INTRODUCTION
The importance of a well aligned prosthesis is documented. The effects of socket alignment perturbations, specifically in the cardinal planes, have been evaluated in recent years. In 2012, Boone et al studied the patient’s ability to communicate mal-alignments to the prosthetist. Hobson et al, found that patients required only a few steps to determine if a mal-alignment was present. The ability to assess mal-alignments was found to be most sensitive in the coronal plane. This study will observe how changes to the alignment of a prosthesis effects the forces and moments at the distal end of the patient's socket, the subject's gait, and the subject's comfort in the prosthesis.

METHOD
This is a single subject study of a male unilateral transtibial amputee. He has been in his current prosthesis for greater than 3 months and has fully acclimated to the system. He is able to walk on level ground without the use of an assistive device and has been assessed as a K3 level ambulator. The subject’s componentry distal to the socket will be replaced with componentry that allows for adjustability and the addition of an iPecs unit. The patient’s test foot will match the patient’s current foot. An iPecs unit (Collage Park®) will be used to quantify the forces and moments within the prosthesis. This componentry will initially be optimally aligned by the prosthetist and recorded as base line data; all adjustments will be evaluated relative to this alignment. A prosthetic comfort survey will be administered at the beginning of the session to serve as a control for comparison with the altered alignments. The subject will walk on a treadmill at a self-selected speed for 1 minute to acclimate to the alignment prior to recording data. After the acclimation period, video recordings will begin both in the sagittal and coronal views. Video recording will be captured for at least 30 seconds; then, the subject will be asked to complete a Socket Comfort Score for that particular alignment. One alignment adjustment will be made and the process will be repeated. The table below shows the various alignment adjustments that will be used in this study.

RESULTS
A subject has been selected for the study, componentry has been purchased, and the data collection is scheduled to begin in October with the statistical analysis completed by November.

DISCUSSION
Pending Results

CONCLUSION
Pending Results

CLINICAL APPLICATIONS
The videos collected during the mal-alignment study will be used to develop a simulation program to train students on dynamic alignment. In this program a random video will be presented to the student and they will have the option of changing the angulation, translation, or length to improve the patient’s alignment. Once the student selects the adjustment, the corresponding video will be presented to the student. This interactive video library will increase the time that students have to practice dynamic alignment while reducing patient time and any resulting risk. Long term research goals will include the expansion of the video data base to include sagittal and transverse perturbations and possibly extend to transfemoral and orthotic alignment.

REFERENCES
Boone, D. JRRD 6, 843-854, 2012
Hobson, D. Bull Prosthet. Res. 10,159-163, 1972