

Mid-Term Results of Metaphyseal Cones and Sleeves in Revision Total Knee Arthroplasty. A minimum 5-year follow-up study.

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INTRODUCTION:

Metaphyseal fixation is fundamental in revision total knee arthroplasty (rTKA). Cones and sleeves are highly porous implants that have been developed to address metaphyseal bone loss and support revision implants, aiming for long term biologic fixation. However, only a few studies have directly compared the outcomes between the two implants. The purpose of this study was to compare the mid-term survivorship and aseptic revision rates between metaphyseal cones and sleeves in rTKA.

METHODS:

We reviewed our joint replacement database searching for patients that underwent rTKA with metaphyseal cones or sleeves. We identified 91 patients that were treated with 103 (83 tibial, 20 femoral) metaphyseal cones and 37 patients that were treated with 64 (29 tibial, 35 femoral) sleeves. Bone defects were similar in both groups (AORI II, III, $p>0.05$). Indications for surgery in the cone group included aseptic loosening ($n=46$, 50.6%), periprosthetic joint infection (PJI) ($n=27$, 29.7%), severe osteolysis ($n=14$, 15.4%), instability ($n=3$, 3.3%) and periprosthetic fracture (PPF) ($n=1$, 1%). Surgical indications in the sleeve group included aseptic loosening ($n=17$, 45.9%), instability ($n=7$, 18.9%), PJI ($n=4$, 10.8%), osteolysis ($n=3$, 8.1%), catastrophic polyethylene wear ($n=3$, 8.1%), stiffness ($n=2$, 5.4%) and PPF ($n=1$, 2.7%). Component survivorship, patient reported outcomes and complications were recorded in both groups. The mean follow-up time was 8.3 years (range, 5.1 -13 years) for the patients treated with cones and 8.9 years (range, 5-20 years) for those with sleeves.

RESULTS:

In the cone group, survivorship was 100% when the end point was aseptic loosening of the metaphyseal cone (no cone was revised) and 82.4% when the end point was reoperation for any reason; reoperations were mainly due to PJIs ($n=10$). In the sleeve group, aseptic survivorship was 97.3% (1 aseptic loosening), and 75.6% when the end point was reoperation for any-reason; re-revisions were mainly due to PJIs ($n=6$). All metaphyseal cones showed radiographic evidence of osteointegration without any subsidence or loosening. One femoral sleeve presented radiographic signs of mechanical loosening. The Oxford Knee Score was similar in the two groups (38 ± 6.8 vs 35 ± 9.1 , $p>0.05$). The University of California at Los Angeles (UCLA) score had similar interquartile range of 5-6 points in both patient groups.

DISCUSSION AND CONCLUSION:

Metaphyseal cones and sleeves show very good mid-term outcomes in rTKA. Both implants demonstrated excellent aseptic survivorship and similar functional results, while PJI was the most common reason for re-revision in both implant groups of this study.