 4.0-4.9mm, 5.0-5.9mm). Kaplan-Meier survival was used to determine all-cause and aseptic loosening revision rates.

RESULTS:

We included 2565 THA procedures with a mean follow-up of 13.2 years (range 11.0-18.8). Mean age was 64.3 years (range 19.0 - 95.9), mean BMI was 29.0 (range 15.9 - 63.7) and 1343/2565 (47.6%) were female. Liner thickness varied from 4.9 to 12.7 mm. Seven patients (0.3%) had a liner thickness <5.0mm and 851 (33.1%) had a liner thickness of <6.0mm. Head sizes ranged from 28 to 40 mm with the most common a 32 mm (n=1203, 46.9%) or 36 mm head (n=1169, 45.6%), and 98.4% were metallic heads. Liner-related revision rates were 0.08%, all-cause revision rates were 4.4%, and reoperation rates were 7.3% (Table 1). There was only one liner-related revision for a liner fracture in the whole cohort. Estimated survival rates were 93.7% (95% CI 92.6 – 94.6%) at 10 years (Figure 1). When grouped by liner thickness, there were no significant differences in all-cause revisions (p=0.112) or aseptic revisions (p=0.116).

DISCUSSION AND CONCLUSION:

In our cohort of 2565 primary total hip replacements, there were no significant differences in all-cause or aseptic revisions between any of the liner thickness groups at a mean of 13.2 years. Our results indicate that using thinner HXLPE liners to maximize femoral head size in THA does not lead to increased complications or liner failures at 13.2 years and is a safe practice

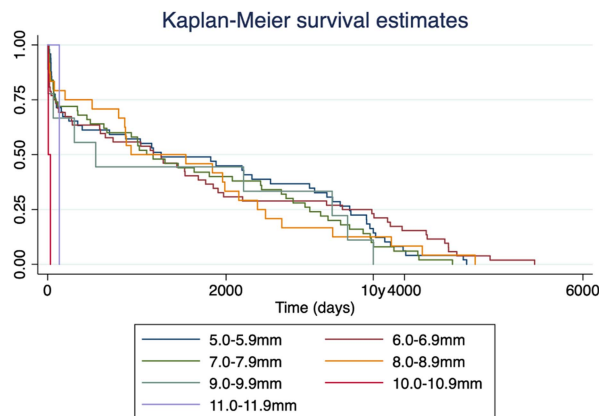


Table 1. Indications for reoperations

Indication	1st reoperation	2nd reoperation
	n=188	n=10
Fracture	48	1
Instability	35	3
Infection	29	4
ALVAL/pseudotumor	28	1
Early loosening/failure to in grow	15	0
Hematoma evacuation	10	1
Leg length discrepancy/stem subsidence	5	0
Pain	5	0
Superficial wound problems	4	0
Removal of suture knots causing trochanteric bursitis	3	0
Iliopsoas release	2	0
Liner fracture	1	0
Aseptic loosening	1	0
Sciatic nerve dysfunction	1	0
Hardware removal	1	0