

Physics Student Seminar

Joshua Kingsley

(w. Brandy Black and Megan Eason)
School of Engineering / Mercer University

Wednesday 3/28/2007, 4:30pm
Willet Science Center 101

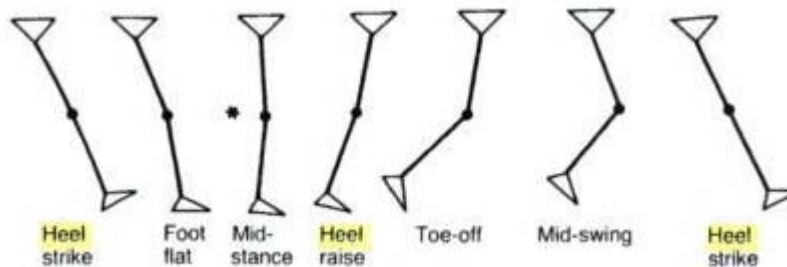
Myoelectric Motorized Dorsiflexive Prosthetic Foot

The biological motions of the ankle are controlled by the muscles located below the knee. After below the knee amputation, these muscles and their functions need to be imitated using a prosthetic device. The four main concepts that need to be replicated from a biological foot are: shock absorption, propulsion, balance, dorsiflexion and plantarflexion (Pitkin 1995). Most devices used for everyday walking, such as the College Park TruStep® Foot, do mimic dorsiflexion and plantarflexion of the ankle, but not as effectively as a biological ankle

The goal of our project is to design, build and test a fully motorized ankle that will drive the flexion of a prosthetic foot in order to create a smooth gait. The team will modify an existing prosthetic foot, College Park Industries TruStep® Foot. The foot was provided by our client, and BEK, Inc. will add components in order to improve its flexive abilities as well as the rhythmic of gait. Since shock absorption, propulsion, and balance are already compensated for in the College Park design, our main focus will be on improving the dorsiflexion and plantarflexion of the foot.



Ideally prosthetic ankle devices should mimic the motions of the anatomical foot, so walking remains as normal as possible for an amputee, but most prosthetic feet inhibit the degree of flexibility, dorsiflexion and plantarflexion, of the biological foot. The lack of flexive abilities makes the amputee expend more energy during locomotion. However, BEK, Inc. has developed a theoretical prototype that encompasses both dorsiflexion and plantarflexion of the prosthetic foot which will ultimately reduce the energy expended by the amputee during gait.



Please join us for light refreshments at 4:15pm outside WSC 109.