et modérée pour 5 items. La fiabilité intra observateur est excellente en dehors d’un seul item. La validité de construit comprend :
– une analyse factorielle qui confirme les 3 dimensions ;
– une consistance interne élevée pour D1 et D2 (Cronbach’s α>0,90) et acceptable pour D3 (α=0,69) ;
– de bonnes corrélations avec les autres mesures utilisées (Brooke, Vignos, CGI) (corrélations rho>0,75).

Conclusion.– La mesure de fonction motrice 20 peut être utilisée pour suivre l’évolution naturelle de la fonction motrice ou en cas d’essai thérapeutique. L’analyse des résultats de l’étude de sensibilité au changement est en cours.

Pour en savoir plus

Version anglaise

CO24-001–EN
Motion analysis in cerebral palsy children in 2011: State of the art and news
O. Remy-Neris
Service de médecine physique et de réadaptation, hôpital Morvan, CHRU de Brest, 5, avenue Foch, 29609 Brest, France

Keywords: Motion analysis; Children

Beyond the methodological precautions that are necessary, a question must be raised: what’s the use of motion analysis in children with cerebral palsy. The first and easiest usage is an additional examination offering a dynamic picture of a child at a stage of the disease course. It provides assistance to medical practice as a balance point of a functional state. More recently its use as an indicator for instituting focal treatments in cerebral palsy children and functional surgery has been questioned. For focal treatment (motor blocks with botulinum toxin), knowledge of the validity of the calculations of joint efforts is crucial. The editorial by Adam Shortland (2011) [2] is quite significant in the analysis of dynamic data in the gait of cerebral palsy children. Indeed the maximum strength provided by the muscles of children with cerebral palsy is completely different during analytical contractions and during walking. The quality of the measurement depends on the condition of the joints centers. Defined by both anatomical and functional methods in three-dimensional analysis is still very approximate (Lempereur et al. 2010) [1]. Its improved value for diagnostic during walking is strongly correlated to its ability to predict the deleterious actions exerted by muscles to the function they are supposed to generate. The same difficulties of measurement accuracy have a significant impact on the diagnosis of bone corrections to be provided to these children with their lower limbs. Given the current accuracy of the measurement, prediction of optimal surgery remains widely subject to interpretation of clinical results. Multimodal integration of radiological or ultrasound and mechanical data will refine the measures and the ability to support the three-dimensional analysis to predict the functional outcome of multisegmental surgery.

Further readings

CO24-002–EN
Early treatment in walking cerebral palsy children: The surgeon’s and the physiatrist’s point of view
C. Boulay *, E. Viehweger*
Orthopédie pédiatrique et plateforme d’évaluation de la motricité, hôpital Timone Enfants, 264, rue Saint-Pierre, 13385 Marseille cedex 05, France
*Auteur correspondant.

Keywords: Cerebral palsy; Gait analysis; Child; Dynamic electromyography; Physiotherapy; Surgery

Natural history of psychomotor learning and walking difficulties in cerebral palsy (CP) children is now well established. Therapy programs may be standardized. We may establish typical evaluation and medico-surgical schemes according to children’s severity and motor potential. Longitudinal follow-up may be planned.
In young children early multidisciplinary therapy program may avoid major functional decrease with time. Contrarily, development of functional capacities may be favored and adult life prepared. Each step is guided in determining previously precise therapeutic objectives. Very early global evaluation of the child, including physiatrist’s and neuroorthopaedic surgeon’s point of view is necessary.

Therapy of walking involvement associates physiotherapy, orthosis and assistive devices, with medical (principally intra-muscular) and surgical (orthopaedic and sometimes neurosurgical) treatment. Muscular balance and biomechanical architecture best to learning and progress of walking have to be reached. We identify different therapeutic targets in the course of the maturation of the child. Muscular balance of the pelvis and the trunk, associated to bony structure free of torsional deformities or dysplasia, influence seating position and trunk control, which are mandatory conditions for further development of standing and walking.
As soon as the child starts walking, we have to identify abnormal muscular activation pattern using dynamic electromyography data, because they induce neuro-orthopaedic deformities. Certain muscles like the peroneus longus may for example induce flat foot deformities in cerebral palsy children, which are even more severe if there is an associated trieps deficit (iatrogenic or due to the CP itself). Tibialis posterior activation abnormalities may induce equinovarus deformities. Fixed midfoot break will necessitate surgical correction with reconstruction of the medial foot arch. Early medical treatment may act before deformation fixity. Early neuro-orthopaedic surgeon involvement in the therapeutic planning is useful to alert before deformities influence the child’s functional progress or even decrease in time.

Transversal multidisciplinary collaboration in CP treatment planning, best coordinated by a case manager who coordinates the child’s longitudinal therapy program should be mandatory.

CO24-003–EN
Can, physical examination, explain inside patella gait, in children with spastic diplegia?
A.L. Simon *, C. Mallet, B. Ilharreborde, A. Presedo , G.F. Pennec-orthopedie et traumatologie infantile, hôpital Robert-Debré, 48, boulevard Sérurier, 75019 paris, France
*Corresponding author.

Keywords: Inside patella gait; Femoral anteverversion; Cinematic; Spastic diplegia

Introduction.– Excessive femoral anteverversion, is usually considered to be responsible for inside patella gait, in children with spastic diplegia, thus, indicating, a femoral derotation osteotomy. The aim of our study was to compare, the data from routine physical examination with, those obtain from gait analysis, in order to attempt to explain gait pattern with inside patella.

Materials and methods.– Hundred and three spastic diplegic children with inside patella gait pattern were retrospectively studied. The internal hip rotation, reflecting femoral anteverversion, and the position of the patella was reported from the physical examination, and pelvic and hip rotations were studied from cinematic data.
Modular posture orthosis for the lower limbs (POMMI) for the cerebral palsy patient
F. Metté a,∗, J.M. Milcent b, S. Burlot b, C. Bonhomme c

a Rééducation, centre hospitalier de Mayotte, BP 04, 97600 Mamoudzou, Mayotte
b TPM orthopedie, Saint-Pierre, France
C Hôpital d’Enfants, Saint-Denis, Réunion

∗Corresponding author.

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.

Results.– 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

Medecine physique et réadaptation, UCL cliniques universitaires Saint-Luc, 10, avenue Hippocrate, 1200 Bruxelles, Belgium

∗Corresponding author.

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

Quantitative measurement of muscle strength of lower limbs: Validation study
A. Poulain ∗∗, D. Dispa , A. Renders

Medecine physique et réadaptation, UCL cliniques universitaires Saint-Luc, 10, avenue Hippocrate, 1200 Bruxelles, Belgium

∗Corresponding author.

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 valid 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).