Cerebral palsy

Oral communications

CO0150
Gross Motor Function Measure Evolution Ratio: Use as a control for natural progression in cerebral palsy
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Objective To develop a new way to interpret Gross Motor Function Measure (GMFM-66) score improvement in studies conducted without control groups in children with cerebral palsy (CP).

Material and methods The curves, which describe the pattern of motor development according to the children’s Gross Motor Function Classification System level, were used as historical control to define the GMFM-66 expected natural evolution in children with CP. These curves have been modeled and generalized to fit the curve to particular children characteristics.

Results Assuming that the GMFM-66 score evolution followed the shape of the Rosenbaum curves, by taking into account the age and GMFM-66 score of children, the expected natural evolution of the GMFM-66 score was predicted for any group of children with CP who were < 8 years old. Because the expected natural evolution could be predicted for a specific group of children with CP, the efficacy of a treatment could be determined by comparing the GMFM-66 score evolution measured before and after treatment with the expected natural evolution for the same period. A new index, the Gross Motor Function Measure Evolution Ratio, was defined as follows: Gross Motor Function Measure Evolution Ratio = measured GMFM-66 score change/expected natural evolution.

Discussion/Conclusion For practical or ethical reasons, it is almost impossible to use control groups in studies evaluating effectiveness of many therapeutic modalities. The Gross Motor Function Measure Evolution Ratio gives the opportunity to take into account the expected natural evolution of the gross motor function of children with CP, which is essential to accurately interpret the therapy effect on the GMFM-66.

Keywords Cerebral palsy; Children; GMFM

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CO0151
Perceived effectiveness, tolerance of cares in children and adults with cerebral palsy
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Objective A better understanding of the perception of the rehabilitative and medical care’s by persons with cerebral palsy (CP) and their families may help in providing better adherence to these cares. The main objective of this study was to assess overall satisfaction, self-perception of effectiveness and tolerance of the rehabilitative and medical cares in individuals with CP.

Material and methods This was a cross-sectional questionnaire-based study. A total of 950 questionnaires were sent to French Britain children and adults with CP. Perceived effectiveness and tolerance were evaluated for each type of care using a Likert scale from 1 to 7 and overall satisfaction by a visual analog scale. Comparison of means and uni-and-multivariate analyzes for correlation analysis were carried out.

Results A total of 512 (53.9%) questionnaires were analyzed; 230 (44.9%) were children and 54% were walkers (GMFCS I, II or III).
The overall satisfaction was 6.83/10 (SD 2.21). Orthoptic, orthosis and physical therapy were reported to be the most effective cares (5.34/5.30/5.29) while botulinum toxins, intrathecal baclofen, and speech therapy the least effective (4.42/4.52/5.02). Intrathecal baclofen, orthosis and botulinum toxin were the less well-tolerated therapies (4.75/5.11/5.28). Antiepileptic drugs were reported to be the most effective and best-tolerated drug contrary to analgesics. Overall, satisfaction was inversely correlated to the GMFCS in the multivariate analysis (P = 0.013). The perceived effectiveness of occupational therapy, botulinum toxin injections and physiotherapy are inversely related to GMFCS in the univariate analyzes. The tolerance and effectiveness of the orthosis have a positive correlation with the GMFCS in the uni-and-multivariate analyzes.

Objective Different ankle-foot orthoses (AFO) are often prescribed in children with cerebral palsy (CP) although their efficiency on gait remains unclear.

The tolerance and effectiveness of care therapies (4.75/5.11/5.28) was inversely related to GMFCS in the univariate analyzes. The tolerance and effectiveness of orthosis have a positive correlation with the GMFCS in the univariate analyzes. The tolerance and effectiveness of the orthosis have a positive correlation with the GMFCS in the uni-and-multivariate analyzes.

Discussion/Conclusion This study shows a good overall satisfaction on medical and paramedical care but highlights a large discrepancy between user self-perception and evidence base medicine. More communication about the therapies between professionals and individuals with cerebral palsy is needed and comparing opinions of patients and their families to literature can give us the keys to improve communication around these therapies.

Keywords Cerebral palsy; Effectiveness of cares; Tolerance of cares

Disclosure of interest The authors declare that they have no competing interest.

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CO0152
Physiological anatomy of botulinum toxin effect on the spastic muscle of children with cerebral palsy
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Objective Botulinum toxin is one of the treatments available to treat spasticity in patients with cerebral palsy (CP) from 2 years of age. The long-term action of the toxin on the neuromuscular junction (NMJ) and muscle structure is still unknown. We formulated the hypothesis that repeated injections of botulinum toxin could modify muscle structure. The main aim of our 3-year monocentric descriptive study is to evaluate the long-term effect of repeated injections of botulinum toxin on the muscle and the neuromuscular junction in patients with CP.

Material and methods Histopathological features and molecular biology were studied on muscle biopsies taken during scheduled orthopaedic surgeries. Evaluation criteria were the presence of fragmented neuromuscular junctions (both qualitative and quantitative) and axonal sprouting (qualitative).

Results Two muscle biopsies were performed in 2 children aged respectively 7 and 10 years. The biopsies were located respectively in the right gracilis (after 1 injection) and in the right sural triceps (after 3 injections). Histological features found were fragmented neuromuscular junctions (between 1 to 6), lack of axonal sprouting at the junction, the presence of CD56 satellite cells and presence of molecules suggesting the presence of denervated fibers. Whereas type I and type II fiber atrophy and fibrosis were found on the first biopsy, on the second were seen signs of atrophy of undifferentiated fibers without any sign of fibrosis. Additional results will be available soon.

Discussion/Conclusion This study should improve knowledge about the effects of long-term botulinum toxin on muscle (and therefore its safety in use) on the NMJ and on the physiopathology of the muscle of children with CP.

Keywords Toxin; Spastic neuromuscular junction; Cerebral palsy child

Disclosure of interest The authors declare that they have no competing interest.

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CO0153
Effect of ankle-foot orthoses on gait in children with cerebral palsy: A meta-analysis
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Objective Different ankle-foot orthoses (AFO) are often prescribed in children with cerebral palsy (PC) although their efficiency on gait remains unclear.

Purpose (1) To determine the effect of AFOs on gait in children with CP and (2) to evaluate the effect of each type of AFO.

Material and methods Studies in English with control condition (barefoot or shoes) assessing effect of AFO about children with CP gait were searched on the Pubmed, CINAHL+, Web of Science, Cochrane Library databases. Quality of each study was assessed by modified PEDRO scale. Only studies with a score more than 4 were selected. 10 gait parameters were extracted in each study. Effect size and 95% confidence interval were calculated for each parameter.

Results Seventeen studies (490 subjects) were included. Comparing AFOs to control condition, stride length increased (15 studies) d = 1.04 [95% CI: 0.69; 1.38], velocity increased (16 studies) d = 0.27 [95% CI: 0.14; 0.41], cadence decreased (15 studies) d = −0.69 [95% CI: −0.95; −0.43]. Ankle dorsiflexion increased at initial contact (11 studies) d = 1.64, [95% CI: 1.16; 2.11] and in swing phase (7 studies) d = 5.21, [95% CI: 1.91; 8.52]. Ankle power generation in stance phase decreased (6 studies) d = −0.26, [95% CI: −0.38; −0.14]. The duration of tibialis anterior activation and energy data did not changed significantly. Four types of orthosis were found: dynamic AFO, hinged AFO, solid AFO, supra-malleolar orthosis. Hinged AFO was the orthosis that improved the greater number of gait parameters and was the only one to improve velocity with an effect size > 0.8 (large effect).

Discussion/Conclusion This study shows clinically significant effect of AFO on stride length, ankle dorsiflexion at initial contact and swing phase. Hinged AFO seems to have the greatest effect on gait. New data are needed to refine the choice of the orthosis according to the child gait pattern.

Keywords Cerebral palsy; Ankle-foot orthosis; Gait; Meta-analysis

Disclosure of interest The authors declare that they have no competing interest.

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CO0154
Relationship between hand function assessment and upper limb kinematic analysis in children with hemiplegic cerebral palsy
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