The Influence of Proximal versus Distal Strength on Balance Control in Athletes versus Non-Athletes

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Minor correlations between measurements for lower-extremity muscle strength and balance in individuals, regardless of the age, have been revealed. Similarly, maximal strength and balance have been individually investigated between an athletic population and a non-athletic population. However, comparisons between lower extremity strength (specifically ankle strength and hip strength) and balance between an athletic versus a non-athletic population have not been established. **PURPOSE:** The purpose of this pilot study was to find correlations in hip strength and balance versus ankle strength and balance in an athletic (NCAA athletes) and non-athletic population. **METHODS:** Twelve NCAA Division-1 athletes (age: 20.42 ± 1.51 years, height: 179.27 ± 11.2 cm, mass: 79.07 ± 14.89 kg, gender: 6M, 6F) and twelve healthy college students (age: 22.58 ± 2.47 years, height: 171.65 ± 8.00 cm, mass: 72.72 ± 14.21 kg, gender: 6M, 6F) participated. Following informed consent, balance on the dominant leg was measured using a BOSU ball in timed trials with eyes open and eyes closed. Using a Biodex System 4 Isokinetic Dynamometer, the isokinetic muscular strength and directional torque of eight muscle groups in the sagittal and frontal planes were measured. Lastly, multivariate regression models were performed ($\alpha=0.05$). Eyes open and eyes closed analyses were performed separately. **RESULTS:** Athletes had a higher ability to balance (athletes: 61.61 ± 42.67s vs non-athletes: 26.48 ± 27.19s)($p=0.030$) in the eyes open trial and presented a correlation for ankle dorsiflexion ($R=0.674$)($p=0.008$) when regressed with eyes open and ankle eversion ($R=0.833$)($p=0.002$) with eyes closed. Meanwhile, non-athletes demonstrated a correlation for hip extension when regressed with eyes closed ($R=0.705$)($p=0.005$). **CONCLUSIONS:** This study revealed a stronger correlation for ankle strength and balance in an athletic population while a stronger correlation between hip strength and balance was observed for a non-athletic population. Hence coaches, clinicians, or physical therapists can use these findings to tailor exercise protocols specific to individual cases and potentially increase balance to prevent injuries and falls.