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3D Printing of Knee Models to Decrease OR Time and Reduce Revisional Surgery in Total Knee Arthroplasty (TKA)

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DESIGN PROJECT Abstract

Project Title: 3D Printing of Knee Models to Decrease OR Time and Reduce Revisional Surgery in Total Knee Arthroplasty (TKA)

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Project Background: Osteophytes are a common problem, affecting 2% of the United States population. For many elderly people, these osteophytes will cause them to seek medical attention. Due to the 2-D nature of MRIs and CT scans, it can be difficult to gain a complete understanding of the complicated soft tissue structures surrounding the joint when performing a Total Knee Arthroplasty(TKA). Without proper removal of osteophytes and correct soft tissue balancing, there is an increased rate of revisional surgery. By utilizing a 3-D model preoperatively and within the OR, surgeons can visualize various aspects of the knee to determine what may be contributing to a soft tissue imbalance.

Proposed Methods: We plan to conduct a prospective cohort study at the Rothman Institute. We will use CT images to create 3-D printed models of knees complicated with osteophytes. The surgeon will have the model to reference both preoperatively and during the surgery. We will measure the effectiveness of model by collecting data on the total procedural time, the rate of revisional surgery within the next year, and through feedback from the surgeons.

Results: Although we do not currently have any results, we anticipate approval for our project shortly. We hope to have data collected within the next few months supporting our hypothesis that 3-D models will decrease both OR time and revisional surgeries.

Conclusions: While the literature shows that these 3-D models may help with OR time, we have been unable to verify this yet. Additionally, revisional surgery can happen months later, so this data may be more difficult to collect in our time frame. After the pilot study has been completed, if we have promising results we hope to expand the project to include other types of surgeries affected by soft tissue balancing.

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