Subsidence and Survivorship of a Cementless, Triple Tapered Collared Femoral Stem in Total Hip Arthroplasty: A Minimum Two-Year Follow-Up

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INTRODUCTION: Clinical outcomes and survivorship of triple taper femoral stems are of increasing importance given rising total hip arthroplasty (THA) utilization. This study sought to report THA outcomes using a single cementless, triple tapered femoral stem system with a minimum follow-up of two years.

METHODS: A retrospective chart review was conducted of patients who underwent primary THA using a cementless, collared, triple taper femoral stem (Actis; Johnson & Johnson MedTech) by four surgeons with a two-year minimum follow-up. Radiographic subsidence was assessed at 6-weeks and most recent film. Clinically relevant subsidence was defined as ≥3 mm. Implant survivorship and reoperation rates were analyzed between sex and Dorr classification subgroups with Chi-Square tests. This study was approved by the IRB committee.

RESULTS: 307 THAs (284 patients) were included, with an average age of 63.8 ± 10.4 years and follow-up of 37.3 ± 12.6 months. The cohort consisted of 178 females (60.0%). 76.2% of patients exhibited Dorr type A femurs, and 23.8% exhibited Dorr type B, with no Dorr type C. The mean 6-week subsidence was 0.5 ± 1.7mm and most recent (average 30.1 months) was 1.1 ± 1.7mm. Clinically relevant subsidence rates were 1.6% and 5.1% at 6-weeks and most recent, respectively. Femoral revision-free survivorship was 99.4%, overall revision-free survivorship 97.4%, and reoperation-free survivorship 95.1% (Figure 1). Periprosthetic fractures were noted in 0.65% of THAs. No difference was noted in subsidence or survivorship between male and female patients (P=.45 and P=.59, respectively) or Dorr A and Dorr B femurs (P=.56 and .19, respectively; Table 1). No difference was found in the canal fill between subsidence and no subsidence cohorts (0.76 ± 0.09 v. 0.76 ± 0.07, P>.99).

DISCUSSION: This study demonstrates minimal subsidence as well as excellent early outcomes of a single, triple taper femoral stem. As use of this stem design continues to rise, further research is needed to determine long-term survivorship of these implants.

SIGNIFICANCE/CLINICAL RELEVANCE: Understanding subsidence and femoral stem migration patterns, particularly in various femora, is critical to achieving and maintaining proper fixation in cementless THA.

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IMAGES & TABLES:

Table 1. Comparisons Between Subsided and Non-Subsided Hips.

Parameter	No Clinical Subsidence (n=240)	Clinical Subsidence (at most recent) (n=13)	P value
Approach			**.0478**
-DA	117 (48.75)	10 (76.92)	-
-Posterior	123 (51.25)	3 (23.08)	-
Alignment			**.0008**
-Neutral	190 (79.17)	5 (38.46)	-
-Varus	4 (1.67)	0 (0)	-
-Valgus	46 (19.17)	8 (61.54)	-
Dorr Classification			.5644
-A	183 (76.25)	9 (69.23)	-
-B	57 (23.75)	4 (30.77)	-
CFI	3.70 ± 0.66	3.37 ± 0.56	.0783
-Normal	186 (77.50)	11 (84.62)	.5473
-Stovepipe	36 (15.0)	2 (15.38)	.9698
-Champagne Flute	18 (7.5)	0 (0)	.3056
AP CBR	0.41 ± 0.07	0.42 ± 0.08	.6189
LAT CBR	0.47 ± 0.09 (n=207)	0.51 ± 0.14 (n=9)	.2048
MCF LT	0.76 ± 0.07	0.76 ± 0.09	>.9999
Calcar Contact	159 (66.25)	7 (53.85)	.8845
Reoperations	12 (5.0)	0 (0)	.4088
Revisions	6 (2.5)	0 (0)	.5640

Note: 54 hips without a most recent film were not included in this table.
Abbreviations: AP=anteroposterior, CBR=canal bone ratio, CFI=canal flare index, DA=direct anterior, LAT=lateral, MCF LT= Metaphyseal Canal Fill at Lesser Trochanter.

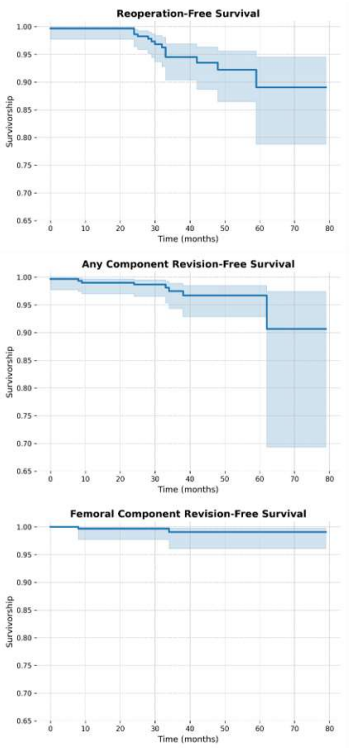

Figure 1. Kaplan-Meier Curves of Reoperation-Free, Any Component Revision-Free, and Femoral Component Revision-Free Survivorship.