The effects of two different AFOs on the gait of acute hemiplegic subjects: Preliminary results.

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INTRODUCTION

An AFO is commonly prescribed during the early rehabilitation period to assist the restoration of walking in individuals who have suffered a cerebral vascular accident (CVA). While several authors have demonstrated the effectiveness of AFOs in improving the gait of individuals with chronic hemiplegia secondary to CVA[1], few studies have examined the impact of an AFO during the acute phase. In addition, Rao et al. report an improvement in the gait of acute CVA patients[2], while Tyson and Rogerson found no improvement[3]. Additionally, authors frequently ignore the clinical importance of providing CVA patients with an AFO that is customized for that patients functional needs, instead opting to test all subjects with the exact same design of AFO regardless of the clinical appropriateness of the design for each individual subject.[3]

Custom fit carbon-fiber AFOs (Cf-AFO) have been available from several manufacturer's for several years. Yet, no studies could be identified that compare these devices to a custom fabricated polymer AFO (P-AFO), the current standard of practice.

The purpose of this study is to compare the effects of a Cf-AFO to a P-AFO on the gait of acute hemiplegic subjects. Subject perception of the relative merits of the two devices is also assessed.

METHOD

Twenty-one subjects with acute hemiplegic CVA were recruited with IRB approval during their stay at Marianjoy Rehabilitation Hospital. (M:10, F:11; Age:58.3±12 years; time since CVA: 21±7 days) Subjects were fit with a P-AFO (Flexible:4, Semi-Rigid:11, Rigid:6) and a Cf-AFO in random order. In the absence of any data comparing the several available Cf-AFOs, the Ossur Dynamic was selected for use in this study. Gait parameters were collected using a GAITRite portable electronic walkway under the no-AFO, P-AFO, and Cf-AFO conditions. Subjects also completed an L-Test in each condition, and provided responses to a survey about their perceptions of each device. Subjects were allowed to use an appropriate assistive device, and to rest as needed. A 1-way repeated measures ANOVA was used to asses statistical significance for gait data.

RESULTS

Subjects walked significantly faster and with a higher cadence and longer stride length when using the P-AFO as compared to No AFO.(Table 1) While velocity, cadence, and stride length were all improved with the CF-AFO, there was no statistical difference between the Cf-AFO condition and either the No-AFO or P-AFO conditions. Subjects completed the L-Test significantly faster with the P-AFO, than either the No-AFO or Cf-AFO conditions. Fourteen of 21 subjects stated a preference for the P-AFO while 5 preferred the Cf-AFO. Two subjects reported a preference to use no AFO.

	NO AFO	P-AFO	CF-AFO
Velocity (cm/s)	30 ± 12	39 ± 16*	35 ± 14
Cadence (Step/min)	55 ± 15	62 ± 16*	60 ± 14
Stride length (cm)	65 ± 14	74 ± 17*	70 ± 17
L-Test (sec)	85±32	75 ±30*♦	84±37

Table 1. Mean and standard deviation Velocity, Cadence, Stride length and L-test score for each test conditions: * significantly greater than No-AFO at $p<0.05$; ♦ significantly greater than Cf-AFO at $p<0.05$

DISCUSSION

This study is possibly the first to directly compare a Cf-AFO to a P-AFO. It is also one of the few to assess the impact of an AFO on acute hemiplegic subjects. Acute Hemiplegic CVA subjects clearly benefit from the use of an AFO. While subjects walked faster with the P-AFO than the Cf-AFO, the difference in walking speed may not be clinically meaningful. Subject perception of the devices indicates that variables such as balance, and sense of safety are also very important acute CVA patients prescribed an AFO.

CONCLUSION

Acute hemiplegic CVA subjects receive immediate and meaningful benefit from a custom fabricated AFO.

REFERENCES

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Study funding: OPERF SGA-1-2010

American Academy of Orthotists & Prosthetists
38th Academy Annual Meeting and Scientific Symposium
March 21-24, 2012