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3D Printing of Bone Spurs Before Surgical Removal During Total Knee Arthroplasty

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SI/DES ABSTRACT

Project Title: 3D Printing of Bone Spurs Before Surgical Removal During Total Knee Arthroplasty

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Background: In the United States, total knee arthroplasty (TKA) is the most common performed orthopedic surgery, with over 700,000 cases per year. Overall, 21-25% underwent revision due to instability. Incorrect soft tissue balancing during the procedure can lead to improper alignment, flexion, and extension. Visualization of osteophytes in a 3D manner prior to removal is difficult and poses significant risks for improper balancing on TKA. The purpose of the study is to determine whether the utilization of 3D osteophyte models is beneficial to Orthopaedic surgeons in the course of care, specifically with regard to improving outcomes, decreasing complication rates, and decreasing OR time.

Methods: A pilot study will be performed pending the approval of the IRB and research proposal by the Rothman Institute. Deidentified 3D models for upcoming procedures will be printed utilizing patient CT scans prior to date of operation. The models will be provided to Orthopaedic Surgeons at the Rothman Institute prior to the procedure. Data from at least 10 cases will be collected post-operatively, in which operating surgeons will be interviewed assess beliefs on utility of models, OR times, and rates of revision.

Results: Direct interviews with Orthopaedic surgeons and residents of the Rothman Institute demonstrate early interest and support of the utilization of 3D models in the OR. Lack of IRB

prevents the utilization of models in the OR, but we anticipate decrease OR time and increased satisfaction by involved surgeons.

Conclusions: Initial feedback from Orthopaedic surgeons suggest a space for the utility of 3D models in the OR. A significant limitation may be accessing CT images of patients and they are often not performed prior to operations. Next steps include IRB approval and finalizing a logistical blueprint for utilization for the models in the OR, specifically whether the models will be use preoperatively or perioperatively.

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