

Repeatability of Upper Extremity Sway Measures in Weight-Bearing

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Background: Analysis of upper extremity weight bearing ability is important for athletes as some function largely in a closed chain capacity (e.g., wrestling, football, gymnastics), but also, all require closed chain upper extremity function during strength and conditioning. Additionally, in a rehabilitation setting, closed chain upper extremity functional testing is often used as a return to play criterion. Lower extremity sway measures (biomechanical and clinical) have been published widely and have established reliability and validity; however, the reliability of upper extremity sway biomechanical measures have not been investigated to date. **Methods:** All data was collected using a force plate system with commercially available software (SpartaTrac). 490 healthy Division I athletes were tested for both their dominant and non-dominant upper extremity at one of 2 testing sessions. Subjects were instructed to stay as still as possible while maintaining a full plank position with one upper extremity on the force plate and the contralateral upper extremity behind their back. Two, 20 second trials were performed for each extremity. **Results:** Intraclass correlation coefficients (ICC (2,1)) and their 95% confident intervals were calculated using SPSS statistical package version 25 (SPSS Inc, Chicago, IL) based on a mean-rating ($k = 2$), absolute-agreement, 1-way mixed-effects model, for all force plate variables for 980 limbs. No difference was seen between left and right extremities for any measure ($P < 0.05$). ICC's ranged from 0.61-0.90 for all variables, indicating moderate to excellent reliability for all variables.

Variable	ICC (2,1)
Sway_Vel	0.700
Sway_VelAP	0.710
Sway_VelML	0.876
VAP1	0.874
VAP2	0.731
VML2	0.609
FreML1	0.897
FreML2	0.875

Conclusion: Upper extremity sway biomechanical variables using a force plate system have adequate reliability. These results are important prior to validation and clinical utilization of these measures.