Poster Presentation
A Case Study: Effects of Various Backpack Strap Usage on Postural Alignment during Static and Dynamic Conditions
Alex Parker
Faculty Mentor: Tammi Bories
Exercise Science

Previously, the effect of backpack loads on posture has been studied. This study’s purpose was to analyze whether using additional backpack straps affect static and dynamic postural control. One participant, wearing tightly fitted clothing and 3 reflective markers on the acromion (shoulder), greater trochanter (hip), and lateral malleolus (ankle), stood and walked under four different conditions: no load, 30% (of body weight) load with shoulder straps only, 30% load with additional chest strap, and 30% load with additional chest and waist straps. Forward trunk inclinations, as well as temporal-spatial variables of gait, were measured. Findings suggested a more upright stance during static posture when additional straps were used. The opposite was found for the gait conditions, a greater forward trunk lean was observed when multiple straps were worn. Additionally, although gait speed was only different for the unloaded versus the loaded conditions, step cadence appeared to be inversely related to trunk inclination. A greater forward lean resulted in fewer steps per minute. Although the backpack was worn with no load and only the shoulder straps as a control condition, the participant’s postural alignment was closer to that with the loaded backpack. When loaded while wearing the additional straps, the participant’s postural alignment improved. When only using shoulder straps during gait, the body becomes more upright with the center of mass located more posteriorly. This causes shorter steps resulting in a greater cadence to maintain overall gait speed making for a less efficient gait.