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*“A Study of the Trabecular Bone Density Distribution in the Scapula Relevant to Reverse Shoulder Arthroplasty”*

Reverse shoulder replacement surgery is a reliable treatment option for patients with a variety of shoulder conditions. Unfortunately, scapular implant loosening is a common cause of failure and revision surgery.

The overall goal of this research is to determine the optimal implant design and placement, including screw placement, which ensures long-term fixation and survival. Current work suggests that screw placement in regions of high trabecular bone density may reduce motion in initial implant fixation, which, in turn, will improve long-term outcomes. As a first phase in this long-term project, the proposed study addresses the role of screw placement and trabecular bone density in a physical model. The study will measure implant motion under loading conditions representative of activities of daily living and compare this motion across a range of screw placements and bone densities expected in clinical practice.

The results from this study will help to inform decisions on implant positioning, screw selection and placement to help promote initial fixation. Good initial fixation is conducive to osseous integration of the implant into the scapular bone and thus promotes long-term stability. This will hopefully lead to longer implant survival and improved patient outcomes.