Modular posture orthesis for the lower limbs (POMMI) for the cerebral palsy patient
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Objectives.– Our therapeutic protocol in children with cerebral palsy includes an early introduction of night-posture for the spastic muscles. The polyarticular anatomy of the concerned muscles require a staged immobilization (ankles, knees and hips). In front of the important difficulty for families to set up the big enorpedal orthesis with fixed abduction, we imagined a modular orthosis fixing the different joints (ankles, knees and hips) in an ascending way.

Method.– After having resolved the administrative problems linked to the additional cost of this modular orthosis, we followed the implementation of 46 orthesis in specialized consultations. With the orthoprosthetist, we defined the specifications of this modular orthosis. It consists of anti-equinus ankle-foot orthesis fit into postural kneepads connected by an adjustable and removable system to control the abduction.

Result.– We cannot compare with analytical element the modular orthosis with the fixed one made before, but satisfaction of families about ergonomics and tolerance of the modular orthosis led us to abandon the fixed one.

Discussion.– The modular orthosis has the inconvenience to be more expensive but offers better tolerance, it can be adjusted to adapt to the growth of the child and can be used to posture the limb in a segmental way.

Conclusion.– The modular postural orthosis of lower limbs improves tolerance and compliance with the same orthopaedic aims as the fixed orthosis. We continue to improve it to make the installation simpler and safer.

Further readings

Quantification of muscle strength of lower limbs before and after injection of botulinum toxin A in children with cerebral palsy
A. Poulain, D. Dispa, A. Renders

Keywords: Spasticity; Botulinum toxin A; Strength; Children

Objectives.– Botulinum toxin, used in case of focal spasticity, has for principal physiological effect to decrease the transmission of the input at the level of the neuromuscular junction, which reduces the intensity of the muscle contraction. For this reason, injections of botulinum toxin could enable decreased strength of the injected muscle and an increased strength of the antagonist muscle [1] through retrograde axonal transport at the medullar level. To confirm this hypothesis, a validated tool for the muscle strength measurement is required. The aim of this study was to validate an electronic dynamometer quantifying muscle strength in healthy children. By this mean it will be usable in children with cerebral palsy.

Materials, patients and methods.– An electronic dynamometer (ISOBEX® 2.1, Cursor AG, Bern, Switzerland) [2], wall or ground mounted with a double sucker, was used to assess 20 healthy children aged six to ten years. Four muscular groups were tested (dorsal and plantar flexors of the ankle and flexor and extensor of the knee) at two times, fourteen days apart. Three trials with a prior test were performed with resting of 15–30 seconds between each trial. The statistical analysis was made on the average of the three measures with a two way RM Anova (repeated measures analysis of variance).

Results.– We observed a significant difference for age for all muscle groups tested (all P-values < 0.022) and an absence of significant difference between the two sessions for all muscle groups (all P-values > 0.155).

Discussion and conclusions.– These results should be taken with caution because the number of subjects. However, they are encouraging for the use of ISOBEX® in clinical practice to assess muscle strength of the lower limb in children. Note that the significant difference in strength between younger and older children was expected.

References

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Materials, patients and methods.– An electronic dynamometer (ISOBEX® 2.1, Cursor AG, Bern, Switzerland) [2], wall or ground mounted with a double sucker, was used to assess 10 CP children aged 6 to 12 years (mean: 8 years and 11 months), before the injections of botulinum toxin A and 2 months after the injections. Two muscular groups were tested (flexor and extensor of the knee). Three trials with a prior test were performed with resting of fifteen to thirty seconds between each trial. The statistical analysis was made on the average of the three measures with a one-way RM ANOVA (repeated measures analysis of variance).