Impaired Center of Pressure Displacement following Concussion

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The clinical concussion assessment battery is up to 96% sensitive in acutely identifying concussions. However, there is a marked decrease in the sensitivity of the battery in identifying concussion recovery, particularly postural control. Gait termination (GT) is an effective tool in identifying altered forces and impaired movement strategy following concussion. **PURPOSE:** To evaluate the effect of sport-related concussion on center of pressure (CoP) displacements during planned GT. **METHODS:** Nineteen NCAA Division 1 student-athletes (age: 19.0 ± 0.8 years, height: 177.0 ± 10.1 cm, weight: 83.3 ± 20.0 kg) with diagnosed concussions completed two standard gait and five planned GT trials during pre-season baseline (Pre) testing and on Day 1 (Post) post-concussion. Mediolateral (ML) and anteroposterior (AP) CoP displacements were calculated during the three phases of GT (S1, S2, S3) (see Figure). The Pre and Post CoP displacements were compared using a paired sample t-test. **RESULTS:** There were significant differences in the S1ML displacement (Pre: 17.96 ± 6.12 cm, Post: 13.20 ± 6.65 cm, p= 0.012) and the S2AP displacement (Pre: 9.47 ± 5.61 cm, Post: 18.57 ± 16.70 cm, p= 0.032). There were no differences during the S3 phase. **CONCLUSION:** Following concussion, the CoP displacement decreased during S1 and increased during S2. This alteration in GT performance is indicative of impaired postural control and similar to the performance seen in individuals with other neurological disorders. These results provide supporting evidence that GT is an appropriate dynamic task for identifying impairments in postural control following concussion.

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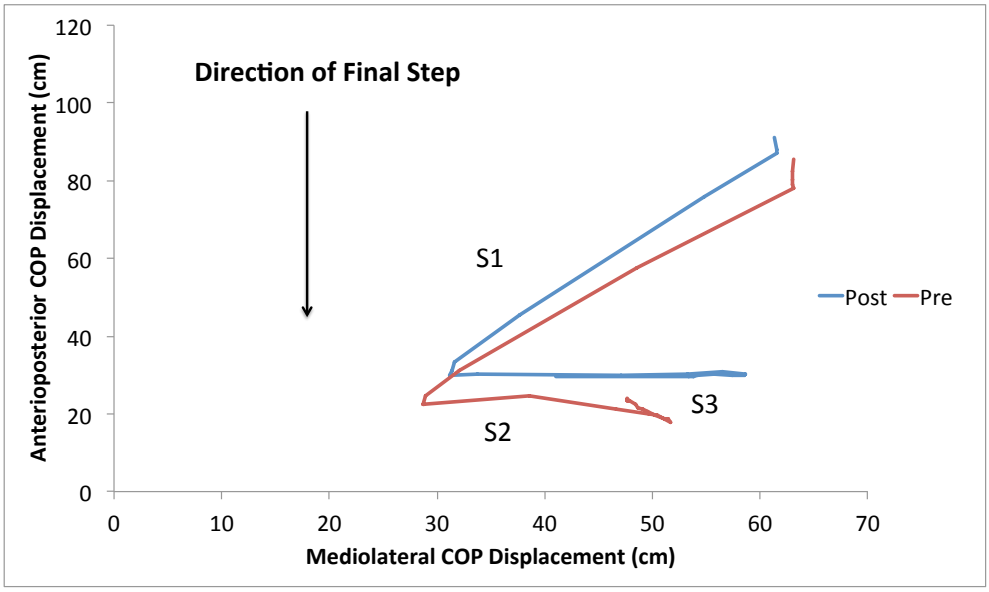

Figure. Exemplar CoP Displacements