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## Interventions and Management

1. *Dev Med Child Neurol.* 2015 Sep 10. doi: 10.1111/dmcn.12867. [Epub ahead of print]

**Prevalence of orofacial dysfunction in cerebral palsy and its association with gross motor function and manual ability.**

Edvinsson SE, Lundqvist LO.

AIM: To investigate the prevalence of orofacial dysfunction (OFD) and explore factors associated with OFD in young individuals with cerebral palsy (CP). METHOD: We conducted a cross-sectional study on a population with CP in a Swedish county (132 individuals, mean age 14y 2mo [SD 4y 5mo], range 5-22y) using the Nordic Orofacial Test - Screening (NOT-S), Gross Motor Function Classification System (GMFCS), and Manual Ability Classification System (MACS). The NOT-S interview was completed by 129 individuals (76 males, 53 females) of whom 52 (30 males, 22 females) also agreed to complete the NOT-S examination. RESULTS: OFD occurred in at least one NOT-S domain in about 80% of the individuals and was present in all subdiagnoses, GMFCS levels, and MACS levels. Prevalence of OFD increased with increasing levels of GMFCS and MACS from level I=55% to level V=100%. Within the 12 NOT-S domains, the prevalence of OFD varied between 19% and 69%, wherein seven of them were at least 40%: 'Drooling', 'Nose breathing', 'Chewing and swallowing', 'Face at rest', 'Oral motor function', 'Speech', and 'Facial expression' (in ascending order). INTERPRETATION: OFD is common in CP. The use of OFD screening in health service planning would assist detection of areas in need of further evaluation.

[PMID: 26356495](#)

2. *Dev Med Child Neurol.* 2015 Sep 10. doi: 10.1111/dmcn.12897. [Epub ahead of print]

**The impact of orofacial dysfunction in cerebral palsy.**

Sellers D.

This commentary is on the original article by Edvinsson and Lundqvist.

[PMID: 26354851](#)

**3. Neuropsychiatr Dis Treat. 2015 Aug 3;11:1929-38. doi: 10.2147/NDT.S84090. eCollection 2015.**

**Piano training in youths with hand motor impairments after damage to the developing brain.**

Lampe R, Thienel A, Mitternacht J, Blumenstein T, Turova V, Alves-Pinto A.

Damage to the developing brain may lead to impairment of the hand motor function and negatively impact on patients' quality of life. Development of manual dexterity and finger and hand motor function may be promoted by learning to play the piano. The latter brings together music with the intensive training of hand coordination and fine finger mobility. We investigated if learning to play the piano helped to improve hand motor skills in 18 youths with hand motor disorders resulting from damage during early brain development. Participants trained 35-40 minutes twice a week for 18 months with a professional piano teacher. With the use of a Musical Instrument Digital Interface piano, the uniformity of finger strokes could be objectively assessed from the timing of keystrokes. The analysis showed a significant improvement in the uniformity of keystrokes during the training. Furthermore, the youths showed strong motivation and engagement during the study. This is nevertheless an open study, and further studies remain needed to exclude effects of growth and concomitant therapies on the improvements observed and clarify which patients will more likely benefit from learning to play the piano.

[PMID: 26345312](#)

**4. An Pediatr (Barc). 2015 Sep 7. pii: S1695-4033(15)00332-X. doi: 10.1016/j.anpedi.2015.07.028. [Epub ahead of print]**

**[Developmental dysplasia of the hip in children with a psychomotor disorder. A risk factor for a poor outcome?]**

**[Article in Spanish]**

Pipa-Muñiz I, de Los Llanos Rodríguez-Rodríguez M, Felgueroso-Juliana MB, Riera-Campillo M, González-Herranz P.

**INTRODUCTION:** Orthopaedic treatment of developmental dysplasia of the hip (DDH) has a high success rate in cases that are diagnosed early. However, the outcomes of these patients are not really known when they are subsequently diagnosed with some type of cerebral impairment. **MATERIALS AND METHODS:** A retrospective observational study was conducted on cases of DDH with a poor outcome after orthopaedic treatment, being unknown if they had any type of psychomotor disorder. The patients were clinically and radiologically assessed, and afterwards received neurological valuation by the Child Neurology Unit. **RESULTS:** Of the 325 cases of DDH diagnosed in 293 patients, 10 patients (3%) with 16 hips with DDH were diagnosed of any cerebral impairment. All them were initially treated orthopedically. Clinical and radiologically evolution was succesful only in 4 cases (25%) being necessary any surgical procedure in the remaining 12 cases. After surgical treatment we got an improvement in the Acetabular Index ( $p=0.005$ ) and Reimers Extrusion Index ( $p=0.042$ ). Neck-shaft angle and Wiberg CE angle also improved but this difference was not statically significant. Cerebral impairment was diagnosed at 2,5 years of age and the begining of walking was delayed at 2.4 years of age. **CONCLUSIONS:** Cerebral impairment can lead to an unfavourable outcome in the treatment of DDH, with the relative risk of a poor outcome being 7.2 times higher in these patients. An unfavourable outcome with conventional treatment of DDH must make us suspect the presence of some type of neurological disorder, particularly if there is a delay in walking.

[PMID: 26360018](#)

**5. Physiother Res Int. 2015 Sep 9. doi: 10.1002/pri.1646. [Epub ahead of print]**

**A Critical Evaluation of the Updated Evidence for Casting for Equinus Deformity in Children with Cerebral Palsy.**

Tustin K, Patel A.

**BACKGROUND AND PURPOSE:** Equinus deformity is common in ambulant children with cerebral palsy (CP).

Although lower leg casting is frequently used, the physiological basis for casting and effects beyond range of motion (ROM) gains are unclear. This review critically evaluates the updated evidence for casting in the management of ankle equinus in children with CP. **METHODS:** Comprehensive searches were conducted using electronic databases AMED, MEDLINE, CINAHL, Scopus, PEDro and the Cochrane Database of Systematic Reviews, publication years 2005-2014, in order to identify literature published since an earlier comprehensive systematic review. Only studies evaluating lower leg casting for conservative management of equinus deformity in children with CP were considered. Two independent raters critically appraised studies against the hierarchy of levels of evidence and rigour of study conduct questions proposed by the American Academy of Cerebral Palsy and Developmental Medicine's methodology for systematic review. **RESULTS:** Four relevant systematic reviews were identified, although these largely concerned earlier literature. Five original studies were included, all demonstrating improvement in dorsiflexion ROM. Combined treatment with botulinum toxin and casting offered greater and/or more sustained ROM gains than botulinum toxin alone in three studies. Effects on gait parameters and motor function were inconsistent. Participation outcomes were not evaluated. Methodological limitations make firm conclusions difficult. **CONCLUSIONS:** Recent years have offered little progress in the state of evidence for casting in the management of equinus deformity. Casting appears to offer at least short-term improvement in ankle dorsiflexion, although the proposition that this improves function or avoids surgery is not well substantiated. Future research needs to ensure more robust study design and broader evaluation across domains of the International Classification of Functioning, Disability and Health to determine the functional and long-term effect of casting for equinus deformity. Greater knowledge is required of the effect of casting on muscle structure and function in spastic CP. Copyright © 2015 John Wiley & Sons, Ltd.

[PMID: 26351821](#)

**6. Zh Nevrol Psikhiatr Im S S Korsakova. 2015;115(5 Part 2 CHILDREN'S NEUROLOGY AND PSYCHIATRY):35-41.**

**[Selection of a dose of the botulinum toxin A in spastic forms of cerebral palsy]. [Article in Russian]**

Kurenkov AL, Klochkova OA, Karimova KM, Bursagova BI, Namazova-Baranova LS, Kuzenkova LM, Mamedyarov AM, Artemenko AR, Petrova SA.

**AIM:** To analyze the efficacy and safety of dose ranges of abobotulinum toxin A (BTA) for multilevel injections into upper and lower extremity muscles in children with spastic forms of cerebral palsy (CP). **MATERIAL AND METHODS:**

We analyzed retrospectively multilevel BTA injections for 216 patients, aged from 2 to 17 years. Children received 1-6 repeated injections and complex physiotherapy. Patients were classified according to the GMFCS. Treatment results were evaluated with the modified Ashworth and Tardieu scales. **RESULTS:** Multilevel BTA injections were indicated for the most (89/8%) of the patients with spastic forms of CP, and in most of them the total dosage exceeded 30 U/kg. In the bilateral forms of CP, the total dosage (U and U/kg) was higher compared to the unilateral forms. Doses for each muscle in U/kg were similar in all CP forms. The total doses of BTA and the intervals between the repeated injections were stable for each patient. **CONCLUSION:** The dose ranges suggested for CP are effective and safe for the reduction of spasticity in several functional segments of upper and lower extremities in one treatment session.

[PMID: 26356278](#)

**7. Ann Rehabil Med. 2015 Aug;39(4):624-9. doi: 10.5535/arm.2015.39.4.624. Epub 2015 Aug 25.**

**Gross Motor Function Outcome After Intensive Rehabilitation in Children With Bilateral Spastic Cerebral Palsy.**

Lee SH, Shim JS, Kim K, Moon J, Kim M.

**OBJECTIVE:** To compare gross motor function outcomes in children with moderate to severe degrees of bilateral

spastic cerebral palsy (CP) who received either intensive inpatient rehabilitation or intermittent rehabilitation on an outpatient basis. **METHODS:** A non-biased retrospective chart review was done for patients diagnosed with bilateral spastic CP who received rehabilitation therapy. The intensive rehabilitation group (inpatient group) agreed to be hospitalized to receive 22 sessions of physical and occupational therapy per week for 1 month. The intermittent rehabilitation group (outpatient group) received four sessions of physical and occupational therapy per week for 3 months in an outpatient setting. Changes in the total score on the Gross Motor Function Measure (GMFM) between baseline and the follow-up period were analyzed. **RESULTS:** Both groups showed significant improvements in total GMFM scores at the follow-up assessment compared to that at baseline ( $p=0.000$  for inpatient group,  $p=0.001$  for outpatient group). The increase in mean total GMFM score after 1 month was significantly greater in the inpatient group than that in the outpatient group ( $p=0.020$ ). Higher increase in GMFM score was observed in younger subjects as revealed by the negative correlation between age and the increase in GMFM score after 1 month ( $p=0.002$ ,  $r=-0.460$ ). **CONCLUSION:** Intensive inpatient rehabilitation therapy for patients with bilateral spastic CP of moderate to severe degree was more effective for improving gross motor function than intermittent rehabilitation therapy on an outpatient basis.

[PMID: 26361600](#)

#### **8. IEEE J Biomed Health Inform. 2015 Sep 8. [Epub ahead of print]**

##### **Body Sensor Network-Based Spasticity Detection.**

Misgeld B, Luken M, Heitzmann D, Wolf S, Leonhardt S.

Spasticity is a common disorder of the skeletal muscle with a high incidence in industrialised countries. A quantitative measure of spasticity using body-worn sensors is important in order to assess rehabilitative motor training and to adjust the rehabilitative therapy accordingly. We present a new approach to spasticity detection using the Integrated Posture and Activity NETWORK by Medit Aachen (IPANEMA) body sensor network (BSN). For this, a new electromyography (EMG) sensor node was developed and employed in human locomotion. Following an analysis of the clinical gait data of patients with unilateral cerebral palsy, a novel algorithm was developed based on the idea to detect co-activation of antagonistic muscle groups as observed in the exaggerated stretch reflex with associated joint rigidity. The algorithm applies a cross-correlation function to the EMG signals of two antagonistically working muscles and subsequent weighting using a Blackman window. The result is a co-activation index which is also weighted by the signal equivalent energy to exclude positive detection of inactive muscles. Our experimental study indicates good performance in the detection of co-active muscles associated with spasticity from clinical data as well as measurements from a BSN in qualitative comparison with the Modified Ashworth Scale (MAS) as classified by clinical experts. Possible applications of the new algorithm include (but are not limited to) use in robotic sensorimotor therapy to reduce the effect of spasticity.

[PMID: 26357413](#)

#### **9. J Child Neurol. 2015 Sep 9. pii: 0883073815604228. [Epub ahead of print]**

##### **Validity of the Child Facial Coding System for the Assessment of Acute Pain in Children With Cerebral Palsy.**

Hadden KL, LeFort S, O'Brien M, Coyte PC, Guerriere DN.

The purpose of the current study was to examine the concurrent and discriminant validity of the Child Facial Coding System for children with cerebral palsy. Eighty-five children (mean = 8.35 years, SD = 4.72 years) were videotaped during a passive joint stretch with their physiotherapist and during 3 time segments: baseline, passive joint stretch, and recovery. Children's pain responses were rated from videotape using the Numerical Rating Scale and Child Facial Coding System. Results indicated that Child Facial Coding System scores during the passive joint stretch significantly correlated with Numerical Rating Scale scores ( $r = .72$ ,  $P < .01$ ). Child Facial Coding System scores were also significantly higher during the passive joint stretch than the baseline and recovery segments ( $P < .001$ ).

Facial activity was not significantly correlated with the developmental measures. These findings suggest that the Child Facial Coding System is a valid method of identifying pain in children with cerebral palsy.

[PMID: 26353879](#)

#### 10. Eur Spine J. 2015 Sep 7. [Epub ahead of print]

**Expert's comment concerning Grand Rounds case entitled "Combined selective dorsal rhizotomy and scoliosis correction procedure in patients with cerebral palsy" (Samiul Muquit, Amr Ammar, Luigi Nasto, Ahmad A. Moussa, Hossein Mehdian, Michael H. Vloeberghs).**

Hamilton DK.

This succinct case report and literature review [1] chronicles the care of a 17-year-old female patient with cerebral palsy, on intrathecal baclofen therapy, since 11 years old. Her mild thoracolumbar scoliosis progressed to a significant level of deformity compromising her care and function over long-term follow-up by a multidisciplinary team. The paper also mentions the gradual but significant increases in dosage and frequency of refills of her intrathecal baclofen administered via an implanted pump. Final reported management, involved combined selective dorsal rhizotomy and correction of her deformity.

[PMID: 26346848](#)

#### 11. J Phys Ther Sci. 2015 Aug;27(8):2611-4. doi: 10.1589/jpts.27.2611. Epub 2015 Aug 21.

**Relationship between activity limitations and participation restriction in school-aged children with cerebral palsy.**

Park EY, Kim WH.

[Purpose] This study investigated the relationship between activity limitation and participation restriction in school-aged children with cerebral palsy. [Subjects and Methods] Data were collected from 109 children with cerebral palsy aged 6-12 years. Activity limitations were assessed by using functional classification systems including the Korean-Gross Motor Function Classification System, the Korean-Manual Ability Classification System, and the Korean-Communication Function Classification System. Participation restriction was measured using the Korean-Frequency of Participation Questionnaire. Physical or occupational therapists and parents collected the data. [Results] All levels of the functional classification systems were significantly negatively correlated with Korean-Frequency of Participation Questionnaire ratings ( $r = -0.382$  to  $-0.477$ ). The Korean-Frequency of Participation Questionnaire ratings differed significantly with respect to the functional classification systems; in particular, the differences in the ratings of levels I and V were significant. The Korean-Communication Function Classification System and Korean-Gross Motor Function Classification System were significant predictors of participation, explaining 26.5% of the variance. [Conclusion] Intervention programs are required to promote communication skills and gross motor ability in order to improve the participation of children with cerebral palsy.

[PMID: 26357445](#)

#### 12. Res Dev Disabil. 2015 Sep 2;47:73-79. doi: 10.1016/j.ridd.2015.08.009. [Epub ahead of print]

**Stability of leisure participation from school-age to adolescence in individuals with cerebral palsy.**

Majnemer A, Shikako-Thomas K, Schmitz N, Shevell M, Lach L.

With increasing age, youth with disabilities are at risk for decreased participation in leisure activities, a key component for physical and mental health. This prospective study describes changes in leisure participation and

leisure preferences from school-age to adolescence in children with cerebral palsy (CP). Participants were recruited at school-age (6-12 years) for a study on participation and reassessed for a second study on adolescents (12-19 years) if >12 years. Thirty-eight children (24 males) with CP who could actively participate in the completion of the Children's Assessment of Participation and Enjoyment (CAPE) and the Preferences for Activities of Children (PAC) comprised the sample. Average time between assessments was  $5.0 \pm 1.3$  years. Most children were ambulatory (32/38 Gross Motor Function Classification System I-II). In addition to the CAPE and PAC, children were evaluated using the Gross Motor Function Measure-66 and parents completed a socio-demographic questionnaire. Paired t-tests revealed a significant decline in leisure participation diversity and intensity (CAPE) for recreation ( $p < .0001$ ), skill-based ( $p < .0001$ ) and self-improvement ( $p < .05$ ) activities, whereas social participation remained stable ( $p > .05$ ). Diversity of active-physical activities increased modestly ( $p = .06$ ) although intensity of participation in this activity domain decreased ( $p = .003$ ). There was also a decline in enjoyment of leisure activities. Preferences for these leisure activities remained unchanged between school-age and adolescence, except for recreational activities. Gender, maternal education, family income and gross motor ability were not related to differences in CAPE/PAC scores with increasing age. Findings suggest that over time, children with CP's participation in leisure activities diminishes, which is of concern to their functioning and well-being. Parents may be more involved in early childhood in facilitating participation whereas in adolescence, youth may be faced with more environmental barriers and a greater awareness of challenges to participation. Adolescents demonstrated a persisting desire to do these activities, challenging rehabilitation specialists to prioritize strategies to promote greater participation as children transition to adolescence.

[PMID: 26342327](#)

### **13. J Trauma Dissociation. 2015 Sep 11. [Epub ahead of print]**

#### **Trauma-related Pathological Dissociation in a Case with Cerebral Palsy.**

Fung HW Bss Sw.

This paper provides a case report of a Chinese-Cantonese female with both cerebral palsy and dissociative identity disorder (DID). To my knowledge, this is the first case report of DID from Hong Kong. Large-sample studies should be undertaken in the future to investigate the prevalence of dissociative disorders in a variety of populations in Hong Kong, including individuals with diagnosed brain diseases.

[PMID: 26360309](#)

### **14. J Child Neurol. 2015 Sep 9. pii: 0883073815604224. [Epub ahead of print]**

#### **Structural and Perfusion Abnormalities of Brain on MRI and Technetium-99m-ECD SPECT in Children With Cerebral Palsy: A Comparative Study.**

Rana KS, Narwal V, Chauhan L, Singh G, Sharma M, Chauhan S.

Cerebral palsy has traditionally been associated with hypoxic ischemic brain damage. This study was undertaken to demonstrate structural and perfusion brain abnormalities. Fifty-six children diagnosed clinically as having cerebral palsy were studied between 1 to 14 years of age and were subjected to 3 Tesla magnetic resonance imaging (MRI). Brain and Technetium-99m-ECD brain single-photon emission computed tomography (SPECT) scan. Male to female ratio was 1.8:1 with a mean age of  $4.16 \pm 2.274$  years. Spastic cerebral palsy was the most common type, observed in 91%. Birth asphyxia was the most common etiology (69.6%). White matter changes (73.2%) such as periventricular leukomalacia and corpus callosal thinning were the most common findings on MRI. On SPECT all cases except one revealed perfusion impairments in different regions of brain. MRI is more sensitive in detecting white matter changes, whereas SPECT is better in detecting cortical and subcortical gray matter abnormalities of perfusion.

[PMID: 26353878](#)

**15. Dev Med Child Neurol. 2015 Sep 8. doi: 10.1111/dmcn.12895. [Epub ahead of print]**

**The challenge of predicting cerebral palsy.**

Haataja L.

This commentary is on the review by Romeo et al.

[PMID: 26347464](#)

**16. Dev Med Child Neurol. 2015 Sep 6. doi: 10.1111/dmcn.12924. [Epub ahead of print]**

**Happiness and well-being: surgical outcomes for families and children with severe cerebral palsy.**

Gannotti M.

This commentary is on the original article by DiFazio et al.

[PMID: 26344927](#)

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## Prevention and Cure

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No New Articles Available