

## **Are there Balance Differences between Aquatic and Land Athletes?**

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### **ABSTRACT**

Proficiency in static and dynamic balance tests is an indicator of both athletic proficiency as well as an indicator of movement deficiencies. Those movement deficiencies could be due to a neurological issue related to mild traumatic brain injury (i.e. concussion). Previous studies have studied single leg static balance using the BESS (Balance error scoring system) which is also used by the NCAA to pre-test for concussions (Riemann, 2012). Aquatic athletes could be at a predisposed disadvantage in NCAA concussion testing because there is a possibility of having differences in balance ability (as compared to land athletes) that may be mistaken as concussion-like symptoms. Examining the difference between aquatic and land athletes' balance could help us find a better alternative for concussion testing aquatic athletes. **PURPOSE:** This study aimed to determine if land and aquatic athletes have different levels of inherent balance. We hypothesized that aquatic athletes would have worse balance compared to land athletes. **METHODS:** Thirty healthy NCAA DIII athletes (15 aquatic and 15 land athletes) volunteered in accordance with the California Lutheran University IRB. Subjects performed the BESS test while barefoot. Independent t-tests compared BESS scores for the land and aquatic athlete groups (jamovi v2.2.5). Paired samples t-test determined differences between surfaces (flat vs. foam) across the entire group. Significance for all tests was set at  $\alpha = 0.05$ . **RESULTS:** There was no difference between total BESS scores for aquatic ( $17.13 \pm 5.35$ ) versus land athletes ( $14.86 \pm 4.55$ ,  $t(28)=1.25$ ,  $p=.221$ ). We found there was a difference in total BESS score between flat ( $4.3 \pm 2.83$ ) vs. foam ( $11.7 \pm 3.42$ ,  $t(28) = 10.76$ ,  $p < .001$ ). There was no difference between total flat BESS score for aquatic versus land athletes ( $t(28)=.996$ ,  $p=.342$ ), or total foam BESS score for aquatic versus land athletes ( $t(28)=1.01$ ,  $p=.318$ ). **CONCLUSIONS:** The results of this study showed the BESS test is more difficult on a foam surface compared to a solid surface. The comparison of the BESS scores for land versus aquatic athletes could show differences with a larger subject pool as we saw aquatic athletes generally had higher overall BESS score. We plan to further study the BESS test with a larger sample population of athletes in a wider variety of sports.