Impact of Backpack Load and Unload on Dynamic Parameters of Static Posture

KALEB M. LUNA, BREANNA R. MORALES, & BRYON C. APPLEQUIST

Biomechanics Laboratory; Kinesiology; Texas A&M University Corpus Christi; Corpus Christi, TX

Category: Undergraduate

Advisor / Mentor: Bryon, Applequist (bryon.applequist@tamucc.edu)

ABSTRACT

Backpacks are versatile and suitable tools in various educational settings, from elementary to university. Carrying a backpack can alter the natural walking gait. Individuals may adopt compensatory movements, such as leaning forward or to the side, to manage the load, affecting overall gait and balance. However, there has been little investigation into the changes in posture while carrying a backpack after walking. By incorporating dynamic movements, we can better understand how backpack use influences posture in real-world scenarios. **PURPOSE**: The purpose of this study is to investigate the influence of backpack load on dynamic parameters of static posture. **METHODS**: Nineteen college aged students (n = 19, Age = 21.4 ± 1.3 years, Height = 1.7 ± .1 m , Weight = 66.7 ± 10.4 kg) walked on an instrumented treadmill for 3 - 4 minutes followed by 1 minute of quiet standing while wearing an empty backpack and while wearing a backpack containing a 25lbs load. During the quiet standing trials, center of pressure (COP) velocity in both the anteroposterior (AP) and the mediolateral (ML) directions, and COP sway area rate was computed from COP force data. Data between the loaded and unloaded conditions was compared using a dependent t-test with an alpha of 0.05. **RESULTS**: There were no significant differences between the unloaded and loaded conditions for COP AP velocity, COP ML velocity, or sway area rate (p > .05). **CONCLUSION**: Backpack load during quiet standing posture had no effect on the dynamic parameters of posture. It is possible that this method of analysis is not sensitive enough to detect the changes that load creates on the organization of posture. Future research into more sensitive methods, such as nonlinear analysis of the variability of posture should be investigated.