Results.—Among the 149 children with clinical internal hip rotation ≥ 60°, cinematic data showed an internal hip rotation in 44.3% of the cases, an external hip rotation in 18.1% and a neutral hip rotation in 37.6%. Among the 57 patients with clinical internal hip rotation < 60%, cinematic data showed an internal hip rotation in 28% of the cases, an external hip rotation in 24.6% and a neutral hip rotation in 47.4%.

Discussion.—Excessive femoral anteversion is not explained by excessive kinematic internal hip rotation in 55.7% of the cases. In 49% of the cases, the inside patella gait pattern is explained by an internal pelvic rotation. When the pelvic rotation is neutral or external, the inside patella gait pattern should be explained by the gracileus spasticity.

Conclusion.—The inside patella gait pattern doesn’t necessarily imply excessive femoral anteversion. The physical examination alone is not sufficient to analyze the inside patella gait pattern and cinematic data from gait analysis remain necessary for therapeutic decisions.


CO24-004–EN

Modular posture orthosis for the lower limbs (POMMI) for the cerebral palsy patient
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Keywords: Cerebral Palsy; Apparatus

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 cruropedal orthosis 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 orthosis in specialized consultations.

With the orthoprosthesis, we defined the specifications of this modular orthosis. It consists of anti-equinus ankle-foot orthosis 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


CO24-005–EN

Quantitative measurement of muscle strength of lower limbs in children: Validation study
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Keywords: Strength; Child; Lower limb

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


CO24-006–EN

Quantification of muscle strength of lower limbs before and after injection of botulinum toxin A in children with cerebral palsy
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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. The aim of this study was to quantify muscle strength of knee flexors and extensors before and after the injection of botulinum toxin A in the hamstrings muscles of children with cerebral palsy (CP).

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).