Impact of Standing Desk Intervention on Sedentary Behavior of 4th Grade Students
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Abstract
The object of this study was to investigate sedentary behavior of students with standing desks vs students with traditional desks. The null hypothesis stated that no statistical difference would be found in sedentary behaviors between students with traditional desks and those with standing desks. Thirteen students were recruited for the study. Research took place at a small private elementary school in the Midwest. During the assessment, students were accelerometers for a school week at the beginning of intervention and for another school week at the end of the semester. Data was collected through ActivPAL software through the accelerometers. Analyses were completed using two-tailed independent t-tests. The accelerometer data, collected showed very few statistically significant data points. The total number of sedentary bouts per week and day, as well as the total and average sedentary breaks were the few data points that were significant.

Introduction
Past research has linked sedentary behavior with health outcomes due to the resulting lack of physical activity in sedentary individuals. The negative effects from sedentary behavior include metabolic dysfunction, which is characterized by increased plasma triglyceride levels, decreased levels of high-density lipoprotein (HDL) cholesterol and decreased insulin sensitivity. Another deleterious effect resulting from extensive sedentary behavior include decreased bone mass, hyperemia, and increased blood pressure. Coupled with sedentary behavior, adolescents increase their individual health risk of cardiovascular disease, obesity, diabetes, and more by not participating in the recommended time of moderate to vigorous physical activity (MVPA). Other studies have implemented standing desks in a study and the results showed that time spent sitting was decreased and standing time increases both inside and outside of school. Low levels of physical activity relate to greater body mass, higher proportions of overweight/obesity than those with higher levels of physical activity. Implementing standing desks affects physical activity

Methods

Setting
• Small Midwestern Private Elementary School
• Academic School Year (2019-2020)

Participants
• 13 4th Grade Students (Male=5; Female =8)

Procedures
• Gaining permission from principals, teachers, and parents
• Obtaining informed consent for participants
• Measuring baseline biometric data on participants and performing a PACER test
• Splitting the students into four groups, two groups participating with standing desks and obtaining accelerometer data at the beginning and end of each session
• Remeasuring biometric data on participants and performing a PACER test
• This procedure was repeated each quarter to obtain data on each group at each desk.
• A t-test, means and standard deviations were used to report results

Figure 1
Students participating at standing desk interventions

Discussion & Conclusions
This study provides data on sedentary behavior from accelerometers worn by the students at standing desks and traditional desks. The data from this study provided results showing that some sedentary behavior would be affected, such as total number of sedentary bouts per week and per day, as well as the total and average sedentary breaks were the few data points that were significant. This data is represented in Table 2.

References

Acknowledgements
I would like to greatly thank Dr. Starkoff and Dr. Helm for their assistance and guidance throughout the entirety of this investigation. I would also like to express my gratitude to Mrs. Currinham, Mrs. Knaz, and the school for allowing us to perform the investigation and impart on their class time. I would like to thank the 13 students who participated in the research. I would also like to thank Jennifer Ocampo from the kinesiology department for assisting in the collection of data. Lastly, I would like to thank Terance Wade from the statistics department for assisting in the data analyses.

Table 1

<table>
<thead>
<tr>
<th>Student Characteristics</th>
<th># of Students</th>
<th># of Desks</th>
<th>Mean &amp; SD</th>
<th>Mean &amp; SD</th>
<th>Mean &amp; SD</th>
<th>Mean &amp; SD</th>
<th>Mean &amp; SD</th>
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</thead>
<tbody>
<tr>
<td>Demographics</td>
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Table 1 includes student demographics including the pre- and post- height, weight and BMI of the participants. The accelerometer data collected showed very few statistically significant data points. The total number of sedentary bouts per week and day, as well as the total and average sedentary breaks were the few data points that were significant. This data is represented in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean &amp; SD</th>
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<th>Mean &amp; SD</th>
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Table 2 includes data on sedentary behavior from accelerometers worn by the students at standing desks and traditional desks. The data from this study provided results showing that some sedentary behavior would be affected, such as total number of sedentary bouts per week and per day, as well as the total and average sedentary breaks were the few data points that were significant. This data is represented in Table 2.