Seminar Announcement

Friday, October 25, 2019
12:00 pm – 1:00 pm
Olin Engineering, Room 202
Marquette University

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Abstract

“Ankle Joint Complex Kinematics following Surgical Intervention in Patients with End-Stage Ankle Osteoarthritis”

Ankle osteoarthritis (OA) affects 100,000 individuals per year. Most cases of ankle OA are secondary to trauma, and thus, patients are typically younger than those with knee OA. Two surgical options are available: ankle arthrodesis (i.e. fusion of the tibia to the talus) or total ankle replacement (TAR). Arthrodesis provides pain relief, but 50% of patients are unable to return to their desired activities. Furthermore, 100% of patients suffer from painful adjacent subtalar joint OA 20 years post-op. TAR is an attractive alternative to arthrodesis, as it enables tibiotalar motion. Unfortunately, TAR survival rates are much lower than knee or hip arthroplasty; 29% of TAR implants fail within 10 years and 38% need at least one revision of the prosthetic components. With neither surgical option being an optimal solution, we aim to study post-operative ankle joint complex kinematics in these two surgical populations using a biplane fluoroscopy imaging system to investigate subtalar joint compensations and TAR implant motion. In this presentation, I will first describe the post-operative subtalar kinematics in patients following tibiotalar arthrodesis. Then I will share our lab’s newly developed approach to apply novel image tracking methods to biplane fluoroscopy images using a hybrid model of patient specific TAR bone and implant models. Finally, I will describe our preliminary kinematic results in patients following TAR, and compare the kinematics to the arthrodesis cohort and to healthy controls. Ultimately our goal is to improve the understanding of ankle joint complex motion during dynamic tasks to improve surgical outcomes and quality of life for patients with end-stage ankle OA.

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