Effect Of Prophylactic Ankle Bracing On Postural Control And EMG Of Lower Extremity And Trunk Muscles

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The purpose of this study was to examine the effect of ankle bracing on postural control while analyzing electromyography (EMG) of the lower extremity and trunk muscles. A one-group pretest-posttest design was used in this study. A 2X6 (brace condition by muscle) ANOVA was performed with the alpha level set at $p<.05$. The independent variables were braced condition and muscles. The dependent variables were center of pressure (COP) length, range, and velocity in the medial-lateral and anterior-posterior directions; EMG amplitude and duration for the anterior tibialis (AT), medial gastrocnemius (MG), rectus femoris (RF), biceps femoris (BF), rectus abdominis (RA), and paraspinals (PS) muscles. The average of three trials was used for each condition (braced and unbraced). Twenty-eight healthy subjects volunteered to participate in this study (13 men and 15 women, age = 21.33 ± 2.32 yr, ht = 171.79 ± 9.30 cm, wt = 77.34 ± 18.77 kg). The Don-Joy Rocket Soc (DonJoy Orthopedics, Vista, CA) was the PAB chosen for use in this study. EMG data were collected using the Myopac System (Run Technologies, Laguna Hills, CA). The NeuroCom Smart Balance Master (Clackamas, OR) was used to collect force data. Subjects performed three, 20-second trials (eyes closed) for the braced and unbraced conditions. All EMG data were stored and analyzed using Datapac 2000. There were no significant differences in muscle amplitude or duration between the braced and unbraced conditions. There was a significant main effect for amplitude and duration between individual muscles under each condition. The results revealed that the AT and MG were active the majority of the time (99.04% and 86.23%, respectively). The RF was found to be active 76.96% of the time while the BF was only on 54.14%. The muscles of the trunk were active the least, with PS 19.40% and AB only 6.21%. Postural control results revealed no significant difference between the braced and unbraced conditions. There was a significant main effect for sway velocity, sway length, and sway range under each plane of motion. For all postural variables measured, significantly greater sway values were found in the medial-lateral versus the anterior-posterior direction regardless of braced condition. Within the limitations of this study, it can be concluded that an ankle brace does not affect postural control or change lower extremity and trunk muscle amplitude or duration.