

Monday 19 December 2016

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Interventions and Management

1. Systematic review of the effects of mirror therapy in children with cerebral palsy.

Park EJ, Baek SH, Park S.

J Phys Ther Sci. 2016 Nov;28(11):3227-3231. Epub 2016 Nov 29.

Purpose: To provide data for systematic intervention plans in occupational therapy practice by objectivity showing the value of mirror therapy interventions in children with cerebral palsy. **Subjects and Methods:** Medline and EMBASE databases were searched for the key words "cerebral palsy," "mirror movement," "mirror therapy," and "mirror visual feedback." Nine studies that met the inclusion and exclusion criteria were identified. The qualitatively determined level of evidence, period of research, comparisons and interventions, tools used to measure the intervention, and the effects were analyzed. **Results:** According to the results analyzed, one (1/9, 11.1%) study showed the same result as the control group, one (1/9, 11.1%) showed a negative effect, and seven (7/9, 77.8%) showed positive effects of mirror-mediated therapy, with meaningful improvement in function, such as hand strength, movement speed, muscle activity, and accuracy of hand matching. **Conclusion:** Through this study, the value of mirror-mediated therapeutic interventions in occupational therapy practice targeting cerebral palsy was confirmed. It is expected that this result will be useful in establishing mirror therapy as an interventional program.

[PMID: 27942154](#)

2. The effects of neck and trunk stabilization exercises on upper limb and visuoperceptual function in children with cerebral palsy.

Shin JW, Song GB.

J Phys Ther Sci. 2016 Nov;28(11):3232-3235. Epub 2016 Nov 29.

Purpose:The present study aimed to investigate the effects of neck and trunk stabilization exercises on upper limb and visuoperceptual function in children with cerebral palsy. The Jebson-Taylor hand function test and the Korean Developmental Test of Visual Perception-2 (K-DTVP-2) test were utilised. **Subjects and Methods:** The study subjects were 11 schoolchildren who had paraplegia caused by premature birth, and who had been diagnosed with periventricular leukomalacia. Kinesitherapy was implemented in individual children for eight weeks, twice a week, for 45 minutes at a time. After a preliminary evaluation, kinesitherapy, including neck and trunk stabilization exercises common to all the children, was implemented for eight weeks according to the functioning and level of each child. A post evaluation was performed after the eight weeks of kinesitherapy. **Results:** The intervention showed a significant effect in five subcategories of the Jebson-Taylor hand function test, as well as according to the K-DTVP-2 test.

Conclusion: Because neck and trunk stabilization exercises requiring positive participation by the children included fundamental elements of daily living motion, the exercises might have had a positive effect on upper limb and visuoperceptual function.

[PMID: 27942155](#)

3. Hallux valgus deformity correction without fusion in children with cerebral palsy.

Bayhan IA, Kadhim M, Sees JP, Nishnianidze T, Rogers KJ, Er MS, Miller F.

J Pediatr Orthop B. 2016 Dec 9. [Epub ahead of print]

This study aimed to evaluate the outcomes of nonarthrodesis surgical treatment of hallux valgus (HV) deformity in children with cerebral palsy using radiographic and gait analysis parameters. There were 25 patients who had hallux valgus correction in 39 feet. The mean age at surgery was 15 ± 2.8 years and the mean follow-up duration was 14.6 months. The first metatarsal osteotomy was performed in nine feet, bunionectomy in 25 feet, and Aiken osteotomy in 32 feet. None had metatarsophalangeal joint fusion. We observed a significant correlation between HV correction and other foot and ankle gait parameters. Our study showed correction of HV deformity at short-term follow-up without fusion of the metatarsophalangeal joint. LEVEL OF EVIDENCE: Level IV Therapeutic Studies.

[PMID: 27941531](#)

4. Influence of patellar position on the knee extensor mechanism in normal and crouched walking.

Lenhart RL, Brandon SC, Smith CR, Novacheck TF, Schwartz MH, Thelen DG.

J Biomech. 2016 Nov 22. pii: S0021-9290(16)31231-3. doi: 10.1016/j.jbiomech.2016.11.052. [Epub ahead of print]

Patella alta is common in cerebral palsy, especially in patients with crouch gait. Correction of patella alta has been advocated in the treatment of crouch, however the appropriate degree of correction and the implications for knee extensor function remain unclear. Therefore, the goal of this study was to assess the impact of patellar position on quadriceps and patellar tendon forces during normal and crouch gait. To this end, a lower extremity musculoskeletal model with a novel 12 degree of freedom knee joint was used to simulate normal gait in a healthy child, as well as mild (23 deg min knee flexion in stance), moderate (41 deg), and severe (67 deg) crouch gait in three children with cerebral palsy. The simulations revealed that quadriceps and patellar tendon forces increase dramatically with crouch, and are modulated by patellar position. For example with a normal patellar tendon position, peak patellar tendon forces were 0.7 times body weight in normal walking, but reached 2.2, 3.2 and 5.4 times body weight in mild, moderate and severe crouch. Moderate patella alta acted to reduce quadriceps and patellar tendon loads in crouch gait, due to an enhancement of the patellar tendon moment arms with alta in a flexed knee. In contrast, patella baja reduced the patellar tendon moment arm in a flexed knee and thus induced an increase in the patellar tendon loads needed to walk in crouch. Functionally, these results suggest that patella baja could also compromise knee extensor function for other flexed knee activities such as chair rise and stair climbing. The findings are important to consider when using surgical approaches for correcting patella alta in children who exhibit crouch gait patterns.

[PMID: 27939752](#)

5. The Gross Motor Function Classification System Family Report Questionnaire: reliability between special-education teachers and caregivers.

Ramrit S, Yonglitthipagon P, Janyacharoen T, Emasithi A, Siritaratiwat W.

Dev Med Child Neurol. 2016 Dec 14. doi: 10.1111/dmcn.13356. [Epub ahead of print]

The aim of this study was to investigate the reliability of the Thai Gross Motor Function Classification System Family Report Questionnaire (GMFCS-FR) and the possibility of special-education teachers and caregivers in the community using this system in children with cerebral palsy (CP). METHOD: The reliability was examined by two teachers and two caregivers who classified 21 children with CP aged 2 to 12 years. A GMFCS-FR workshop was organized for raters. The teachers and caregivers classified the mobility of 362 children. The rater reliability was analysed using the weighted kappa coefficient. The possibility of using the GMFCS-FR is reported.

The reliability of using the GMFCS-FR in the community was analysed by the intraclass correlation coefficient. RESULTS: The intrarater reliability ranged from 0.91 to 1.00. The interrater reliability between teachers was 0.85 (95% confidence interval [CI] 0.69-0.97) and between caregivers was 0.84 (95% CI 0.70-0.97). Ninety-seven percent of raters used the Thai GMFCS-FR correctly. The overall intraclass correlation coefficient between raters was 0.90 (95% CI 0.88-0.92). INTERPRETATION: The Thai GMFCS-FR is a reliable system for classifying the motor function of young children with CP by teachers and caregivers in the community.

[PMID: 27966216](#)

6. Commentary on "Effects of Combined Exercise Training on Functional Performance in Children with Cerebral Palsy: A Randomized-Controlled Study".

Moore JG, Gimenez CW.

Pediatr Phys Ther. 2017 Jan;29(1):46.

[PMID: 27984467](#)

7. Effects of Combined Exercise Training on Functional Performance in Children With Cerebral Palsy: A Randomized-Controlled Study.

Peungsuwan P, Parasin P, Siritaratiwat W, Prasertnu J, Yamauchi J.

Pediatr Phys Ther. 2017 Jan;29(1):39-46.

The purpose of this study was to investigate the effects of combined exercise training on functional performance in participants with cerebral palsy. METHODS: Fifteen participants with spastic cerebral palsy were randomly allocated into either exercise or control groups. Participants in the exercise group participated in a combined strength and endurance training program for 70 minutes per day, 3 days per week, for 8 weeks, whereas those in the control group did not participate in an exercise program. Study participants in both groups continued with their regular physical therapy during the study. RESULTS: After the 8-week training, a 6-minute walk, 30-second sit-to-stand, 10-m walk, and Functional Reach Tests, participants in the exercise group had significant improvement over their baseline values and were significantly higher than those in the control group. CONCLUSIONS: Combined exercise training improved walking ability, functional lower limb strength, and balance in participants with cerebral palsy.

[PMID: 27984466](#)

8. Commentary on "Habitual Physical Activity in Children With Cerebral Palsy Age 4 to 5 Years Across All Functional Abilities".

Linehan M, Kerkering G.

Pediatr Phys Ther. 2017 Jan;29(1):15.

[PMID: 27984459](#)

9. Habitual Physical Activity in Children With Cerebral Palsy Aged 4 to 5 Years Across All Functional Abilities.

Keawutan P, Bell KL, Oftedal S, Davies PS, Ware RS, Boyd RN.

Pediatr Phys Ther. 2017 Jan;29(1):8-14.

To compare ambulatory status in children with cerebral palsy aged 4 to 5 years with their habitual physical activity and time spent sedentary, and to compare their activity with physical activity guidelines. METHODS: Sixty-seven participants-independently ambulant, marginally ambulant, and nonambulant-wore accelerometers for 3 days. Time spent sedentary as a percentage of wear time and activity counts were compared between groups.

RESULTS: There were significant differences in time spent sedentary and activity counts between groups. Children who were independently ambulant were more likely to meet physical activity guidelines. **CONCLUSION:** Children with cerebral palsy spent more than half of their waking hours in sedentary time. Interventions to reduce sedentary behavior and increase habitual physical activity are needed in children with cerebral palsy at age 4 to 5 years.

[PMID: 27984458](#)

10. Commentary on "Developing a Clinical Protocol for Habitual Physical Activity Monitoring in Youth With Cerebral Palsy".

Bjornson K, Lyman J.

Pediatr Phys Ther. 2017 Jan;29(1):7.

[PMID: 27984457](#)

11. Developing a Clinical Protocol for Habitual Physical Activity Monitoring in Youth With Cerebral Palsy.

Nicholson K, Weaver A, George A, Hulbert R, Church C, Lennon N.

Pediatr Phys Ther. 2017 Jan;29(1):2-7.

The StepWatch (SW) has been used to monitor physical activity (PA) in youth with cerebral palsy; however, there is no standard collection protocol. The goal was to develop such a protocol. **METHODS:** Data were examined from patients who wore the SW for 8 to 14 days. The Spearman-Brown prediction formula determined the minimum number of days for reliable PA. Weekdays were compared to weekends and 10- and 60-second collection intervals were examined. **RESULTS:** The PA data were collected from 98 youth with cerebral palsy. Results showed 3 days would provide reliable representation of PA, participants took significantly more steps during school days compared with weekends, and there were no differences between collection intervals. **CONCLUSIONS:** We recommend setting the SW for 7 days at 10-second collection rate. Data should be analyzed if at least 3 days of data are present. Weekdays and weekend days should be noted, and both included when possible.

[PMID: 27984456](#)

12. Supports and barriers to implementation of routine clinical assessment for children with cerebral palsy: A mixed-methods study.

Kerr C2, Shields N, Quarmby L, Roberts K, Imms C; 'Best Service at the Best Time' group *.

Disabil Rehabil. 2016 Dec 15:1-10. [Epub ahead of print]

The purpose of this study is to investigate supports and barriers to evidence-based routine clinical assessment of children with cerebral palsy. **METHOD:** This mixed methods study included physiotherapists, occupational therapists and speech pathologists providing services to children with cerebral palsy (3-18 years) within five organizations across Australia. Four organizations initiated standardized routine clinical data collection (Commencing organizations), and one had previously mandated routine assessment (Comparison organization). Participants completed the Supports and Barriers Questionnaire (n = 227) and participated in focus groups (n = 8 groups, 37 participants). Quantitative data were summarized descriptively, qualitative data were analyzed thematically and comparisons between organizations assessed. **RESULTS:** Organizational structures, resources, therapists within organizations, assessment tools, and children and families were, on average, viewed as supportive of routine clinical assessment. There were no differences between the Comparison and Commencing organizations except 'therapists within the organization' were viewed as more supportive by the Commencing organizations (p = 0.037). Five themes were derived from qualitative analyzes: motivation to adopt routine clinical assessment; acquiring and utilizing expertise; ensuring effective ongoing communication; availability and distribution of resources; and therapist perceptions of child and family wishes. **CONCLUSIONS:** Organizations experience challenges to effective and sustained implementation of routine clinical assessment. Adequate resourcing and positive, clear communication were perceived as critical for success. Implications for Rehabilitation The value of routine clinical assessment of children with cerebral palsy is undisputed.

Tailored solutions to organization-specific challenges are required when implementing routine clinical assessment for children with cerebral palsy. Positive, clear communication of organizational priorities by management may assist AHPs to prioritize workload activities when changing practice.

[PMID: 27973929](#)

13. Effects of Aquatic Intervention on Gross Motor Skills in Children with Cerebral Palsy: A Systematic Review.

Roostaei M, Baharlouei H, Azadi H, Fragala-Pinkham MA.

Phys Occup Ther Pediatr. 2016 Dec 14:1-20. [Epub ahead of print]

To review the literature on the effects of aquatic intervention on gross motor skills for children with cerebral palsy (CP). **DATA SOURCES:** Six databases were searched from inception to January 2016. **REVIEW METHODS:** Aquatic studies for children aged 1-21 years with any type or CP classification and at least one outcome measuring gross motor skills were included. Information was extracted on study design, outcomes, and aquatic program type, frequency, duration, and intensity. Quality was rated using the Centre of Evidence-Based Medicine: Levels of Evidence and the PEDro scale. **RESULTS:** Of the 11 studies which met inclusion criteria, only two used randomized control trial design, and the results were mixed. Quality of evidence was rated as moderate to high for only one study. Most studies used quasi-experimental designs and reported improvements in gross motor skills for within group analyses after aquatic programs were held for two to three times per week and lasting for 6-16 weeks. Participants were classified according to the Gross Motor Function Classification System (GMFCS) levels I-V, and were aged 3-21 years. Mild to no adverse reactions were reported. **CONCLUSIONS:** Evidence on aquatic interventions for ambulatory children with CP is limited. Aquatic exercise is feasible and adverse effects are minimal; however, dosing parameters are unclear. Further research is needed to determine aquatic intervention effectiveness and exercise dosing across age categories and GMFCS levels.

[PMID: 27967298](#)

14. Association of environmental enrichment and locomotor stimulation in a rodent model of cerebral palsy: Insights of biological mechanisms.

Meireles AL, Marques MR, Segabinazi E, Spindler C, Piazza FV, Salvalaggio GS, Augustin OA, Achaval M, Marcuzzo S.

Brain Res Bull. 2016 Dec 7;128:58-67. doi: 10.1016/j.brainresbull.2016.12.001. [Epub ahead of print]

Several physiotherapy approaches are used with different aims in the treatment of cerebral palsy (CP), such as the early stimulation and the locomotor training, but their biological effects, isolated or combined, are not completely known. In animals models, these strategies can be compared, with due translational restrictions, to the environmental enrichment (EE), that involves the enhancement of animal's physical and social environment, and locomotor stimulation (LS), that can be performed using the treadmill adapted for rats. This study was designed to describe which biological and functional mechanisms underlying rehabilitative process in clinical practice. Male rat pups were initially divided in two groups: control (healthy) and submitted to a CP model. Then, pups were divided in eight groups: CP, CPEE, CPLS, CPEELS and its respectively control groups. Functional outcomes were assessed at the postnatal day (P) 31 and P52. The tibialis anterior and soleus muscles, tibia bone parameters, the expression of synaptophysin in the primary motor cortex (M1) and ventral horn (VH) of the spinal cord, were evaluated. The association of therapies was able to improve the functional assessments and musculoskeletal parameters. Isolated therapies presented complementary benefits in CP, but the association of therapies proved to be a fundamental and effective strategy to functional recovery, besides alter positively all biological tissues evaluated in this study.

[PMID: 27940102](#)

15. Pain hurts 2: changes over time in children and young people with cerebral palsy.

Jahnsen R.

Dev Med Child Neurol. 2016 Dec 16. doi: 10.1111/dmcn.13365. [Epub ahead of print]

[PMID: 27981575](#)

16. Commentary on "The Relationships Between Capacity and Performance in Youths With Cerebral Palsy Differ for GMFCS Levels".

Rodby-Bousquet E, Altizer W.

Pediatr Phys Ther. 2017 Jan;29(1):29.

[PMID: 27984463](#)

17. The Relationships Between Capacity and Performance in Youths With Cerebral Palsy Differ for GMFCS Levels.

Ho PC, Chang CH, Granlund M, Hwang AW.

Pediatr Phys Ther. 2017 Jan;29(1):23-29.

PURPOSE: To examine change in, and longitudinal relationships between motor capacity and activity performance across the Gross Motor Function Classification System (GMFCS). **METHODS:** Ninety-two youths with cerebral palsy were examined at 2 time points, 1 year apart, using the Gross Motor Function Measure-66 (GMFM-66) for motor capacity, and the Chinese version of the Activities Scale for Kids-Performance Version (ASKp-C) for activity performance. The score changes and capacity-to-performance/performance-to-capacity pathways were explored across GMFCS levels. **RESULTS:** The GMFM-66 scores declined over time in GMFCS levels IV-V while ASKp-C scores increased in GMFCS level I. The correlations for both pathways in GMFCS levels I, III, and IV-V were significant with a higher correlation for performance-to-capacity pathway in GMFCS levels IV-V. **CONCLUSIONS:** Longitudinal changes in and relationships between capacity and performance differ between GMFCS levels. The opportunities to perform activities need to be emphasized in GMFCS levels IV-V.

[PMID: 27984462](#)

18. Phakic Intraocular Collamer Lens (Visian ICL) Implantation for Correction of Myopia in Spectacle-Aversive Special Needs Children.

Tychsen L, Faron N, Hoekel J.

Am J Ophthalmol. 2016 Dec 6. pii: S0002-9394(16)30591-8. doi: 10.1016/j.ajo.2016.11.016. [Epub ahead of print]

A subset of children with high anisometropia or isoametropia and neurobehavioral disorders have chronic difficulties with spectacle or contact lens wear. We report the results of refractive surgery in a series of these children treated using bilateral or unilateral intraocular collamer lens (Visian ICL) implantation for moderate to high myopia.

DESIGN: Prospective non-randomized cohort study. **METHODS:** Clinical course and outcome data were collated prospectively for 40 implanted eyes in 23 children (mean age 10.2 ± 5.3 years, range, 1.8-17 years). Myopia ranged from -3.0 to -14.5 D, mean -9.2 ± 3.5 D. Goal refraction was plano to + 1 D. Correction was achieved by sulcus implantation of a Visian ICL under general anesthesia. Mean follow-up was 15.1 months (range, 6-22 months). **RESULTS:** 35 eyes (88%) were corrected to within ± 1.0 D of goal refraction; the other 12% were corrected to within 1.5 D. Uncorrected distance visual acuity improved substantially in all eyes (from a mean 20/1050 [logMAR 1.72] to a mean 20/42 [logMAR 0.48]). Spherical regression at last follow up was an average +0.59 D. Visuomotor co-morbidities (e.g. amblyopia, nystagmus, foveopathy, optic neuropathy) accounted for residual post-operative, subnormal visual acuity. Thirteen of the 23 (57%) children had a neurobehavioral disorder (e.g. developmental delay/intellectual disability/mental retardation, Down syndrome, cerebral palsy, autism spectrum disorder). Eighty-five percent (11/13) of those children were reported to have enhanced visual awareness, attentiveness, or social interactions. Endothelial cell density was measureable in 6 cooperative children (10 eyes), showing an average 1% decline. Central corneal thickness, measured in all children, increased an average 8 microns. Two children (8%) required unplanned return to the OR on the first post-operative day to alleviate pupillary block caused by a non-patent iridotomy. No other complications were encountered. **CONCLUSION:** Visian ICL implantation improves visual function in special needs children who have moderate to high myopia and difficulties wearing glasses or contact lenses.

[PMID: 27939561](#)

19. Can mastication in children with cerebral palsy be analyzed by clinical observation, dynamic ultrasound and 3D kinematics?

Remijn L, Groen BE, Speyer R, van Limbeek J, Vermaire JA, van den Engel-Hoek L, Nijhuis-van der Sanden MW.

J Electromyogr Kinesiol. 2016 Nov 29;32:22-29. doi: 10.1016/j.jelekin.2016.11.005. [Epub ahead of print]

The aim of this study was to explore the feasibility of the Mastication Observation and Evaluation (MOE) instrument, dynamic ultrasound and 3D kinematic measurements to describe mastication in children with spastic cerebral palsy and typically developing children. Masticatory movements during five trials of eating a biscuit were assessed in 8 children with cerebral palsy, spastic type (mean age 9.08years) and 14 typically developing children (mean age 9.01years). Differences between trials were tested (t-test) and the mastication of individual children with cerebral palsy was analyzed. MOE scores ranged from 17 to 31 (median 24) for the children with cerebral palsy and from 28 to 32 (median 31) for the typically developing children.

There was an increased chewing cycle duration, a smaller left-right and up-down tongue displacement and larger anterior mandible movements for the trials (n=40) of cerebral palsy children ($p < 0.000$ for all comparisons) compared to the trials of typically developing children (n=70). The MOE captures differences in mastication between individual children with cerebral palsy. The MOE items 'jaw movement' and 'fluency and coordination' showed the most similarity with the objective measurements. Objective measurements of dynamic ultrasound and 3D kinematics complemented data from the MOE instrument.

[PMID: 27940411](#)

20. Reliability and validity of a tool to measure the severity of tongue thrust in children: the tongue thrust rating scale.

Serel Arslan S, Demir N, Karaduman AA.

J Oral Rehabil. 2016 Dec 14. doi: 10.1111/joor.12471. [Epub ahead of print]

This study aimed to develop a scale called Tongue Thrust Rating Scale (TTRS), which categorized tongue thrust in children in terms of its severity during swallowing, and to investigate its validity and reliability. METHODS: The study describes the developmental phase of the TTRS and presented its content and criterion-based validity and inter-observer and intra-observer reliability. For content validation, seven experts assessed the steps in the scale over two Delphi rounds. Two physical therapists evaluated videos of 50 children with cerebral palsy (mean age, 57.9 ± 16.8 months), using the TTRS to test criterion-based validity, inter-observer, and intra-observer reliability. The Karaduman Chewing Performance Scale (KCPS) and Drooling Severity and Frequency Scale (DSFS) were used for criterion-based validity. RESULTS: All the TTRS steps were deemed necessary. The content validity index was 0.857. A very strong positive correlation was found between two examinations by one physical therapist, which indicated intra-observer reliability ($r = 0.938$, $p < 0.001$). A very strong positive correlation was also found between the TTRS scores of two physical therapists, indicating inter-observer reliability ($r = 0.892$, $p < 0.001$). There was also a strong positive correlation between the TTRS and KCPS ($r = 0.724$, $p < 0.001$) and a very strong positive correlation between the TTRS scores and DSFS ($r = 0.822$ and $r = 0.755$; $p < 0.001$). These results demonstrated the criterion-based validity of the TTRS. CONCLUSIONS: The TTRS is a valid, reliable, and clinically easy-to-use functional instrument to document the severity of tongue thrust in children. This article is protected by copyright. All rights reserved.

[PMID: 27973693](#)

21. Study on the quality of life of children with cerebral palsy.

Park SK, Yang DJ, Heo JW, Kim JH, Park SH, Uhm YH.

J Phys Ther Sci. 2016 Nov;28(11):3145-3148. Epub 2016 Nov 29.

Prevention and Cure

22. Does maternal psychological distress affect neurodevelopmental outcomes of preterm infants at a gestational age of ≤ 32 weeks.

Bozkurt O, Eras Z, Sari FN, Dizdar EA, Uras N, Canpolat FE, Oguz SS.

Early Hum Dev. 2016 Dec 12;104:27-31. doi: 10.1016/j.earlhumdev.2016.11.006. [Epub ahead of print]

There is some evidence that maternal psychological status in the prenatal and postnatal periods is associated with infants' cognitive, behavioural, and emotional functions. AIM: The aim of this study was to examine the relationships of maternal depression and anxiety with neurodevelopmental outcomes of preterm infants with a gestational age of ≤ 32 weeks, examined at a corrected age of 18 to 22 months. STUDY DESIGN: Cross-sectional study. SUBJECTS: In total, 220 preterm infants with a gestational age of ≤ 32 weeks who were born from January 2008 to September 2011 and admitted to the neonatal intensive care unit were prospectively examined. OUTCOME MEASURES: Neurodevelopmental evaluation was performed at a corrected age of 18 to 22 months by a developmental paediatrician using the Bayley Scales of Infant Development II (BSID-II). The Beck Depression Inventory and Beck Anxiety Inventory were used to assess maternal depression and anxiety at the same visit as the neurodevelopmental evaluation. RESULTS: The depression scores of mothers of infants with a Mental Development Index (MDI) score of < 70 were significantly higher than those of mothers of infants with an MDI score of > 70 (16.3 ± 12.8 vs 8.8 ± 7.0 , $p < 0.001$). The depression scores of mothers of infants with neurodevelopmental impairment were also significantly higher than those without neurodevelopmental impairment (12.8 ± 10.5 vs 8.8 ± 7.3 , $p = 0.003$). There was no relationship between the presence of cerebral palsy or a Psychomotor Developmental Index (PDI) score of < 70 and the mothers' depression scores. Multiple regression analysis revealed that maternal depression and the occurrence of more than two sepsis attacks were associated with an MDI score of < 70 , and grade III to IV intraventricular haemorrhage was associated with neurodevelopmental impairment and a PDI score of < 70 . CONCLUSION: Maternal depression is negatively associated with the neurodevelopment of preterm infants at a gestational age of ≤ 32 weeks. Maternal psychological well-being should be taken into consideration during the long-term follow-up of preterm infants.

[PMID: 27978476](#)

23. Survival and Neurodevelopmental Outcomes of Preterms Resuscitated With Different Oxygen Fractions.

Boronat N, Aguar M, Rook D2, Iriondo M, Brugada M, Cernada M, Nuñez A, Izquierdo M, Cubells E, Martinez M, Parra A, van Goudoever H, Vento M.

Pediatrics. 2016 Dec;138(6). pii: e20161405. Epub 2016 Nov 16.

Stabilization of preterm infants after birth frequently requires oxygen supplementation. At present the optimal initial oxygen inspiratory fraction (Fio₂) for preterm stabilization after birth is still under debate. We aimed to compare neurodevelopmental outcomes of extremely preterm infants at 24 months corrected age randomly assigned to be stabilized after birth with an initial Fio₂ of 0.3 versus 0.6 to 0.65 in 3 academic centers from Spain and the Netherlands. METHODS: Randomized, controlled, double-blinded, multicenter, international clinical trial enrolling preterm infants < 32 weeks' gestation assigned to an initial Fio₂ of 0.3 (Lowox group) or 0.6 to 0.65 (Hiox group). During stabilization, arterial pulse oxygen saturation and heart rate were continuously monitored and Fio₂ was individually titrated to keep infants within recommended ranges. At 24 months, blinded researchers used the Bayley Scales of Infant and Toddler Development, Third Edition (Bayley-III) to assess visual acuity, neurosensory deafness, and language skills. RESULTS: A total of 253 infants were recruited and 206 (81.4%) completed follow-up. No differences in perinatal characteristics, oxidative stress, or morbidities during the neonatal period were assessed. Mortality at hospital discharge or when follow-up was completed didn't show differences between the groups. No differences regarding Bayley-III scale scores (motor, cognitive, and language composites), neurosensory handicaps, cerebral palsy, or language skills between groups were found. CONCLUSIONS: The use of an initial lower (0.3) or higher (0.6-0.65) Fio₂ during stabilization of extremely preterm infants in the delivery room does not influence survival or neurodevelopmental outcomes at 24 months.

[PMID: 27940687](#)

24. SGA as a Risk Factor for Cerebral Palsy in Moderate to Late Preterm Infants: a System Review and Meta-analysis.

Zhao M, Dai H, Deng Y, Zhao L.

Sci Rep. 2016 Dec 13;6:38853. doi: 10.1038/srep38853.

Small for gestational age (SGA) is an established risk factor for cerebral palsy (CP) in term infants. However, there is conflicting data on the association between SGA and CP in moderate to late preterm infants. The aim of the article was to explore the relationship between SGA and CP in the moderate to late preterm infants and its strength by meta-analysis. We performed a system search in OVID (EMBASE and MEDLINE) and WANFANG from inception to May 2016. The study-specific risk estimates were pooled using the random-effect model. A total of seven studies were included in the meta-analysis, consisting of three cohort and four case-control studies. A statistically significant association was found between SGA and CP in moderate to late premature infants (OR: 2.34; 95% CI: 1.43-3.82). The association were higher in the several subgroups: 34-36 week gestational age (OR: 3.47; 95% CI: 1.29-9.31), SGA < 2SDs (OR: 3.48; 95% CI: 1.86-6.49), and malformation included in CP (OR: 3.00; 95% CI: 1.71-5.26). In moderate to late premature infants, SGA is a convenient and reliable predictor for CP. More studies are needed to explore the underlying mechanisms between SGA and CP association.

[PMID: 27958310](#)