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The Effects of Vision Impairment on Balance in Athletes and Non-Athletes

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PURPOSE: To compare athletes' and non-athletes' balance when visual impairments (VI) were induced with alcohol impairment simulation goggles. **METHODS:** Twenty subjects (10 males, 10 females, half athletes and half non-athletes; age: 21.55 ± 1.05 yrs; mass: 78.64 ± 21.14 kg, height: 172.40 ± 1.19 cm) performed three balance tests in a randomized order under various VI conditions. A nine-step tandem walk and modified Y-Balance test were completed under the following conditions with: (1) no VI (CON), (2) 0.07-0.10 blood alcohol content (BAC) goggles (GOG A), and (3) 0.17-0.20 BAC goggles (GOG B). Postural sway (PS) was also assessed, using a force plate, with two different stances for 15 s under a blindfolded (BLD) condition as well as the other conditions. Data were analyzed using group by condition repeated measures ANOVAs. **RESULTS:** There were no significant differences found between athletes and non-athletes on the balance measures. However, differences were noted among the conditions ($p < .05$). For the tandem walk, there was a significant decrease while wearing the goggles as compared to the CON condition (CON 19.83 ± 0.49 points vs. GOG A 15.10 ± 1.89 points and GOG B 15.50 ± 2.19 points). Also, a significant decrease in the relative distance covered was found during the Y-balance (expressed as a percentage of leg length) on the right leg from CON ($98.56 \pm 8.91\%$) to GOG A ($94.21 \pm 9.86\%$). However, there were no differences found for the left leg or between CON and GOG B for the right leg. There was a significant increase in anterior-posterior PS from CON (0.013 ± 0.010 cm) to BLD (0.440 ± 1.243 cm) when standing on both feet. Further, there were significant increases in PS while standing on the non-dominant limb for both anterior-posterior (CON: 0.106 ± 0.114 cm, GOG A: 0.020 ± 0.016 cm, GOG B: 0.389 ± 1.625 cm, BLD: 0.435 ± 1.389 cm) and medial-lateral (CON: 0.114 ± 0.488 cm, GOG A: 0.019 ± 0.066 cm, GOG B: 0.124 ± 0.515 cm, BLD: 0.410 ± 1.081 cm) directions. **CONCLUSION:** While there were no differences found between the groups, changes were noted among the conditions when vision was impaired. These results suggested both dynamic and static balance were negatively impacted. More specifically, subjects made more errors during the tandem walk, did not reach as far while standing on the right leg, and swayed more while wearing vision impairment goggles.