BIOMECHANICS OF THE FEMOROPOPLITEAL ARTERY: THE ROLE OF ENGINEERING IN IMPROVING TREATMENT MODALITIES FOR PERIPHERAL ARTERIAL DISEASE

Featuring Dr. Alexey Kamenskiy
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September 30, 2016 | 12:00 - 1:00 pm | HPER 112

ABSTRACT

Angioplasty and stenting for atherosclerotic occlusive disease in the arteries supplying the legs (Peripheral Arterial Disease, PAD) is the most common endovascular procedure outside of the heart, but carries the highest rate of reconstruction failure. Though the underlying reasons for these poor results are not completely clear, the main arterial segment within the leg, the femoropopliteal artery, appears to be significantly different from other peripheral arteries, such as the carotid or iliac arteries, possibly because of lower blood flow, but more importantly because the Superficial Femoral Artery (SFA) and Popliteal Artery (PA) that comprise the femoropopliteal artery segment, undergo large deformations during flexion of the limb. These severe deformations are reflected clinically by the high incidence of stent fractures in the SFA and PA.

In this talk we will cover the biomechanics of the human SFA and PA by describing ways to measure limb flexion-induced arterial deformations, study the mechanical properties and structure of these arteries, and assess physiologic stresses and strains that play an important role in vascular remodeling and adaptation. We will also discuss treatment methods and the role of patient-specific computational modeling in improving device design and treatment outcomes.

ABOUT DR. KAMENSKY

Alexey Kamenskiy, Ph.D., is an assistant professor in the Department of Surgery at UNMC. He was a recipient of UNMC’s 2015 New Investigator Award, which goes to outstanding UNMC scientists who in the past two years have secured their first funding from the National Institutes of Health, the Department of Defense or other national sources. His focus is in vascular mechanobiology and the understanding of the function and pathophysiology of the arterial wall.