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Title
The effect of a mechanical stance control orthosis in rehabilitation in order to improve standing, walking and activities of daily living.

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Summary
The case studies show that it is important to use Mechanical Stance Control Orthosis as soon as possible (preferably during the rehabilitation process) in case of quadriceps insufficiency so that patients can quickly return to an efficient gait pattern and to activities of daily life.

Introduction/ basics
Choosing the correct orthosis at the right moment in a rehabilitation process for patients with severe knee instability due to quadriceps disfunction is a major issue.
The decision for a MSCO is often made too late or too conservative due to a lack of knowledge about the possibilities the MSCO can offer in the clinical rehabilitation process or because of the cost price of the orthosis not being properly considered in the overall rehabilitation process.
The MSC hinge does not impose restrictions during gait but only gives the security by locking the knee during stance phase.
The purpose of the MSCO consists to activate the full body function and not to stimulate the compensatory gait in order to improve functional activities and to get patients faster back to the most normal life as possible.
The persons in this case studies had a decrease or stagnation of the body control during rehabilitation without an MSCO, as well as during postural static position as during gait.

Material method; implementation/ process
All patients were tested with the testing device and after having the approval of the multidisciplinary team they received a custom made KAFO with the Swing Phase Lock joint as knee joint and a double action joint on the ankle with a dorsal flexion stop and dorsal flexion assistance if needed.

The use of the orthosis has been supported by physical rehabilitation following a written plan of treatment which stimulates postural and gait training. The mechanical stance control joint requires active body posture and controlled movement of the patient which stimulates the entire muscle chain (whether or not actively present). To observe the improvements with the MSCO, TUG-test, MRC-scale, 6 minute walking test, Patient Specific Functional Scale and pain Scale were used. All tests were done with and without the MSCO and were video recorded. All data were documented and differences in speed, pain and functionality were calculated with the G-walk sensor, chronometer or with approved scales.

Results

3 active persons, 2 male and 1 female with average age of 43.66 years old were included in this case study. They all had quadriceps insufficiency less than or equal to 3 following the MRC scale. 2 persons had dorsal flexors deficit and 2 persons walked with a cane. All persons showed a Genu Recurvatum since minimum several months or even years.

The outcome measures with the MSCO were positive, up to 29,7% faster in walking speed with pain rated at 1 instead of 6 with the MSCO and without a cane. The rating on the PSFS improved from average 2 to 7 in less than 2 weeks. One person with Multiple Sclerosis improved the muscle force from 3 to 4+ in 18 months. One person was able to go back to work after he received the orthosis.

Discussion/ conclusion; conclusion for the practice

To use MSCO early in rehabilitation helps avoiding compensation techniques and means freedom by walking without a cane, walking faster, more active body function and a greater participation. The 3 persons all regretted not having been helped with MSCO before. Not having restrictions during gait, MSCO should be implemented earlier in rehabilitation even if recovery is expected.

Some topics of the MSCO need to be discussed such as Gait analysis and energetic tests could have been added.

The impact of an early application of the MSCO for quadriceps deficiency has been shown to have benefits not only on the activity level but also on the overall cost of rehabilitation.

References

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