Title: Can mesenchymal stem cells survive under impaction allograft in revision total hip replacements?

Keywords: Stem cells, revision total hip replacements, impaction bone graft, bone cement, impaction force.

Brief Description:
Impaction of bone graft in revision total hip replacements to treat bone defect has been widely used. However, the results of new bone generation are not consistent, which affect the fixation of the revision implants and the clinical outcome of the revision total hip replacements. Previous in vivo study demonstrated that seeding the stem cells onto bone graft would enhance new bone formation. In vitro studies also showed that these stem cells could survive separately from the normal impaction forces and the heat generated from the cement polymerization. Now the question is that whether the combination of the impaction force, cement heat and toxicity from methyl methacrylate monomer will affect the viability of the stem cells.

This study will investigate the viability of the sheep stem cells using the same surgical techniques of impaction allograft in revision total hip replacements. The stem cells from sheep bone marrow will be used and seeded onto the sheep bone graft, impacted into a plastic tube (to mimic bone), leaving a central cavity for injecting bone cement. The stem cells that are not under impaction allograft will be served as control. The viability of the stem cells and their abilities of further proliferation and differentiation to other cell lineages will be studied and compared between two groups. This study will provide scientific evidence for a further clinical translational study using animal models to investigate amount of new bone formation from these stem cells under impaction allograft.

Relevant Publications:


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