ABSTRACT

Mountain climbing is an extreme activity that demands significant muscular effort, particularly from the lower body muscles, to maintain stability and balance. During a climb, individuals typically carry essential supplies and equipment to the summit using a carrier or hiking backpack. Improper load packaging and distribution within the carrier can increase the risk of excessive muscle fatigue and potential injury. Although previous studies have investigated the effects of load carriage during climbing, further exploration into the specific impact of load packaging methods and trail slope variations on bodily responses remains limited. This study aims to evaluate the influence of load packaging methods and trail types on muscle fatigue, with a focus on the lateral hamstrings (HA) muscles, which play a key role in maintaining body stability during climbing.

Surface electromyography (sEMG) was used as a biomechanical indicator, while blood lactate levels served as a supporting physiological indicator for assessing muscle fatigue.

The findings revealed a tendency for load distribution and trail slope to influence muscle fatigue. ANOVA tests on Spectral Entropy (SEN) variable of sEMG related to load placement yielded p-value of 0,0670 , indicating a difference in muscle response, although not statistically significant. Meanwhile, ANOVA tests on blood lactate levels across varying trail slopes produced a p-value of 0.0503, approaching the threshold for statistical significance. Although the results did not reach statistical significance for either variable, these findings suggest a potential relationship between load packaging methods and trail conditions with muscle fatigue independently, highlighting the need for further research using broader and more in-depth approaches.

***Keywords**: mountain climbing, load distribution, carrier packaging, lateral hamstrings, sEMG, blood lactate, muscle fatigue, trail slope.*