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Title
Effect of dynamic contracture and tone management following Low Load Prolonged Stretch to obtain an increase of ROM in the lower limb.

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Summary
Case studies will show that contractures can be treated and tone can be managed following the LLPS to obtain a better ROM with a dynamic hinge on an orthosis. Achieving physiological ROM is needed to apply the most effective orthosis and to help patients to improve gait and functional activities.

Introduction/ Basics
Contracture management can be done in different ways but they are not always effective and painless. In these case studies, we will use a dynamic hinge on a (K)AFO. All patients were having a decreased ROM in the lower limb (knee and/or ankle).The purpose of LLPS contracture treatment and tone management by a dynamic joint on a resting (non-weight bearing) orthosis is to obtain an increase of ROM. Creating a better AROM or PROM will help the persons to achieve fixed goals such as a better gait pattern by applying the correct gait orthosis, specific daily activities, hygienic matters or personal objectives and this with minor inconveniences and pain. A comfortable orthosis, time, multidisciplinary follow-up and patient compliance is the key to success. All cases in this study improved their quality of gait by gaining PROM.

Methods/ work process
A flat coil spring implemented in the dynamic joint on a (K)AFO gives the requested linear force to work following LLPS-principles. Each orthosis is custom made, designed following the need and is fitted at first without force to check comfort and to achieve the correct wearing time. AROM and PROM in knee and/or ankle were measured with a standard goniometer in the beginning of the treatment and weekly after delivery of the orthoses to check the progress. The

force has only been increased if there was no improvement in ROM. This method was used complementary to the manual therapy (High Load Brief Stretch) that the patients already had before starting the LLPS treatment and continued while LLPS treatment.

Implementation

The included persons, 2 male and 2 female adults, on which the dynamic joints were applied have neurological and orthopaedic knee and ankle contractures and/or hypertonia. The average wearing time of the (K)AFO was 6 to 8 hours a day and the persons wore the orthosis for minimum 5 days a week. The orthosis was worn most of all during the sleeping hours. The follow-up by a Physical Therapist of the case-studies persons was remarkable and was very helpful to attend the final result.

Conclusion

In one case we could measure a gain of end range of passive knee extension up to 14°, which is a considerable improvement. After obtaining the best possible result 3 of the 4 patients received a gait orthosis that increased their postural position and gait. We followed in this study only adults but children with neurological diseases can be treated and followed also. The dynamic contracture treatment following LLPS can be an effective and painless way of treating correctable contractures and to manage tone if the wearing time, the compliance, the comfortable orthotic design and accurate follow-up has been set up. Having a better ROM gives the disabled persons more opportunities to be more functional in activities of daily living and to get a correct aligned orthosis which will improve their gait. Prevention of contractures would have been an even better an less expensive approach in all those cases but that needs to be implemented in the paramedical treatment.

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