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Electromyography and Y-Balance Test for Assessment of Neuromuscular Control of Lower Extremities in Collegiate Athletes

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Ankle sprains are commonly reported musculoskeletal injuries with approximately 23,000 per day in the United States. Non- custom foot orthotics (NCFO) may have the potential to increase neuromuscular efficiency in the lower extremities of collegiate athletes and therefore reduce the risk of injury. **PURPOSE:** To establish a baseline for neuromuscular and postural control in collegiate football players prior to the regular use of foot orthotics. **METHODS:** A sample (n=21) of NCAA football athletes completed the Y-Balance Test (YBT) while Electromyographic (EMG) activity of the tibialis anterior, peroneus longus and the medial and lateral gastrocnemius muscles was recorded. A composite score for each participant for the YBT was calculated from the reach distance in three separate directions. EMG was used to determine the average amount of force production from each of the four tested muscles during each trial of the YBT. This muscle activity was compared to each participant's Maximum Voluntary Contraction (MVC) and reported as %MVC. The %MVC and the YBT composite score provide a profile of neuromuscular control of the major synergists and stabilizers of the foot and ankle. **RESULTS:** A mean score of 92.5 for the YBT was seen in the athletes. YBT mean scores for offensive players were 96, defensive players 88.7 and stationary positions 93.8. %MVC analysis for six of the twenty-one players, included three players in a normal range and three players in an at risk range. Players in the at-risk group had a %MVC ranging from 26%-52% with a mean of 35.1%. The normal group %MVC ranged from 22%-24% with a mean of 23.3%. **CONCLUSION:** The defensive players' mean composite score (88.7) fell below the at risk cutoff point (89.6) for college football players. A higher range of %MVC was associated with an elevated level of muscle activity in the at risk group.

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