

**Proof of Concept: Analyzing the Structure and Durability of an Autonomy-Supportive Skiing Aid**

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This study sought to assess the strength and durability of a novel designed Autonomy Supportive Skiing Aid (ASSA). This innovation was created to address the challenge of maneuverability in a common children’s ski learning aid, the Edgie Wedgie (EW). The innovation was designed using computer aided design (CAD) and was additively manufactured. Prior to testing, benchmarks were established to ensure the ASSA meets the standards of strength and resilience established by the EW. Tensile and cyclic fatigue testing were conducted to evaluate the product’s response to varying amounts of load applied. Both tensile and fatigue testing were conducted over a range of temperatures, simulating authentic winter conditions. Several trials were conducted for each product, at each temperature. The change in length of the product before and after testing was analyzed to determine the product’s degradation after exposure to varying loads. Statistical analysis using a 2 sample T test determined the difference in degradation between the ASSA and EW across the multiple tests to be insignificant. This indicates comparable trends in performance and degradation between the products compared. The novel ASSA device was shown to be non-inferior to the EW benchmark, allowing for progression to future second phase studies involving human participants. This future study will evaluate the effect of this novel device on its users’ perceived autonomy and enjoyment while learning to ski. If proven effective, this novel innovation would help reduce the barrier to sport participation among children.

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