The purpose of this study was to characterize postural sway using center of pressure (COP) measures in these five stance conditions: quiet standing, tandem Romberg with dominant leg in front, tandem Romberg with non-dominant leg in front, stance with focus on an autostereogram, and stance after the feet are immersed in an ice bath. Characterizing postural sway in different stances and tasks is an important part of the field of research investigating balance under various perturbations and patient populations with balance impairments. Attention demands on postural sway have also been investigated typically with tasks involving minimal movement. To this researcher’s knowledge no study has been done using a completely visual attention task such as focusing on an autostereogram (colloquially, a MagicEye).

Four subjects (3 female, 1 male) were asked to:
• stand on a force platform for 1 minute.
• stand in a tandem Romberg stance (heel-to-toe) with each foot in front for 1 minute.
• place their feet in an ice bath for 5 minutes and then step onto a force platform and stand for 1 minute.
• perform a visual attention task on a force platform for 1 minute.

A number of small retro-reflective motion-capture markers were taped to the skin of the subjects’ feet. Motion capture cameras and force-plates were used to record data. If the subject lost balance and needed to move their feet before the 1 minute was up, they were asked to try again a maximum of one more time. For each subject, a control condition (quiet standing) was analyzed. Motion changes of the COP, anteroposterior and mediolateral root-mean-squared (RMS), was analyzed.

There was a significant amount of change in mediolateral postural sway for tandem Romberg stance. In the autostereogram and the iced feet conditions, there was little change in postural sway compared to quiet standing, however, there was an increase in variability between subjects. The limitations of the current study were the limited number of subjects, the project development time, and the fact that testing was done on separate forceplates making gross COP measures difficult to obtain. Future works in this area would probably include gross COP measures, more challenging stance conditions such as eyes closed or unilateral stance, and a longer duration of foot immersion in the ice bath.

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REFERENCES