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Interventions and Management

1. Dev Med Child Neurol. 2014 Dec 9. doi: 10.1111/dmcn.12650. [Epub ahead of print]

Trunk control in children with cerebral palsy: where are we now?

Desloovere K1, Heyrman L.

[PMID: 25489626](#) [PubMed - as supplied by publisher]

2. Eur Rev Med Pharmacol Sci. 2014 Nov;18(21):3223-8.

The relief effect of botulinum toxin-a for spastic iliopsoas of cerebral palsy on children.

Liu JJ1, Ji SR, Wu WH, Zhang Y, Zeng FY, Li NL.

OBJECTIVE: This work intended to observe the effect of injecting botulinum toxin type A (BTX-A) for relieving spastic iliopsoas of cerebral palsy on children, and to investigate the improvement of this method for the motor function in these children. **PATIENTS AND METHODS:** From July 2006 to August 2012, 37 children with spastic iliopsoas cerebral palsy were received rehabilitation therapy. The age ranged from 3 to 15 years. The control group were treated by conventional physical therapy (PY). The experimental group were treated not only by the conventional physical therapy, but also BTX-A injection. The dose of BTX-A injection was according to the weight of the child and the Modified Ashworth Scale (MAS). The dose of the injection ranged from 15 IU to 45 IU with the average dose 31.2 ± 13.9 IU. **RESULTS:** There was no significant difference between two the groups on ages, weight and MAS, GMFM (Gross Motor Function Measure) and extension angle of hip joints before treatment. In both groups, the Modified Ashworth Scale decreased, GMFM and extension angle of hip joints increased after eight weeks. In the control group, the GMFM improved significantly. In the experimental group, MAS, GMFM and extension angle of hip joints changed significantly after therapy. There was significant difference between two groups in MAS, GMFM and extension angle of hip joints after two months. **CONCLUSIONS:** The BTX-A injection can relieve iliopsoas spasticity of cerebral palsy on children efficiently. This therapy can help children to correct abnormal gait and to improve their motor function.

[PMID: 25487932](#) [PubMed - in process] Free full text

3. Dev Med Child Neurol. 2014 Dec 10. doi: 10.1111/dmcn.12648. [Epub ahead of print]**Measuring participation for children with mobility limitations: a modified Delphi survey for those who use power mobility.**

Butler C1.

[PMID: 25492610](#) [PubMed - as supplied by publisher]**4. J Pediatr Orthop. 2014 Dec 9. [Epub ahead of print]****How Critical is Patient Positioning in Radiographic Assessment of the Hip in Cerebral Palsy When Measuring Migration Percentage?**

Kinch K1, Campbell DM, Maclean JG, Read HS, L Barker S, Robb JE, Gaston MS.

BACKGROUND: Migration percentage (MP) is an accepted method of assessing lateral displacement of the femoral head in children with cerebral palsy (CP). Difficulty in positioning of patients for pelvic radiography remains a concern for the reliability of the MP. **METHODS:** This 2-part quantitative study examined 100 anteroposterior pelvic radiographs for children with CP. Fifty were from a region that had a positioning protocol for hip surveillance of children with CP and 50 images were from a region without. Images were assessed for acceptability of position in relation to hip abduction/adduction and/or pelvic rotation. Ten images deemed Acceptable or Borderline from the region with no protocol were then randomly selected. MP was measured on 2 separate occasions by 5 children's orthopaedic surgeons and statistically analyzed for intrarater and interrater reliability. **RESULTS:** There was no statistically significant difference in the acceptability of images between the 2 regions with 60% to 66% of the images meeting the criteria outright. When allowances were made for slight variation of abduction/adduction within 5 degrees, 74% to 80% of the images were acceptable. Reliability was variable with limits of agreement between 4.96% and 15.15%. Observers more familiar with the software measuring package had higher reliability within and between occasions. Variability within and between observers decreased as MP increased. **CONCLUSIONS:** Poor positioning did not appear to be the main reason for the variation in reliability of MP. Repeat measurements were reliable although standardized technique, training, and familiarity with software measuring programmes did influence outcomes.

LEVEL OF EVIDENCE: This is a level 1 diagnostic study divided into 2 parts. The first half is a retrospective study of pelvic radiographs of children with CP as part of their annual/biannual orthopaedic assessment. The second half is an interrater and intrarater reliability study of MP measurement.

[PMID: 25494023](#) [PubMed - as supplied by publisher]**5. Gait Posture. 2014 Nov 24. pii: S0966-6362(14)00758-9. doi: 10.1016/j.gaitpost.2014.11.005. [Epub ahead of print]****Does single-event multilevel surgery enhance physical functioning in the real-life environment in children and adolescents with cerebral palsy (CP)?: Patient perceptions five years after surgery.**

Lehtonen K1, Mäenpää H2, Piirainen A3.

Orthopedic procedures are a method of treating gait deviations and musculoskeletal pathology that develop with age in cerebral palsy (CP). Recently single-event multilevel surgery (SEMLS) has become common practice. Although there is evidence that SEMLS could improve gait, it is unclear whether it will enhance overall physical functioning and coping strategies in the real-life environment. It is unclear how improved walking capacity affects actual functioning and enables greater independence. The aim of this study was to examine the perceptions of adolescents concerning the results of surgery on personal physical functioning in the environment five or more years after SEMLS. In this study, qualitative data were gathered by open interviews and analyzed using phenomenographic approach, which aims to study variation in human understanding and perceptions of the phenomenon in question. Gait Profile Score (GPS) was used to describe the objective change. The results indicate that SEMLS had a clear positive effect on the participants' physical functioning capacity, particularly experienced as better walking ability. GPS improved by 3.5° five years postoperatively. Surgery could enhance physical activity and

the motivation to maintain mobility in the future. The perceptions of the effect of surgery on physical functioning in the real-life environment varied from a challenge-avoiding, support-seeking agency to a highly active, independent agency in daily life. Our rehabilitation practice after multilevel surgery should be more focused on enhancing active agency in collaboration with adolescents with CP and their families.

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6. Neurobiol Dis. 2014 Dec 7. pii: S0969-9961(14)00371-4. doi: 10.1016/j.nbd.2014.11.025. [Epub ahead of print]

Brain-machine interfaces in neurorehabilitation of stroke.

Soekadar SR1, Birbaumer N2, Slutzky MW3, Cohen LG4.

Stroke is among the leading causes of long-term disabilities leaving an increasing number of people with cognitive, affective and motor impairments depending on assistance in their daily life. While function after stroke can significantly improve in the first weeks and months, further recovery is often slow or non-existent in the more severe cases encompassing 30-50% of all stroke victims. The neurobiological mechanisms underlying recovery in those patients are incompletely understood. However, recent studies demonstrated the brain's remarkable capacity for functional and structural plasticity and recovery even in severe chronic stroke. As all established rehabilitation strategies require some remaining motor function, there is currently no standardized and accepted treatment for patients with complete chronic muscle paralysis. The development of brain-machine interfaces (BMIs) that translate brain activity into control signals of computers or external devices provides two new strategies to overcome stroke-related motor paralysis. First, BMIs can establish continuous high-dimensional brain-control of robotic devices or functional electric stimulation (FES) to assist in daily life activities (assistive BMI). Second, BMIs could facilitate neuroplasticity, thus enhancing motor learning and motor recovery (rehabilitative BMI). Advances in sensor technology, development of non-invasive and implantable wireless BMI-systems and their combination with brain stimulation, along with evidence for BMI system's clinical efficacy suggest that BMI-related strategies will play an increasing role in neurorehabilitation of stroke.

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7. J Int Med Res. 2014 Dec 8. pii: 0300060514558897. [Epub ahead of print]

The effects of motor and intellectual functions on the effectiveness of comprehensive rehabilitation in young children with cerebral palsy.

Zhang H1, Zhang B2, Jia F1, Liang D2, Li H1, Chen Y1, Yang L2, Ge P3, Liang J4.

OBJECTIVE: To determine the effects of motor and intellectual functions on the effectiveness of comprehensive rehabilitation (CR) in young children with cerebral palsy (CP). **METHODS:** This longitudinal cohort study recruited paediatric patients with a confirmed diagnosis of CP. Baseline gross motor function was classified using the Gross Motor Function Classification System. Baseline intellectual level was evaluated using the Developmental Quotient (DQ) via the Gesell Development Scale. Children underwent CR for 3 months and then their motor and intellectual functions were assessed using the Gross Motor Function Measure, Fine Motor Function Measure and DQ. The changes from baseline were calculated. **RESULTS:** Forty-eight children with CP were recruited to this study. Greater improvements in motor function were associated with a lower baseline level of intellectual impairment. Motor and intellectual function in children with CP was significantly improved when treatment was started before 12 months of age. **CONCLUSION:** There might be a close and reciprocal relationship between the baseline levels of impairment of motor and intellectual function with regard to the effectiveness of CR. Early intervention is important to gain a good outcome in children with CP.

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8. Springerplus. 2014 Nov 1;3:646. doi: 10.1186/2193-1801-3-646. eCollection 2014.

Optimization of electric bicycle for youths with disabilities.

Blumenstein T1, Zeitlmann H1, Alves-Pinto A1, Turova V1, Lampe R2.

Cerebral palsy is a group of neurodevelopmental disorders that affect a person's ability to move and to maintain balance and posture. People with cerebral palsy have also perception and space orientation deficits so that special assistance devices should be developed to compensate these handicaps. The objective was to optimize an adapted electric bicycle (E-bike) for youths with neurodevelopmental disorders. An adapted E-bike was provided with ultrasonic sensors that measure distances to objects. If the distance to other objects reduces, an acoustic signal is sent. Additionally, a self-created force plate was fixed on the pedal to evaluate the muscle performances during biking. An experiment with the ultrasound warning system confirmed that acoustic feedback was helpful in avoiding obstacles. The measurement of the blood pressure, the heart frequency and the pedaling force during biking approved that the training condition of the test person can be registered and enables tuning the power of the electric motor to individual requirements. The results demonstrate that an adapted E-bike can be improved to provide better space orientation for people with perceptual disorders and to measure training conditions of patients. Moreover, these enable individual adjustment of the electric motor power to optimize comfort and therapy effect.

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