Biomedical Engineering

Lecture Series Seminar

Meniscal Injury: Biomechanics and Treatments

Wednesday, February 18, 2009

11:30 AM, EC 2300

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Dr. Ling is a Postdoctoral Fellow at University of Florida's Department of Orthopaedics and Rehabilitation. She obtained her bachelor and PhD degrees in the Department of Mechanical Engineering at The University of Hong Kong and The Hong Kong Polytechnic University (HKPU). During her postgraduate studies, she received a Sir Edward Youde Memorial Fellowship and a Postdoctoral Fellowship from HKPU. She has authored/co-authored more than 40 papers in international journals and conference proceedings. Her research interests include biomechanics in cartilage tissue engineering, non-destructive evaluation of biomaterials, and optical coherence tomography. Meniscal tears are the most common knee injuries in the United States. Acute tears most often occur in younger patients, whereas chronic tears are part of a degenerative process in the elderly. Menisci are fibrocartilagenous structures which function as stabilizers, shock absorbers and load transmitters to protect the articular cartilage during knee joint motion. Animal and human studies have shown that removal of meniscal tissue leads to the development of degenerative joint diseases and results in disability. With the understanding of the consequences of total meniscectomy, the focus of meniscal treatment has shifted toward meniscus preservation in the past several decades. Meniscal preservation includes non-surgical treatment of small or partial thickness tears and surgical meniscal repair techniques. However, the biomechanical effects of the non-surgical treatment and different meniscal repairs on the knee are unknown. Deciding if the meniscal tears are amenable to repair is a challenge. For the irreparable tears, trimming the damaged and unstable portion of meniscal tissues is the only viable option. Our research is to seek for the optimal treatments for different types of meniscal injuries from the biomechanical point of view and to develop a new imaging technique to assist the surgeons in better decision-making for meniscal treatments. By virtue of dog models, our work focuses on studying the contact mechanics of meniscal tears and treatments of knee joints. In our study, optical coherence tomography (OCT) has been proposed for imaging torn menisci, aimed at providing a higher resolution, and a more accurate imaging technique for meniscal tear diagnosis.