Short-Term Outcomes following Total Knee Arthroplasty with a Novel Fully Cementless System

Casey Cardillo[1], Alana Prinos[1], Ran Schwarzkopf [1], Seth Greenky[2], Ryland Kagan[3], Erik Hansen[4], Alexander Neuwirth[5], Mark G. Freeman[6], Brian Nickel[7], Stephen McMahon[8], Kenneth Mathis[9]
[1]NYU Langone Health, New York, USA; [2]Syracuse Orthopedic Specialists, New York, USA; [3]Oregon Health and Science University, Oregon, USA; [4]Medical University of South Carolina, South Carolina, USA; [5]Trustees of Columbia University, New York, USA; [6]Erlanger Health, Tennessee, USA; [7]University of Wisconsin, Wisconsin, USA; [8]The Avenue Hospital, Victoria, Australia; [9]University of Texas Health, Texas, USA
schwarzk@gmail.com

Disclosures: Cardillo (None), Prinos (None), Schwarzkopf (3B- Smith & Nephew, Intelijoint, Zimmer; 4- Gauss Surgical, Intelijoint, PSI; 9- AAOS, AAHKS, JOA, Arthroplasty Today), Greenky (3B, 5- Smith & Nephew), Kagan (3B- Smith & Nephew, OrthAlign; 5- Smith & Nephew, 3M KCI, OrthoDevelopment; 8- Journal of Arthroplasty; 9- AAOS, AJRR, AAHKS), Hansen (3B- Smith & Nephew; 9- Wisconsin Ortho Society), Neuwirth (None), Freeman (3B- Smith & Nephew, Conformis; 4- Irrisept, AXIS Research and Technologies, OmniMed), Nickel (3B- Smith & Nephew; 9- Wisconsin Ortho Society), McMahon (1- Corin U.S.A.; 3B- Stryker; 3C- Smith & Nephew); Mathis (2, 5- Smith & Nephew)

INTRODUCTION: Cementless fixation in total knee arthroplasty (TKA) has gained popularity especially for younger, active patients due to improved osteointegration and projected longevity of implant fixation. However, it has yet to be widely adopted due to reports of high failure rates in older designs. This study aimed to evaluate the short-term safety and efficacy of a novel cementless, porous TKA system.

METHODS: An IRB-approved multi-center prospective study including 153 consented patients, contributing 166 knees, who underwent primary TKA using a novel cementless cruciate-retaining system (LEGION◊ CONCELOC◊, Smith & Nephew). At the time of this report, 26 knees had reached 1 year and 100 were at the 6 months' time point. The primary outcome measurement presented in this report is the 1-year post-surgery implant survivorship. Patient baseline characteristics, surgical indication, and number of adverse events were also collected. The Knee Injury and Osteoarthritis Outcome Score, Joint Replacement (KOOS JR) score, Oxford Knee Score (OKS), and Forgotten Joint Score (FJS) were evaluated preoperatively, as well as at 6-weeks, 6-months, and 1-year postoperatively.

RESULTS: All 166 knees received cruciate-retaining fully cementless constructs. Kaplan-Meier survivorship at 1-year was 100%. One patient (0.6%) required a manipulation under anesthesia for arthrofibrosis, and one patient (0.6%) underwent a debridement, antibiotics, and implant retention procedure for infection. None of the patients had removal of femur and/or tibial components at their latest follow-up. There was a significant change in scores from preoperative assessment to the 1-year postoperative visit, with a mean increase of 32.3 in KOOS JR, 19.6 in OKS, and 41.8 in FJS ($p<0.001$).

DISCUSSION: Short-term results of patients undergoing primary TKA with a novel cementless system show significant improvements in function and quality of life, with excellent performance and excellent survivorship.

SIGNIFICANCE/CLINICAL RELEVANCE: The findings in this study support the continued use of this novel cementless TKA design due to excellent short-term outcomes

IMAGES AND TABLES:

Table 1: **Demographic Variables**

Demographic Variable	**Fully Cementless TKA**
Total subjects	153
All knees, No. (%)	
Total	166 (100)
Left	84 (50.6)
Right	82 (49.4)
Mean age (range) [years]	62.7 (31-78)
Age group, No. (%)	
≤ 60 Years	57 (37.3)
> 60 Years	96 (62.7)
Female, No. (%)	57 (37.3)
Surgical indication, No. for knees (%)	
Osteoarthritis	157 (94.6)
Post-Traumatic Arthritis	6 (3.6)
Rheumatoid Arthritis	3 (1.8)

Table 2. Perioperative and Short-Term Postoperative Outcomes

Outcome	**Fully Cementless TKA (n=166)**
MUA, No. (%)	1 (0.6)
DAIR, No. (%)	1 (0.6)
Mean Δ KOOS JR (± SD)	
Δ Preop to 6-weeks KOOS JR	10.0 ± 16.9
Δ Preop to 6-month KOOS JR	23.4 ± 17.3
Δ Preop to 1-year KOOS JR	32.3 ± 25.83
Mean Δ OKS (± SD)	
Δ Preop to 6-weeks OKS	3.0 ± 10.4
Δ Preop to 6-months OKS	13.6 ± 10.2
Δ Preop to 1-year OKS	19.6 ± 11.6
Mean Δ FJS (± SD)	
Δ Preop to 6-weeks FJS	8.3 ± 22.9
Δ Preop to 6-months FJS	31.3 ± 34.0
Δ Preop to 1-year FJS	41.8 ± 31.9

MUA, Manipulation under anesthesia; DAIR, Debridement, antibiotics, and implant retention; KOOS JR, Knee Injury and Osteoarthritis Outcome Score, Joint Replacement; OKS, Oxford Knee Score; FJS, Forgotten Joint Score; SD, Standard deviation