



Mid Atlantic Regional Chapter of the American College of Sports Medicine

45th Annual Scientific Meeting, November 4th- 5th, 2022
Conference Proceedings

International Journal of Exercise Science, Issue 9, Volume 11



The Reliability and Validity of an Accelerometer to Measure the Pop-Up Phase of Surfing

Richard J. Boergers¹, Jerry-Thomas Monaco^{1,2}, Thomas Cappaert², Michael Miller^{2,3}.

¹Seton Hall University, Nutley, NJ, ²Rocky Mountain University, Provo, UT, ³Western Michigan University, Kalamazoo, MI.

Surfing athletes require upper-body strength to change from a prone paddling position to a standing position in one explosive movement often referred to as the pop-up. Therefore, high levels of upper-body force production and tactical skill within a short time constraint is critical for this motion to be successful. Force plates are considered the gold standard for measuring kinetic forces in relation to time, but they are also very expensive and not portable. Similarly, accelerometers measure the acceleration forces acting on an object and can monitor the object's movement in relation to time, but they are portable. **PURPOSE:** The purpose of this study is to assess the inter-trial reliability and criterion validity of using an accelerometer to measure time (s) during the pop-up phase of surfing. **METHODS:** We recruited 12 self-identified healthy and active adults (male=5; female=12) (age: 26.0±8.2 yrs; height: 172.25±13.93 cm; mass: 67.7±13.57 kg). Each subject was instructed by the primary investigator (PI) on how to perform the pop-up maneuver (the subjects performed 3 practice trials) on a flat surface over a yoga mat. The PI attached an accelerometer at the tibial tuberosity on the lead leg and asked to perform 5 trials of the pop-up over the force plate. A 15 second rest period was given after each trial. An accelerometer sensor (2.7 x 3.7 cm) was used to collect time data (s) on the subject performing the pop-up maneuver. The data from the wireless accelerometer sensor and force plates were synced by way of motion capture software. Interclass Correlation (ICC) was used to evaluate inter-trial reliability for the pop up. Pearson correlation coefficient (Pearson's *r*) was used to evaluate the relationship of time of the pop up for the accelerometer and force plate.

RESULTS: There was good agreement (ICC=.889, p=.001) of pop-up times for all trials. There was very strong correlation ($r=.810$, p=.001) between the accelerometer (.63±.11 s) and force plate (.73±.13 s) pop up times. **CONCLUSION:** These findings suggest that an accelerometer is a reliable and valid measurement tool to assess time to pop-up for surfers.