

Modified Reactive Strength Index in DIII Acrobatics and Tumbling Athletes: A Retrospective Pilot Study

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ABSTRACT

Acrobatics and tumbling is a physically demanding sport that combines skills used in cheerleading and gymnastics during individual and group acrobatic lifts, tosses, and tumbling passes. These athletes experience excessive loading of the lower extremities during training and competition. Due to the explosive demands of the sport, injuries are common. Modified reactive strength index (mRSI) is the ability to change from an eccentric muscle action to a concentric muscle action and has been used as a field-based method to assess recovery and exercise readiness using the countermovement jump (CMJ). **PURPOSE:** The purpose of this study is to investigate changes in mRSI throughout a competitive season in Division III acrobatics and tumbling athletes which could guide practitioners in the use of force plate and CMJ assessments. **METHODS:** Thirty-three female acrobatics and tumbling athletes volunteered for this study and performed jump testing 3 days per week during their competition season. Data was filtered to include only subjects ($n = 16$; 19.6 ± 1.1 yrs, 160.5 ± 6.6 cm; 62.5 ± 18 kg) that had consistent compliance during the six-week period that was analyzed. Participants performed three CMJs using Hawk Dynamics force plates and software using standardized CMJ procedures with each CMJ separated by a ten-second rest. mRSI (calculated by dividing jump height by ground contact time) and percent change in mRSI were calculated for each respective time point. mRSI and percent change mRSI were analyzed in SPSS using a one-way ANOVA ($p < 0.05$). **RESULTS:** There were no significant differences in mRSI ($p = 0.657$) or percent change mRSI ($p = 0.437$) throughout all time points. Observed percent changes in mRSI from baseline were -2.88%, -8.25%, -4.75%, -0.45%, and -0.33%. **CONCLUSION:** These findings indicate that mRSI as a measure of exercise readiness was not statistically changed over time in DIII women's tumbling and acrobatic athletes. This data can be used by practitioners to better understand the impact of the current practice and training schedule for these athletes. Future work should focus on better consistency in data collection methodology for more extensive timepoint assessment.