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Ischial screw fixation can prevent cup migration in 3D printed custom acetabular components for complex hip reconstruction

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Introduction: Custom acetabular components have become an established method of treating massive acetabular bone defects in hip arthroplasty. Complication rates however remain high and migration of the cup is still reported. Ischial screw fixation (IF) has been demonstrated to improve mechanical stability for non-custom, revision arthroplasty cup fixation. We hypothesize that ischial fixation through the flange of a custom acetabular component aids in anti-rotational stability and prevention of cup migration.

Methods and Results: Electronic patient records were used to identify a consecutive series of 49 custom implants in 46 patients from 2016 to 2022 in a unit specializing in complex joint reconstruction. Ischial fixation (IF) was defined as a minimum of one screw inserted into the ischium passing through a hole in a flange on the custom cup. The mean follow-up time was 30 months. IF was used in 36 cups. There was no IF in 13 cups. There was no difference between groups in age (68.9 vs 66.3, p=0.48), BMI (32.3 vs 28.2, p=0.11) or number of consecutively implanted cups (3.2 vs 3.6, p = 0.43). Aseptic loosening with massive bone loss was the primary indication for revision. There was no difference in Paprosky grade between the groups (p=0.1). 14.2% of hips underwent revision and 22.4% had at least one dislocation event. No ischial fixation was associated with a higher risk of cup migration (6/13 vs 2/36, X2=11.5, p=0.0007). Cup migration was associated with an increased risk for all-cause revision (4/8 vs 3/38, X2=9.96, p=0.0016, but not dislocation (3/8 vs 8/41, X2=1.2, p=0.26).

Conclusion: The results suggest that failure to achieve adequate ischial fixation, with screws passing through the flange of the custom component into the ischium, increases the risk of cup migration which in turn is a risk factor for revision.

Recent Publications

1. Paprosky WG, O'Rourke M, Sporer SM. The treatment of acetabular bone defects with an associated pelvic discontinuity. Clin Orthop Relat Res 2005; 441: 216–220.
2. Migaud H, Common H, Girard J, et al. Acetabular reconstruction using porous metallic material in complex revision total hip arthroplasty: A systematic review. Orthop Traumatol Surg Res 2019; 105: S53–S61.
3. Gladnick BP, Fehring KA, Odum SM, et al. Midterm Survivorship After Revision Total Hip Arthroplasty With a Custom Triflange Acetabular Component. J Arthroplasty 2018; 33: 500–504.

Biography

Richard Galloway is an orthopedic-focused core surgical trainee, currently undertaking rotations across the north London deaneries. He completed his undergraduate studies at the University of Birmingham in 2019. He has since undertaken orthopaedic rotations at the Royal London Hospital and is currently working within the Sarcoma unit at the Royal National Orthopaedic Hospital, Stanmore. His interests are trauma, joint reconstruction, research, and medical education.

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