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COMPARING THE EFFECT OF LEAF SPRING AND SWEDISH AFO IN PATIENT WITH DROP FOOT DEFORMITY (PERONEAL NERVE INJURY)

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Abstract

Background: Injection-molded polypropylene splint in Swedish AFO provides static dorsiflexion assistance and lateral stability for the entire foot-ankle area. It prevents foot drop while walking. **Purpose:** Comparing the effect of leaf spring and Swedish AFO in patient with drop foot deformity (Peroneal nerve injury). **Objectives:** To determine better controlling of planter flexion during Initial contact and Mid Swing of the Gait. **Methodology:** Four (4) participants with Drop Foot (Peroneal nerve injury) were selected through simple random sampling and they were allowed to walk at their self-selected speed with Swedish AFO and with PLS AFO in order to compare their controlling of Planter Flexion at Initial Contact and at Mid Swing under experimental design. The study is conducted at Pakistan Institute of Prosthetic and Orthotic Sciences Peshawar. Paired sample "t" test is used to compare the result. **Results:** By observing both the AFO's i.e. Swedish AFO and Posterior Leaf Spring AFO at Initial Contact Phase of the Gait the deviation's results for Swedish AFO's are 3.82, 4.40, 11.22 and 9.18 degrees and deviations results for Posterior Leaf Spring AFO's are 2.32, 3.34, 8.71 and 8.53 degrees. Statistical results implied that the impact of Leaf Spring AFO is bigger than Leaf spring AFO. **Conclusion:** Posterior leaf Spring AFO is more effective design for Persons with Drop foot (Peroneal nerve injury) as compare to Swedish AFO.

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Introduction

Foot drop is a deceptively simple name for a potentially complex problem. It can be defined as a significant weakness of ankle and toe dorsiflexion. Leaf spring AFO splint is made from polypropylene which make it very lightweight. It provides a dorsiflexion assist to prevent foot drop while walking. Variable thickness of the AFO provides strength, more thickness on the vertical aspect for rigidity, while less thick on the footplate for easy trimming.

Injection-molded polypropylene splint in Swedish AFO provides static dorsiflexion assistance and lateral stability for the entire foot-ankle area. Injection molding allows for thicker polypropylene on the vertical aspect for rigidity and a thinner footplate. This feature may affect patients walking pattern.

Methods

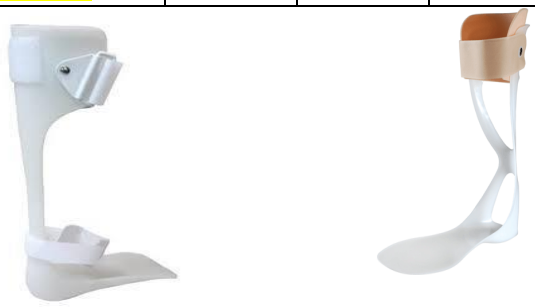
Four (4) participants with Drop Foot (Peronial nerve injury) were selected through simple random sampling and they were allowed to walk at their self-selected speed with Swedish AFO and with PLS AFO in order to compare their controlling of Planter Flexion at Initial Contact and at Mid Swing under experimental design. The study is conducted at Pakistan Institute of Prosthetic and Orthotic Sciences Peshawar. Paired sample t-test is used to compare the results.

Results

Total Appliance made (PLS AFO's) and their Response Rate: Total number of 6 Posterior Leaf Spring AFO's were made for drop foot patients in which 4 (67%) patients take part in Data collection and data Analysis, While the remaining 2 (23%) can't come because of some personal issues at their homes.

Table 1. Comparison of Gait Phases (Initial and Mid Swing) in Swedish AFO and PLS AFO

Phase of gait			
Initial Contact			
Patient Name	Ankle joint (degree)	Targeted (degree)	Deviations (degree)
Patient-1	3.82	0	3.82
Patient-2	4.40	0	4.40
Patient-3	11.22	0	11.22
Patient-4	9.18	0	9.18



Leaf Spring and Swedish AFO

***Figure 1**. Differences between PLS and Swedish AFO*

As per standard at initial contact our mean of null hypothesis is less than alternate hypothesis Alternate Hypothesis=7.1550 null Hypothesis = 5.7850 and standard deviation is greater than alternate hypothesis 3.62110, 3.82985. As per result my null hypothesis has been accepted because leaf spring AFO mean is 5.785 and standard deviation is 3.82958 and alternate hypothesis is rejected because Swedish AFO mean is 7.1550 and standard deviation is 3.62110.

As per standard at Mid swing phase of the gait our mean of null hypothesis is less than alternate hypothesis Alternate Hypothesis=12.7275 Null Hypothesis=8.7225 and standard deviation is greater than alternate hypothesis 3.60028 5.13877

As per result my null hypothesis has been accepted because leaf spring AFO mean is 8.7225 and standard deviation is 5.13877 and alternate hypothesis is rejected because

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Swedish AFO mean is 12.275 and standard deviation is 3.60028

Discussion

By studying the above results, it may be concluded that at Initial Contact Phase of the Gait the targeted value in degrees is zero (0), while according to Simi aktysis software the value taken for patient Patient-1 is 2.32degrees but targeted value is zero (0) degrees so deviations for Patient Patient-1 is 2.32 degrees according to Simi aktysis software. Such deviation's result by wearing Posterior Leaf Spring AFO by Patient Patient-1.

Similarly, Value given by Simi aktysis software for Patient Patient-2 is 3.34 degrees and targeted value is zero (0) so deviations for him is 3.34 degrees these deviations results by wearing Posterior Leaf Spring AFO by Patient Patient-2.

Value that is taken for patient Patient-3 from Simi aktysis is 8.71degrees and targeted value is zero (0) so deviations for Patient-2 is 8.71 degrees these deviations also results by wearing Posterior Leaf Spring AFO by patient.

Value that is taken for patient Patient-4 from Simi aktysis is 8.53degrees and targeted value is zero (0) so deviations for Patient-4 is 8.53 degrees these deviations also results by wearing Posterior Leaf Spring AFO by patient.

By observing both the AFO's i.e. Swedish AFO and Posterior Leaf Spring AFO at Initial Contact Phase of the Gait the deviation's results for Swedish AFO's are 3.82, 4.40, 11.22 and 9.18 degrees and deviations results for Posterior Leaf Spring AFO's are 2.32, 3.34, 8.71 and 8.53 degrees. Statistical results implied that the impact of Leaf Spring AFO is bigger than Leaf spring AFO.

Conclusion and Recommendation

Many organizations/centers of KP working with Rehabilitation and they provide AFO for their Clients. In this study participants are not selected from the other organization/centers. If researcher include the study participants from the other organization/centers those are provide PLS AFO and Swedish AFO, then it will be easy to generalize the result. So, further study is recommended to identify the study population not only at PRSP.

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