INTRODUCTION

Close to 800,000 people in the USA experience a cerebrovascular accident (CVA) every year (Roger 2012). Abnormal gait patterns secondary to CVA may result in increased fall risk. Research demonstrates Ankle Foot Orthoses (AFO) increase walking speed and functional balance, which may be a key factor for mobility and independence (Malas 2010). Current research has focused on changing the alignment of the AFO/Footwear Combination (AFO-FC), or tuning, to normalize lower extremity segment kinematics (Owen 2010). However, the link between tuning and balance in individuals with CVA has not been studied. The purpose of this study was to determine the effects of tuning an AFO on functional balance of individuals who have suffered hemiparesis secondary to CVA.

METHOD

Study Design: Repeated measures design approved by the Northwestern University IRB. Subjects 6 months post CVA affected unilaterally, and have worn an orthosis for at least 6 months were recruited. Sample subject size is 5.

Protocol: Three visits required: 1. Initial evaluation to determine AFO design, 2. Initial tuning of AFO-FC, and 3. One month follow up with AFO-FC.

Outcome Measure: Comparisons of individuals post CVA with original AFO and the AFO-FC after 1 month were completed using gait and balance measures with a 2D video vector lab, the Activities Balance Confidence scale (ABC), the Berg Balance Scale (BBS), three scales from Modified Emory Functional Analysis Profile (MEFAP) scale including timed up and go (TUG), obstacle course, and stair climbing, all defining functional balance.

Data Analysis: Descriptive statistics comparing functional balance were performed due to limited subject size. A Multivariate Analysis of Variance (MANOVA) will be used once data analysis is completed.

RESULTS

Preliminary results show thigh-shank kinematics in Table 1. Outcome measure data is shown in Table 2. The mean values of the collected data along with the minimal detectable changes (MDC) found in the literature are shown at the end of Table 2.

DISCUSSION AND CONCLUSION

At the completion of the study, the majority of individuals were satisfied that knee hyperextension decreased but desired changes for increased comfort. When comparing the mean functional balance data to MDC, the ABC change was the only score greater than the MDC demonstrating a notable decrease in self-reported confidence with the AFO-FC versus their original AFO. The other scores showed a small difference translating to an unremarkable difference in functional balance. Limitations included no physical therapy, limited adjustment time, and no control over wearing time. Purely kinematic improvements may translate directly to perceived functional balance but may not affect actual functional balance.

CLINICAL APPLICATIONS

Tuning may help maintain joint integrity and prevent further joint degradation by improving the kinematics without sacrificing balance.

REFERENCES

Owens E. POI 2010;34;254.