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## Interventions and Management

### 1. *Acta Ortop Bras.* 2015 Sep-Oct;23(5):259-62. doi: 10.1590/1413-785220152305142813.

#### **Nerve Endings and Vascular Supply in Semitendinosus Tendon of Cerebral Palsy Children.**

Grzegorzewski A, Synder M, Modrzewski T, Drobniewski M, Polgaj M, Sibiński M.

**OBJECTIVE:** To evaluate the distribution of SP (substance P) and S-100 peptide immunoreactivity, as well as the vascular supply of tissues commonly used as grafts for anterior cruciate ligament (ACL) reconstruction. A second aim was to compare the above mentioned distribution in the semitendinosus muscle tendons of cerebral palsy (CP) patients with the semitendinosus muscle tendons and patellar tendons of patients without CP. **METHODS:** The first group consisted of 14 children with cerebral palsy with a mean age of 11.7 years old. At the time of hamstring lengthening operation, a sample of semitendinosus muscle was taken for analysis. The second group comprised 20 patients treated for isolated ACL rupture of the knee (mean age 32 years old). Group three comprised ten patients in the mean age of 14.3 years old treated for recurrent lateral patellar dislocation, and from whom a sample of patellar tendon was obtained. **RESULTS:** No statistically significant differences were demonstrated with regard to the amount of immunopositive nerve fibers expressing SP or S-100 in all 3 groups of patients. A significant difference was noted in the number of blood vessels between the adult and child semitendinosus muscles, but not between the semitendinosus muscles and patellar tendon of children. **CONCLUSION:** The number of nociceptors as well as proprioceptive fibers is similar in patients with CP and patients from a neurologically healthy population. Level of Evidence IV, Cases Series.

[PMID: 26981034](#)

### 2. *Comput Methods Biomech Biomed Engin.* 2016 Mar 15:1-6. [Epub ahead of print]

#### **Custom sizing of lower limb exoskeleton actuators using gait dynamic modelling of children with cerebral palsy.**

Samadi B, Achiche S, Parent A, Ballaz L, Chouinard U, Raison M.

The use of exoskeletons as an aid for people with musculoskeletal disorder is the subject to an increasing interest in the research community. These devices are expected to meet the specific needs of users, such as children with cerebral palsy (CP) who are considered a significant population in pediatric rehabilitation. Although these exoskeletons should be designed to ease the movement of people with physical shortcoming, their design is generally based on data obtained from healthy adults, which leads to oversized components that are inadequate to the targeted users. Consequently, the objective of this study is to custom-size the lower limb exoskeleton actuators based on dynamic modeling of the human body for children with CP on the basis of hip, knee, and ankle joint kinematics and dynamics of human body during gait. For this purpose, a multibody modeling of the human body of 3 typically developed children (TD) and 3 children with CP is used. The results show significant differences in gait patterns especially in knee and ankle with respectively 0.39 and -0.33 (Nm/kg) maximum torque differences between TD children and children with CP. This study provides the recommendations to support the design of actuators to normalize the movement of children with CP.

[PMID: 26980164](#)

**3. Gait Posture. 2016 Mar;45:1-6. doi: 10.1016/j.gaitpost.2015.12.004. Epub 2015 Dec 29.**

**Biomechanical and perceived differences between overground and treadmill walking in children with cerebral palsy.**

Jung T, Kim Y, Kelly LE, Abel MF.

The treadmill is widely used as an instrument for gait training and analysis. The primary purpose of this study was to compare biomechanical variables between overground and treadmill walking in children with cerebral palsy (CP). Perceived differences between the two walking modes were also investigated by comparing self-selected walking speeds. Twenty children with CP performed both overground and treadmill walking at a matched speed for biomechanical comparison using a 3-D motion analysis system. In addition, they were asked to select comfortable and fastest walking speeds under each walking condition to compare perceived differences. Significant differences in spatiotemporal variables were found including higher cadence and shorter stride length during treadmill walking at a matched speed (for all,  $P < .003$ ). The comparison of joint kinematics demonstrated significant differences between overground and treadmill walking, which showed increases in peak angles of ankle dorsi-flexion, knee flexion/extension, and hip flexion (for all,  $P < .001$ ), increases in ankle and hip excursions and a decrease in pelvic rotation excursion while walking on treadmill (for all,  $P < .002$ ). Comparison of perceived difference revealed that children with CP chose significantly slower speeds when asked to select their comfortable and fastest walking speeds on the treadmill as compared to overground (for both,  $P < .001$ ). Our results suggest that these biomechanical and perceived differences should be considered when using a treadmill for gait intervention or assessment.

[PMID: 26979874](#)

**4. J Child Orthop. 2016 Mar 14. [Epub ahead of print]**

**Inter-observer and intra-observer reliability in the radiographic diagnosis of avascular necrosis of the femoral head following reconstructive hip surgery in children with cerebral palsy.**

Hesketh K, Sankar W, Joseph B, Narayanan U, Mulpuri K.

**PURPOSE:** The incidence of avascular necrosis (AVN) following reconstructive hip surgery in cerebral palsy (CP) ranges from 0 to 69 % in the current literature. The purpose of this study was to determine the inter- and intra-observer reliability of radiographically diagnosing AVN in children with CP after hip surgery. **METHODS:** A retrospective review of 65 children with CP who had reconstructive hip surgery between 2009 and 2012 at BC Children's Hospital was completed. Anterior-posterior and lateral radiographs were presented to four pediatric orthopaedic surgeons over two rounds. Surgeons were asked to review the set of unidentified radiographs and comment 'yes' or 'no' for the presence of AVN. Two weeks later the same set of radiographs was sent in a different order and the surgeons were again asked to comment on AVN. Inter- and intra-observer reliability was determined using kappa statistics. **RESULTS:** The intra-observer reliability ranged from 0.65 to 0.88 with an average score of 0.76. Inter-observer reliability showed greater variability, ranging from 0.41 to 0.77 with an average score of 0.56 across all surgeons. **CONCLUSIONS:** Although the intra-rater reliability produced a strength of "good" and the inter-rater reliability a strength of "moderate" agreement, the variability within these scores is clinically important as it demonstrates the difficulty in identifying AVN. This may explain the variability in AVN that is reported in the literature. The need for further education and research in the diagnosis of AVN in children with CP who have undergone reconstructive hip surgery is clinically necessary.

[PMID: 26972813](#)

**5. Dev Med Child Neurol. 2016 Mar 16. doi: 10.1111/dmcn.13091. [Epub ahead of print]**

**Obstructive sleep apnea in children with cerebral palsy and epilepsy.**

Garcia J, Wical B, Wical W, Schaffer L, Wical T, Wendorf H, Roiko S.

**AIM:** To examine the risk of obstructive sleep apnea (OSA) in children with cerebral palsy (CP) and/or epilepsy. **METHOD:** This cross-sectional study employs the Pediatric Sleep Questionnaire (PSQ), the Gross Motor Function Classification System (GMFCS), and chart review to identify symptoms of OSA in children presenting to a multi-specialty pediatric healthcare institution. **RESULTS:** Two-hundred and fifteen patients were grouped into those with epilepsy ( $n=54$ ), CP ( $n=18$ ), both ( $n=55$ ), and neither (comparison group,  $n=88$ ). The comparison group comprised children with developmental disabilities but not children with typical development. Significantly increased PSQ scores (indicating increased risk of OSA) were found

among children with CP (58%) and CP with epilepsy (67%) than among the comparison group (27%;  $p < 0.001$  and  $p < 0.0001$  respectively). Children with both CP and epilepsy had a greater number of increased PSQ scores compared with CP alone ( $p < 0.05$ ). Increased PSQ scores were observed with increasing CP severity as measured using the GMFCS. The PSQ identified more children at risk of OSA (46%) than did the medical record review for symptoms of OSA (8.2%,  $p < 0.001$ ).

INTERPRETATION: Children with CP of greater severity or comorbid epilepsy are at increased risk of OSA. This study supports the routine questionnaire-based assessment for OSA as a regular part of the care of all children with CP, especially in those with more severe CP and those with epilepsy.

[PMID: 26991829](#)

**6. J Neuroeng Rehabil. 2016 Mar 12;13(1):25. doi: 10.1186/s12984-016-0135-8.**

**Quantitative evaluation for spasticity of calf muscle after botulinum toxin injection in patients with cerebral palsy: a pilot study.**

Lin YC, Lin IL, Chou TF, Lee HM.

BACKGROUND: Cerebral palsy (CP) is the most common pediatric disease to cause motor disability. Two common symptoms in CP are spasticity and contracture. If this occurred in the ankle plantar flexors of children with CP, it will impair their gait and active daily living profoundly. Most children with CP receive botulinum toxin type A (BoNT-A) injection to reduce muscle tone, but a knowledge gap exists in the understanding of changes of neural and non-neural components of spasticity after injection. The purpose of this study was to determine if our device for quantitative modified Tardieu approach (QMTA) is a valid method to assess spasticity of calf muscles after botulinum toxin injection. METHODS: In this study, we intended to develop a device for quantitative measurement of spasticity in calf muscles based on the modified Tardieu scale (MTS) and techniques of biomedical engineering. Our QMTA measures the angular displacement and resistance of stretched joint with a device that is light, portable and can be operated similar to conventional approaches for MTS. The static (R2), dynamic (R1) and R2-R1 angles derived from the reactive signals collected by the miniature sensors are used to represent the non-neural and neural components of stretched spastic muscles. Four children with CP were recruited to assess the change in spasticity in their gastrocnemius muscles before and 4 weeks after BoNT-A injection. RESULTS: A simulated ankle model validated the performance of our device in measuring joint displacement and estimating the angle of catch. Data from our participants with CP showed that R2 and R2-R1 improved significantly after BoNT-A administration. It indicates both neural and non-neural components of the spastic gastrocnemius muscles improved at four weeks after BoNT-A injection in children with CP. CONCLUSION: Our device for QMTA can objectively measure the changes in spasticity of the gastrocnemius muscle in children with cerebral palsy after BoNT-A injection.

[PMID: 26969526](#)

**7. Eur Spine J. 2016 Mar 15. [Epub ahead of print]**

**Erratum to: Annual changes in radiographic indices of the spine in cerebral palsy patients.**

Lee SY, Chung CY, Lee KM, Kwon SS, Cho KJ, Park MS.

Erratum for

Annual changes in radiographic indices of the spine in cerebral palsy patients. [Eur Spine J. 2016]

[PMID: 26980602](#)

**8. Dev Med Child Neurol. 2016 Mar 15. doi: 10.1111/dmcn.13098. [Epub ahead of print]**

**Growth during infancy and early childhood in children with cerebral palsy: a population-based study.**

Strand KM, Dahlseng MO, Lydersen S, Rø TB, Finbråten AK, Jahnsen RB, Andersen GL, Vik T.

AIM: To describe growth in infancy and early childhood in children with cerebral palsy (CP). METHOD: One hundred and four children with CP born at minimum 36 weeks' gestation in 2002 to 2010 were included. Prospectively collected growth data were requested from public health clinics. We calculated standard deviation (SD) scores (z-scores) for weight and height for 12

set age points for each child from birth to 5 years, and for head circumference from birth to 12 months. RESULTS: Children with CP had normal growth in weight and height if they were born non-small for gestational age (non-SGA) or had mild motor impairments (i.e. Gross Motor Function Classification System [GMFCS] I-II), whereas children born SGA or with severe motor impairments (GMFCS III-V) had reduced growth ( $p < 0.001$ ). Children with feeding difficulties in infancy had reduced growth in weight and height throughout early childhood, while children without feeding difficulties had normal growth. Head circumference growth decreased most severely among children born SGA, who had mean z-scores of -3.0 (95% confidence interval [CI] -3.7 to -2.2) at 1 year. INTERPRETATION: Children with mild CP had normal growth in weight and height until 5 years, and in head circumference during infancy. Feeding difficulties in infancy and being born SGA were strongly associated with reduced growth.

[PMID: 26992128](#)

## 9. Disabil Rehabil. 2016 Mar 12:1-6. [Epub ahead of print]

### Sociometric status and the attribution of intentions in a sample of adolescents with cerebral palsy.

Voyer AP, Tessier R, Nadeau L.

**Purpose** To examine how cerebral palsy (CP) and sociometric status at age 10 explain the development of a cognitive bias across two groups of adolescents aged 15. **Method** Children with CP ( $N = 60$ ) and without CP ( $N = 57$ ) are part of a follow-up study. Three categories of sociometric status (popular, average, rejected) were obtained by conducting a class-wide interview in the class of the target children at age 10. At 15 years old, the same children (CP and non-CP) were asked to complete the Home Interview With Child questionnaire measuring a cognitive bias (hostile attribution of intentions (AI)). **Results** Children with CP, especially girls, were significantly more rejected and less popular than controls at age 10. At age 15, among all participants, sociometric rejected and popular children tended to have a higher percentage of hostile AI than sociometric average children. **Conclusions** There were no significant results for the combined effect of CP and sociometric status on the development of hostile AI at age 15. However, knowing the risk incurred by children with CP of being socially rejected, attention should be paid in the rehabilitation process to opportunities for social participation to facilitate the development of social competence. **Implications for Rehabilitation** Level I or II cerebral palsy (CP) is a condition that affects not only motor abilities but also social competence in children. Sociometric status in a group tends to affect the development of the ability to interpret intentions of others during adolescence. Sociometric measures in the class of children with CP could be a useful tool in the rehabilitation process in order to better define social participation opportunities. To improve social participation attempts, rehabilitation interventions should target social initiating skills, flexibility in interpreting peers' behaviours, and ability to react effectively to negative peer treatment.

[PMID: 26972676](#)

## 10. Phys Occup Ther Pediatr. 2016 Mar 16:1-10. [Epub ahead of print]

### Higher Levels of Caregiver Strain Perceived by Indian Mothers of Children and Young Adults with Cerebral Palsy Who have Limited Self-Mobility.

Prakash V, Patel AM, Hariohm K, Palisano RJ.

**AIM:** Describe and compare the caregiver strain experienced among Indian mothers of children and young adults with cerebral palsy (CP) living in low resource settings. **METHODS:** 62 consecutive children and young adults with spastic CP (mean age  $6.0 \pm 4.5$ , range 2-21) and their parents were recruited from an outpatient physiotherapy department for this cross-sectional study. Ability to walk was classified using the Gross Motor Function Classification System and mother's caregiver strain was measured using caregiver strain index (CSI). **RESULTS:** Mothers of children and young adults who have limited self-mobility perceived higher caregiver strain (mean CSI score  $12.0 \pm 1.3$ ,  $p < 0.05$ ) than mothers of children who can walk (mean CSI score  $4.5 \pm 3.0$ ,  $p < 0.05$ ). All 46 mothers of children and youth in GMFCS levels IV and V reported high levels of caregiver stress compared with only three of 16 mothers of children and youth who walk (levels I and II). **CONCLUSIONS:** Physiotherapists and occupational therapists serving children and youth with CP are encouraged to partner with families to identify goals for ease of caregiving, activity, and participation at home and in the community.

[PMID: 26984713](#)

11. *Res Dev Disabil.* 2016 Mar 10;53-54:314-322. doi: 10.1016/j.ridd.2016.02.012. [Epub ahead of print]

**Parents' experiences and needs regarding physical and occupational therapy for their young children with cerebral palsy.**

Kruijssen-Terpstra AJ, Verschuren O, Ketelaar M, Riedijk L, Gorter JW, Jongmans MJ, Boeije H; LEARN 2 MOVE 2-3 Study Group.

**OBJECTIVE:** To explore the experiences and needs of parents of young children (aged 2-4 years) with cerebral palsy (CP) regarding their child's physical and occupational therapy process in a rehabilitation setting. **METHODS:** A qualitative design was used involving semi-structured interviews with 21 parents of young children with CP. Interviews were conducted until informational redundancy was achieved. **RESULTS:** Three major themes were identified: Information, communication and partnership. A fourth, overarching theme emerged: The process of parent empowerment. Experiences and needs differed between parents and changed over time. **CONCLUSION:** This study suggests that various themes play a key role in the experiences and needs of parents of young children with CP. The identified themes provide important insights into how and why service providers might change their approach. **PRACTICE IMPLICATIONS:** Becoming empowered is a dynamic process for parents, in which both parents and service providers play a role. Service providers should continually adapt their role to parents' needs of information, communication and partnership, and they should support and facilitate parents in becoming empowered. For that, service providers should be educated on the process of parent empowerment, on ways to facilitate this process and on the importance of involving and interacting with parents. This allows families of young children with CP to be provided with services that best suit their needs.

[PMID: 26970858](#)

12. *Scand J Occup Ther.* 2016 Mar 15:1-6. [Epub ahead of print]

**Test-retest reproducibility of the Assessment of Motor and Process Skills for school-aged children with acquired brain injuries.**

Sakzewski L, Lewis M, Ziviani J.

**Background** Persistent impairments resulting from childhood acquired brain injury (ABI) can impact performance of activities of daily living (ADL). Objective and reliable measures of ADL skills are required for treatment planning and research. **Aim** To evaluate test-retest reproducibility of the Assessment of Motor and Process Skills (AMPS) for children with ABI. **Methods** Twenty-eight children with ABI (mean age 11 years 7 months, SD 2 years 4 months; males = 11) were recruited. Two AMPS tasks were performed over two consecutive days, as per standardized AMPS procedures. Intraclass correlation coefficients (ICC; 2,1), standard error of measurement (SEM), smallest detectable difference (SDD), and 95% limits of agreement (Bland-Altman) were calculated. **Results** Test-retest reliability was fair to good for AMPS ADL motor (ICC 0.55) and ADL process (ICC 0.58) measures. The SEM was 0.36 and 0.34 logits for AMPS ADL motor and ADL process measures respectively. The SDD was 1.0 (motor) and 0.93 logits (process) measures. A learning effect was evident. **Conclusion** Test-retest reproducibility of the AMPS was fair to good for children with ABI, which is poorer than previously published data. Administration of the AMPS in an unfamiliar environment, fatigue, and the small time interval between testing sessions may have contributed to poorer results. The AMPS remains a useful measure of ADL, contributing to our understanding of task execution processes.

[PMID: 26980287](#)

## Prevention and Cure

13. *Neural Regen Res.* 2016 Jan;11(1):45-8. doi: 10.4103/1673-5374.175041.

**Unmasking the responses of the stem cells and progenitors in the subventricular zone after neonatal and pediatric brain injuries.**

Clausi MG, Kumari E, Levison SW.

There is great interest in the regenerative potential of the neural stem cells and progenitors that populate the subventricular zone (SVZ). However, a comprehensive understanding of SVZ cell responses to brain injuries has been hindered by the lack of sensitive approaches to study the cellular composition of this niche. Here we review progress being made in deciphering the cells of the SVZ gleaned from the use of a recently designed flow cytometry panel that allows SVZ cells to be parsed into multiple subsets of progenitors as well as putative stem cells. We review how this approach has begun to unmask both the heterogeneity of SVZ cells as well as the dynamic shifts in cell populations with neonatal and pediatric brain injuries. We also discuss how flow cytometric analyses also have begun to reveal how specific cytokines, such as Leukemia inhibitory factor are coordinating SVZ responses to injury.

[PMID: 26981076](#)

14. *AJNR Am J Neuroradiol.* 2016 Mar 17. [Epub ahead of print]

**Whole-Brain DTI Assessment of White Matter Damage in Children with Bilateral Cerebral Palsy: Evidence of Involvement beyond the Primary Target of the Anoxic Insult.**

Arrigoni F, Peruzzo D, Gagliardi C, Maghini C, Colombo P, Iammarrone FS, Pierpaoli C, Triulzi F, Turconi AC.

**BACKGROUND AND PURPOSE:** Cerebral palsy is frequently associated with both motor and nonmotor symptoms. DTI can characterize the damage at the level of motor tracts but provides less consistent results in nonmotor areas. We used a standardized pipeline of analysis to describe and quantify the pattern of DTI white matter abnormalities of the whole brain in a group of children with chronic bilateral cerebral palsy and periventricular leukomalacia. We also explored potential correlations between DTI and clinical scale metrics. **MATERIALS AND METHODS:** Twenty-five patients (mean age, 11.8 years) and 25 healthy children (mean age, 11.8 years) were studied at 3T with a 2-mm isotropic DTI sequence. Differences between patients and controls were assessed both voxelwise and in ROIs obtained from an existing DTI atlas. Clinical metrics included the Gross Motor Function Classification System, the Manual Ability Classification System, and intelligence quotient. **RESULTS:** The voxel-level and ROI-level analyses demonstrated highly significant ( $P < .001$ ) modifications of DTI measurements in patients at several levels: cerebellar peduncles, corticospinal tracts and posterior thalamic radiations, posterior corpus callosum, external capsule, anterior thalamic radiation, superior longitudinal fasciculi and corona radiata, optic nerves, and chiasm. The reduction of fractional anisotropy values in significant tracts was between 8% and 30%. Statistically significant correlations were found between motor impairment and fractional anisotropy in corticospinal tracts and commissural and associative tracts of the supratentorial brain. **CONCLUSIONS:** We demonstrated the involvement of several motor and nonmotor areas in the chronic damage associated with periventricular leukomalacia and showed new correlations between motor skills and DTI metrics.

[PMID: 26988814](#)

15. *Eur J Paediatr Neurol.* 2016 Mar 2. pii: S1090-3798(16)00044-1. doi: 10.1016/j.ejpn.2016.02.011. [Epub ahead of print]

**Comparison of psychomotor outcome in patients with perinatal asphyxia with versus without therapeutic hypothermia at 4 years using the Ages and Stages Questionnaire screening tool.**

Zonnenberg IA, Koopman C, van Schie PE, Vermeulen RJ, Groenendaal F, van Weissenbruch MM.

**INTRODUCTION:** Therapeutic hypothermia improves outcome after perinatal asphyxia. The Ages and Stages Questionnaire is a screening tool to detect neurodevelopmental delay. In this study we examined the outcome of patients with perinatal asphyxia (defined as Apgar score  $<5$  at 10 min, or continued need for resuscitation, or pH  $< 7.00$  in umbilical cord or within one hour

after birth) with and without therapeutic hypothermia treatment at the age of four years. **METHODS:** Cohort study of patients with perinatal asphyxia admitted to the Neonatal Intensive Care Units of the VU University Medical Center, Amsterdam and the Wilhelmina Children's Hospital, Utrecht in the year 2008. Parents were asked to fill out the 48 months Ages and Stages Questionnaire (ASQ). In Wilhelmina Children's Hospital treatment with therapeutic hypothermia was implemented in 2008, in the VU University Medical Center in 2009, providing a historical cohort. **RESULTS/DISCUSSION:** Twenty-three questionnaires were evaluated. Response rate of questionnaires for the VU Medical Center was 63% (n = 10) and Wilhelmina's Children's Hospital 93% (n = 13). No significant differences were found in the mean scores between both groups. However, the untreated group scored more frequently under the -2 SD threshold. In the fine motor skills domain the difference was statistically significant (p = 0.031). In the treated group no patients developed cerebral palsy and in the untreated group two patients developed cerebral palsy. **CONCLUSION:** In this study patients treated with hypothermia tend to have a better neurodevelopmental outcome. No significant differences were found between the two groups, apart from the fine motor skills.

[PMID: 26970946](#)

**16. J Pediatr. 2016 Mar 9. pii: S0022-3476(16)00146-3. doi: 10.1016/j.jpeds.2016.01.069. [Epub ahead of print]**

**Multimodal Outcome at 7 Years of Age after Neonatal Arterial Ischemic Stroke.**

Chabrier S, Peyric E, Drutel L, Deron J, Kossorotoff M, Dinomais M, Lazaro L, Lefranc J, Thébault G, Dray G, Fluss J, Renaud C, Nguyen The Tich S; Accident Vasculaire Cérébral du nouveau-né (AVCnn; [Neonatal Stroke]) Study Group.

**OBJECTIVES:** To evaluate the epileptic, academic, and developmental status at age 7 years in a large population of term-born children who sustained neonatal arterial ischemic stroke (NAIS), and to assess the co-occurrence of these outcomes. **STUDY DESIGN:** A cohort study including 100 term newborns with NAIS was designed. Two infants died during the neonatal period, 13 families were lost to follow-up, and 5 families declined to participate in this evaluation. Thus, 80 families completed the 7-year clinical assessment. Epileptic status, schooling, motor abilities, global intellectual functioning, spoken language, and parental opinions were recorded. Principal component analysis was applied. **RESULTS:** Rates of impaired language, cerebral palsy, low academic skills, active epilepsy, and global intellectual deficiency were 49%, 32%, 28%, 11%, and 8%, respectively. All were highly correlated. Eventually, 59% of children were affected by at least 1 of the aforementioned conditions. In 30% of cases, the viewpoints of health practitioners and parents did not match. **CONCLUSION:** The prevalence of severe disabilities at 7 years after NAIS is low, but most children exhibit some impairment in developmental profile.

[PMID: 26968833](#)

**17. Appl Neuropsychol Child. 2016 Mar 17:1-8. [Epub ahead of print]**

**Recent Advances in the Neuroimaging and Neuropsychology of Cerebral Palsy.**

Gosling AS.

This article reviews the recent advances in understanding of cerebral palsy (CP) and outlines how these advances could inform pediatric neuropsychological rehabilitation. Three main areas are discussed: the improved delineation of differing presentations resulting from more advanced imaging techniques with emerging links to function; a brief review of research examining neuropsychological functioning of children with CP and their quality of life and participation; and lastly, some of the evidence for efficacious interventions and the extent to which these interventions are derived from neuropsychological theory and practice. Advances and gaps in knowledge in addition to suggestions of areas for future focus in research and practice are discussed throughout the article.

[PMID: 26985833](#)