RELIABILITY OF AN INTRA-ORAL MOUTHPIECE ACCELEROMETER WHEN MEASURING HEAD ACCELERATION DURING SOCCER HEADING

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**Context:** Head acceleration during impact is an important measure because it is directly related to brain injury. Measuring head acceleration (g) in non-helmeted athletes has been difficult because of accelerometer fixation and placement. **Objective:** To determine if an accelerometer attached to a custom fitted mouthpiece provides a reliable measurement of head acceleration during soccer heading. **Design:** Repeated measure design. **Setting:** University research laboratory. **Participants:** Forty-four college-aged soccer players (29 females age =19.48 ± 1.80 yrs, ht = 164.34 ± 9.12 cm, mass = 63.38 ± 7.13 kg, head/neck mass = 5.08 ± 0.08; 15 males age = 20.26 ± 2.91 yrs, ht = 174.91 ± 6.66 cm, mass = 74.28 ± 9.40 kg, head/neck mass = 6.14 ± 0.78) participated in this study. **Measurements:** Peak g's were measured for each subject in the X, Y, and Z axis and resultant acceleration was calculated upon each impact. Intra-class correlation coefficients (ICC, 2,1) compared the relationship between the mouthpiece acceleration measures during each testing trial. **Intervention:** Soccer players were instrumented with a triaxial accelerometer attached to a custom fitted mouthpiece. Using a JUGS machine standard soccer balls were projected at the participants traveling at 9.83 m/s (22 mph) and covering a distance of 11 m (35 ft). Four soccer headers were performed by each participant and peak g's were measured upon each impact. **Results:** Observed ICCs for intra-session reliability ranged from .75 to .97 for all measures. **Conclusion:** A triaxial accelerometer attached to a custom fitted mouthpiece is a reliable instrument to measure head acceleration during soccer heading. **Key Words:** Impact acceleration, helmet, head injury, measurement techniques