INTRODUCTION
Kinetic, kinematic and temporal-spatial gait differences have been reported for persons with trans-tibial amputation (Aruin et al., 1997). While able-bodied gait is characterized by a high level of symmetry between the two limbs, literature suggests the opposite for individuals with amputations (Nolan et al., 2003). The reported step length and step time of individuals with trans-tibial amputations are notably longer on the affected side and shorter on the sound side, which contribute to gait asymmetry. The data recorded by Nolan et al. will be tested in the current study. Step length and step time are specific measures that previous studies have used to support a thesis. These studies have different focuses, but contain relevant data nonetheless.

The purpose of this study was to investigate possible asymmetries in the gait of individuals with trans-tibial amputations. These asymmetries can be observed through different variables. This study will focus on step time and step length ratios, which represent symmetry between the right and left sides. The aim of this study will be to replicate the findings of previous studies. Therefore, I hypothesize that data collected in this study will demonstrate shorter sound side step time and step length in persons with trans-tibial amputations.

METHODS
Subjects: 22 students in MSOP graduate program (16 male; age 24.5 ± 1.6), 2 of which having a transtibial amputation and the others able-bodied.

Apparatus: The Zeno Walkway System was used with ProtoKinetics software. Together, this system has been demonstrated to be reliable & valid.

Procedures: Participants each walked along the mat at a self-selected pace for a total of 6 passes. All data collection happened prior to the creation of this thesis.

Data Analysis: ProtoKinetics generated average step length and step time of each participant’s right and left legs. Ratios were calculated with 1.0 representing a symmetrical step length/time.

RESULTS
Able-bodied gait demonstrated a step length ratio closer to one, indicating a more symmetrical step length gait pattern. However, trans-tibial gait showed a perfectly symmetrical step time ratio. Neither difference (step time ratio or step length ratio) was statistically significant based on the p-value threshold of .05.

DISCUSSION
In this case, there was no control over the design, fit or alignment of each trans-tibial prosthesis. These were the normal prosthetic legs that the subjects were used to wearing and ambulating with on a regular basis.

CONCLUSION
The hypothesis of this study is not supported by the results. Step time and step length were symmetrical in normal gait and in trans-tibial gait. Future work should collect data from a larger sample of persons with trans-tibial amputations. The results of this study do not provide any clinical significance, but future work with a larger sample size could.

Analyzing this data retrospectively is a limitation of this study because it limits control over the independent variable. However, that lack of control mimics a realistic clinical scenario. Also uncontrolled were prosthetic components and means of suspension. The results of this study are not an accurate depiction of the general population because there are only two participants with amputations. A larger sample size is necessary to determine if there is a significant difference in gait symmetry between participants with trans-tibial amputation and able-bodied participants.

REFERENCES