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CP Research News

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1: Am J Phys Med Rehabil. 2008 May;87(5):386-394.

Botulinum Toxin Type A Injections into the Calf Muscles for Treatment of Spastic Equinus in Cerebral Palsy: A Randomized Trial Comparing Single and Multiple Injection Sites.

Sätälä H, Pietikäinen T, Iisalo T, Lehtonen-Räty P, Salo M, Haataja R, Koivikko M, Autti-Rämö I.

From the Departments of Paediatric Neurology (HS, MK) and Physiatry (TI, TP), Tampere University Hospital, Tampere, Finland; Departments of Paediatric Neurology (HS) and Physiatry (MS, PL-R), Central Hospital of Kanta-Häme, Hämeenlinna, Finland; School of Public Health, University of Tampere, Tampere, Finland (RH); and Finnish Office for Health Care Technology Assessment, STAKES, Helsinki, Finland (IAR).

Sätälä H, Pietikäinen T, Iisalo T, Lehtonen-Räty P, Salo M, Haataja R, Koivikko M, Autti-Rämö I: Botulinum toxin type a injections into the calf muscles for treatment of spastic equinus in cerebral palsy: a randomized trial comparing single and multiple injection sites. *Am J Phys Med Rehabil* 2008;87:386-394. **OBJECTIVE::** To investigate the hypothesis that the multiple-site injection technique is associated with better outcomes than the single-point injection method in children with cerebral palsy and spastic equinus gait. **DESIGN::** A total of 17 children (nine boys, eight girls ages 1.8-9.4 yrs; eight hemiplegics, eight diplegics, one quadriplegic; levels I-IV with the Gross Motor Function Classification System) with 25 treated lower limbs were randomized into two groups: a single-point group receiving a standard dose of botulinum toxin A injection into one site and a multiple-points group into two sites on both heads of the gastrocnemius. Active and passive range of movement, selective dorsiflexion, dynamic muscle length (modified Tardieu scale), calf tone (modified Ashworth scale), attainment of anticipated gait pattern (Goal Attainment Scale), and video gait analysis (Observational Gait Scale [OGS]) were assessed before and 1, 2, and 4 mos after intervention. **RESULTS::** Both groups improved in dynamic muscle length, muscle tone, OGS-total scores and initial foot contact scores and a similar number of children attained their goals on the Goal Attainment Scale. The only significant difference between the groups was observed at 2 mos in passive dorsiflexion with the knee flexed, favoring the single-point group. Though not significantly, the incidence of adverse effects was higher in the multiple-points group. **CONCLUSIONS::** Using the methods described, no major changes in main outcome measures were associated with the number



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of injection sites. Issues other than efficacy guide the decision on whether to inject in single or multiple sites when treating spastic equinus with botulinum toxin.

PMID: 18427220 [PubMed - as supplied by publisher]

2: Clin J Pain. 2008 May;24(4):335-342.

Pain Characteristics and Their Association With Quality of Life and Self-concept in Children With Hemiplegic Cerebral Palsy Identified From a Population Register.

Russo RN, Miller MD, Haan E, Cameron ID, Crotty M.

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OBJECTIVES: To describe and characterize the prevalence and quality of pain in a population-based community sample of children with hemiplegic cerebral palsy. **METHODS:** Outcomes were assessed from 2 domains of the World Health Organization International Classification of Functioning, Disability and Health: body structure/function (upper limb spans, modified Ashworth scale, Tardieu scale, sensory function), activities-participation (Assessment of Motor and Process Skills), Pediatric Quality of Life Inventory (PedsQL), and self-perception (Harter Self-Perception Profile). **RESULTS:** There were 107 participants of age (mean, 95% confidence interval) 8.94 years (8.23 to 9.65); 61 (57%) were boys and 58 (54%) had hemiplegia affecting the right side. Fifty-one (48%) reported pain. Pain mostly affected the involved side (n=28, 55%) and lower limb (n=19, 37%). Eighteen (35%) reported moderate to severe pain. Thirty-five (69%) said pain impacted on movement/activity and was of an aching quality (n=29, 57%). Mean (95% confidence interval) quality of life according to Pediatric Quality of Life Inventory was significantly lower for children experiencing pain compared with children experiencing no pain [parent 50.2 (45.9 to 54.5) vs. 60.1 (55.1 to 65.1), $P<0.01$; child 60.5 (55.4 to 65.6) vs. 75.8 (68.4 to 83.2), $P<0.01$]. The self-perception domains of Scholastic Competence [no pain, 3.02 (2.78 to 3.26); pain, 2.55 (2.31 to 2.79) $P<0.01$] and Behavioral Competence [no pain, 3.33 (3.07 to 3.60); pain, 2.88 (2.70 to 3.06) $P<0.01$] were significantly lower in children with pain aged ≥ 8 years. **DISCUSSION:** Pain is common in children with hemiplegic cerebral palsy with qualities suggesting a nociceptive origin. Pain is associated with lower quality of life and self-perception. Results suggest clinicians should assess and actively manage pain in this population.

PMID: 18427232 [PubMed - as supplied by publisher]

3: BMC Pediatr. 2008 Apr 24;8(1):14 [Epub ahead of print]

Effectiveness of physical therapy interventions for children with cerebral palsy: a systematic review.

Anttila H, Autti-Ramo I, Suoranta J, Makela M, Malmivaara A.

ABSTRACT: BACKGROUND: To assess the effectiveness of physical therapy (PT) interventions on functioning in children with cerebral palsy (CP). **METHODS:** A search was made in Medline, Cinahl, PEDro and the Cochrane library for the period 1990 to February 2007. Only randomized controlled trials (RCTs) on PT interventions in children with diagnosed CP were included. Two reviewers independently assessed the methodological quality and extracted the data. The outcomes measured in the trials were classified using the International Classification of Functioning, Disability and Health (ICF). **RESULTS:** Twenty-two trials were identified. Eight intervention categories were distinguished. Four trials were of high methodological quality. Moderate evidence of effectiveness was established for two intervention

categories: effectiveness of upper extremity treatments on attained goals and active supination, and of prehensile hand treatment and neurodevelopmental therapy (NDT) or NDT twice a week on developmental status, and of constraint-induced therapy on amount and quality of hand use. Moderate evidence of ineffectiveness was found of strength training on walking speed and stride length. Conflicting evidence was found for strength training on gross motor function. For the other intervention categories the evidence was limited due to low methodological quality and the statistically insignificant results of the studies. **CONCLUSIONS:** Due to limitations in methodological quality and variations in population, interventions and outcomes, mostly limited evidence on the effectiveness of most PT interventions is available through RCTs. Moderate evidence was found for some effectiveness of upper extremity training. Well-designed trials are needed especially for focused PT interventions.

PMID: 18435840 [PubMed - as supplied by publisher]

4: BMC Pregnancy Childbirth. 2008 Apr 24;8(1):14 [Epub ahead of print]

MRC ORACLE Children Study. Long term outcomes following prescription of antibiotics to pregnant women with either spontaneous preterm labour or preterm rupture of the membranes.

Kenyon S, Brocklehurst P, Jones D, Marlow N, Salt A, Taylor D.

ABSTRACT: BACKGROUND: The Medical Research Council (MRC) ORACLE trial evaluated the use of co-amoxiclav 375mg and/or erythromycin 250mg in women presenting with preterm rupture of membranes (PROM) ORACLE I or in spontaneous preterm labour (SPL) ORACLE II using a factorial design. The results showed that for women with a singleton baby with PROM the prescription of erythromycin is associated with improvements in short term neonatal outcomes, although co-amoxiclav is associated with prolongation of pregnancy, a significantly higher rate of neonatal necrotising enterocolitis was found in these babies. Prescription of erythromycin is now established practice for women with PROM. For women with SPL antibiotics demonstrated no improvements in short term neonatal outcomes and are not recommended treatment. There is evidence that both these conditions are associated with subclinical infection so perinatal antibiotic administration may reduce the risk of later disabilities, including cerebral palsy, although the risk may be increased through exposure to inflammatory cytokines, so assessment of longer term functional and educational outcomes is appropriate. **METHODS:** The MRC ORACLE Childrenas Study will follow up UK children at age 7 years born to 4809 women with PROM and the 4266 women with SPL enrolled in the earlier ORACLE trials. We will use a parental questionnaire including validated tools to assess disability and behaviour. We will collect the frequency of specific medical conditions: cerebral palsy, epilepsy, respiratory illness including asthma, diabetes, admission to hospital in last year and other diseases, as reported by parents. National standard test results will be collected to assess educational attainment at Key Stage 1 for children in England. **DISCUSSION:** This study is designed to investigate whether or not peripartum antibiotics improve health and disability for children at 7 years of age.

PMID: 18435833 [PubMed - as supplied by publisher]

5: Pediatr Res. 2008 Apr 23 [Epub ahead of print]

Rolipram, a Phosphodiesterase Type IV Inhibitor, Exacerbates Periventricular White Matter Lesions in Rat Pups.

Chang YC, Huang CC, Hung PL, Huang HM.

Department of Pediatrics [Y.-C.C., P.-L.H.], Department of Ophthalmology [H.-M.H.], Chang Gung University College of Medicine, Kaohsiung 833, Taiwan; Department of Pediatrics [C.-C.H.], National Cheng Kung University College of Medicine, Tainan 704, Taiwan.

Periventricular white matter injury is the leading cause of cerebral palsy in premature infants for which no effective treatments are available. Our previous studies have demonstrated that pharmacological activa-

tion of the cAMP response element-binding protein (CREB) signaling pathway before hypoxic-ischemia protected against neuronal injury in neonatal rats. We examined whether rolipram, a phosphodiesterase type IV inhibitor, treatment after hypoxic-ischemia is protective against white matter injury in neonatal rats. Rats were exposed to hypoxia-ischemia (HI) on P7 and then treated with daily injections of various doses of rolipram (P7-P11). Immunohistochemical staining for myelin basic protein, ED1, glial fibrillary acidic protein, CREB and O1 was examined on P11. We found that the periventricular white matter and deep cortical lesions were exacerbated by rolipram administration after HI injury. The lesions in the rolipram-treated group also showed increased astrogliosis and increased CREB phosphorylation in the activated microglia and astrocytes. Furthermore, the rolipram-post-treated HI group had markedly depleted pre-oligodendrocytes in the ipsilateral hemisphere, which may be related to decreased pre-oligodendrocytes proliferation after rolipram treatment per se. These data suggest that rolipram treatment after hypoxic-ischemia is not protective; in contrast, rolipram may exacerbate hypoxic-ischemic white matter injury in neonatal rat brains.

PMID: 18437099 [PubMed - as supplied by publisher]

6: Eur J Paediatr Neurol. 2008 Apr 18 [Epub ahead of print]

Do visual impairments affect risk of motor problems in preterm and term low birth weight adolescents?

Evensen KA, Lindqvist S, Indredavik MS, Skranes J, Brubakk AM, Vik T.

Department of Laboratory Medicine, Children's and Women's Health, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway; Department of Physical Medicine and Rehabilitation, St. Olavs Hospital, Trondheim University Hospital, Norway.

BACKGROUND: Increased prevalence of motor and visual problems has been reported in low birth weight populations, but the association between them is less studied. **AIM:** To examine how visual impairments may be associated with the increased risk of motor problems in low birth weight adolescents. **METHODS:** Fifty-one very low birth weight adolescents (VLBW), 56 term small for gestational age (SGA) and 75 term control adolescents, without cerebral palsy, were examined at the age of 14. Motor skills were examined by the Movement Assessment Battery for Children. Visual functions included visual acuity, contrast sensitivity, nystagmus, strabismus, stereoacuity, accommodation, convergence and visual perception (Visual-Motor Integration test). An abnormality score was calculated as the sum of visual impairments. We used odds ratio as an estimate of the relative risk of having motor problems. **RESULTS:** The odds of having motor problems were 10.4 (95% CI: 2.2-49.4) in the VLBW group and 5.1 (95% CI: 1.0-25.8) in the SGA group compared with the control group. The odds of having motor problems in the VLBW group were influenced by all visual variables, and most by visual acuity, when we adjusted for these separately. The greatest reduction in OR was found when adjusting for the abnormality score (adjusted OR: 6.8; 95% CI: 1.3-34.5). In the SGA group the odds of having motor problems were relatively unaffected by the visual variables and the abnormality score. **CONCLUSIONS:** Visual impairments influence motor problems in VLBW adolescents, whereas motor problems in SGA adolescents seem to be unaffected by visual impairments.

PMID: 18430596 [PubMed - as supplied by publisher]

7: Dev Med Child Neurol. 2008 Apr 17 [Epub ahead of print]

Growth failure in children with intractable epilepsy is not due to increased resting energy expenditure.

Bergqvist AG, Trabulsi J, Schall JI, Stallings VA.

Division of Neurology, The Children's Hospital of Philadelphia, and Departments of Pediatrics and Neurology, University of Pennsylvania School of Medicine, Philadelphia, PA, USA.

The aim of this study was to evaluate the resting energy expenditure (REE) of children with intractable epilepsy (IE) compared with healthy children, and to determine factors that contribute to the pattern of REE. REE, growth status, and body composition were assessed in 25 prepubertal children with IE (15 males, 10 females; mean age 5y 5mo [SD 2y 2mo] range 2-9y) with and without cerebral palsy (CP) and compared with those in 75 healthy children of similar age, sex, and fat free mass (FFM; 43 males, 32 females; mean age 6y 4mo [SD 1y 8mo], range 2-9y). Of the 25 children with IE, 12 had generalized and 13 partial seizures; 10 children had CP (four hemiplegia, one diplegia, and five tetraplegia); 18 were ambulators. REE (kcal/d), determined by indirect calorimetry, was expressed as a percentage of that predicted using Schofield equations. Energy intake from 3-day weighed food records was assessed for children with IE only and expressed as a percentage of estimated energy requirement. Compared with healthy children, children with IE had significantly lower percentage (Student's t-test, $p < 0.05$) of predicted REE (111 [SD 13] vs 104 [SD 4]), weight z-score, body mass index z-score, and FFM. Using multiple regression, REE adjusted for FFM, fat mass, and sex were significantly lower in children with IE and CP (-110 kcal/d, 95% confidence interval -199 to -21, $p = 0.016$). In children with IE, energy intake was also a statistically significant predictor of REE. CP largely explained the suboptimal growth status and lower REE of children with IE compared with healthy children.

PMID: 18422677 [PubMed - as supplied by publisher]

8: Dev Med Child Neurol. 2008 Apr 14 [Epub ahead of print]

Intrathecal baclofen therapy in children with intractable spastic cerebral palsy: a cost-effectiveness analysis.

Hoving MA, Evers SM, Ament AJ, van Raak EP, Vles JS; On behalf of the Dutch Study Group on Child Spasticity..

Department of Neurology, University Hospital Maastricht, Maastricht, The Netherlands.

In a Dutch national study, we recently established the effectiveness and safety of continuous intrathecal baclofen infusion (CITB) in children with intractable spastic cerebral palsy (CP). Because prospective studies on the cost-effectiveness of CITB in children with spastic CP are lacking, we conducted a cost-effectiveness analysis alongside our prospective national study. We compared the costs and health effects of CITB with those of standard treatment only, from the health care perspective for a 1-year period. Health effects were expressed in terms of a visual analogue scale for individual problems and quality-adjusted life years (QALYs). We included eight females and seven males, aged between 7 and 17 years (mean age 13y 8mo [SD 3y]). Eleven children had spastic CP and four had spastic-dyskinetic CP. One child was classified on the Gross Motor Function Classification System at Level III, two at Level IV, and 12 at Level V. CITB was more effective and more costly than standard treatment only. Gaining one QALY cost on average euro32 737. We conclude that based on the threshold-willingness to pay for one QALY in the Netherlands (euro80 000), our results confirm the cost-effectiveness of CITB for carefully selected children with intractable spastic CP.

PMID: 18422682 [PubMed - as supplied by publisher]

9: Dev Med Child Neurol. 2008 Apr 14 [Epub ahead of print]

Speech, language, and cognition in preschool children with epilepsy.

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Institute of Neuroscience and Physiology/Speech Language Pathology, Göteborg, Sweden.

We studied expressive and receptive language, oral motor ability, attention, memory, and intelligence in 20 6-year-old children with epilepsy (14 females, six males; mean age 6y 5mo, range 6y-6y 11mo) with-

out learning disability, cerebral palsy (CP), and/or autism, and in 30 reference children without epilepsy (18 females, 12 males; mean age 6y 5mo, range 6y-6y 11mo). Ten children had partial, six primarily generalized, and four unclassified epilepsy. Fourteen were having monotherapy and six were taking two or more antiepileptic drugs; 13 children were free from seizures 3 months before the assessment. Results show no statistically significant difference between the groups concerning Verbal IQ, expressive and receptive grammar, and receptive vocabulary. The children with epilepsy had a significantly lower Performance IQ and lower scores in tests of oral motor ability, articulation, emerging literacy, auditory attention, short-term memory, and rapid word retrieval. Parent ratings revealed no significant difference in communicative ability. Polytherapy and early onset of epilepsy influenced some results. Preschool children with epilepsy without learning disability, CP, and/or autism may have receptive verbal ability within the normal range but visuoperceptual, auditory attentional, and speech-language difficulties that could affect school achievement. Careful testing of children with epilepsy who appear to be functioning within the normal range is needed because this may reveal specific impairments that require appropriate professional input.

PMID: 18422681 [PubMed - as supplied by publisher]

10: J Korean Med Sci. 2008 Apr;23(2):328-31.

Identification of proteolipid protein 1 gene duplication by multiplex ligation-dependent probe amplification: first report of genetically confirmed family of pelizaeus-merzbacher disease in Korea.

Kim SJ, Yoon JS, Baek HJ, Suh SI, Bae SY, Cho HJ, Ki CS.

Department of Physical Medicine and Rehabilitation, College of Medicine, Korea University, Seoul, Korea.

Pelizaeus-Merzbacher disease (PMD) is a rare X-linked recessive disorder with a prototype of a dysmyelinating leukodystrophy that is caused by a mutation in the proteolipid protein 1 (PLP1) gene on the long arm of the X chromosome in band Xq22. This mutation results in abnormal expression or production of PLP. We here present a Korean boy with spastic quadriplegia, horizontal nystagmus, saccadic gaze, intentional tremor, head titubation, ataxia, and developmental delay. The brain magnetic resonance imaging (MRI) showed abnormally high signal intensities in the white matter tract, including a subcortical U fiber on the T2-weighted and fluid attenuated inversion recovery (FLAIR) image. The chromosomal analysis was normal; however, duplication of the PLP1 gene in chromosome Xq22 was detected when the multiplex ligation-dependent probe amplification (MLPA) method was used. We also investigated the pedigree for a genetic study related to PMD. This case suggests that the duplication mutation of the PLP1 gene in patients with PMD results in a mild clinical form of the disorder that mimics the spastic quadriplegia of cerebral palsy.

PMID: 18437021 [PubMed - in process]

11: Dev Med Child Neurol. 2008 Mar;50(3):237-8; author reply 238-9.

Comment on:

Dev Med Child Neurol. 2007 Oct;49(10):723.

Mayston comment.

Mayston M.

Publication Types:

Comment

Letter

PMID: 18389529 [PubMed - indexed for MEDLINE]

12: S D Med. 2008 Feb;61(2):53, 55-7.

Idiopathic toe-walking.

Babb A, Carlson WO.

Georgetown University, Washington, DC, USA.

Idiopathic toe-walking is a diagnosis of exclusion when a child presents with bilateral toe-to-toe gait. Although toe-walking is considered part of the normal gait spectrum in development, it is abnormal when persisting past the age of two. Toe-walking may be caused by cerebral palsy, congenital contracture of the Achilles tendon or paralytic muscular disorders such as Duchenne Muscular Dystrophy. Idiopathic toe-walking may be associated with developmental disorders such as autism or other myopathic or neuropathic disorders. The majority of disorders causing toe-walking can be ruled out through the history and physical examination, resulting in a diagnosis of idiopathic toe-walking. However, it may be difficult to differentiate mild forms of cerebral palsy, specifically mild spastic diplegia, and idiopathic toe-walking. The treatment options for idiopathic toe-walking include observation, conservative methods and surgical methods. Most children can be treated in the primary care setting with either observation or conservative treatment. Patients with severe contracture of the Achilles tendon, or persistent toe-walking, may need surgical intervention. The prognosis of idiopathic toe-walking is favorable with both conservative and surgical treatment allowing children to attain normal function and range of plantarflexion. The following article provides an overview of the background information, differential diagnosis and treatment options for idiopathic toe-walking.

PMID: 18432151 [PubMed - in process]

13: Disabil Rehabil. 2008;30(10):792-8.

Conservative management of neuromuscular scoliosis: Personal experience and review of literature.

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Purpose. The principles of conservative management of neuromuscular scoliosis in childhood and adolescence are presented. **Methods.** Analysis of personal experience and literature review. The topic is discussed separately for patients with flaccid or spastic paresis. **Results.** These demonstrate that conservative management might be proposed for patients with neuromuscular scoliosis in many clinical situations. In spastic disorders, it maintains the symmetry around the hip joints. Bracing is technically difficult and often is not tolerated well by cerebral palsy children. In patients with flaccid paresis, the fitting and the use of brace is easier than in spastic patients. The flexibility of the spinal curvature is more important. Functional benefits of conservative management of neuromuscular scoliosis comprise stable sitting, easier use of upper limbs, discharge of the abdomen from the collapsing trunk, increased diaphragm excursion, and, not always, prevention of curve progression. **Conclusions.** Specific natural history and multiple medical problems associated with the disease make the treatment of children with neuromuscular scoliosis an extremely complex issue, best addressed when a team approach is applied. Continuously improving techniques of conservative management, comprising bracing and physiotherapy, together with correctly timed surgery incorporated in the process of rehabilitation, provide the optimal care for patients.

PMID: 18432437 [PubMed - in process]

14: J Dent Child (Chic). 2007 Jan-Apr;74(1):41-5.

Occlusal characteristics in cerebral palsy patients.

Carmagnani FG, Gonçalves GK, Corrêa MS, Dos Santos MT.

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PURPOSE: The purpose of this study was to evaluate the occlusal characteristics of 104 randomly selected, noninstitutionalized patients with a medical diagnosis of cerebral palsy (CP). **METHODS:** Patients were grouped according to the CP motor disorder and clinical patterns. Occlusal characteristics were collected by one examiner. Nonparametric statistical tests, including Fisher's exact test (P) and chi-square test were used. **RESULTS:** The results showed that Class II molars were statistically higher ($P < .05$) for spastic patients. Anterior open bite and an increased overjet were significant ($P < .01$) in spastic patients with clinical patterns of quadriplegia, double-hemiplegia, and diplegia. Double hemiplegia patients presented a higher incidence of open bite (64%) with an edge-to-edge overjet (45%). A deep overbite was presented in athetoid (50%) and ataxic (67%) patients. A high incidence of tooth wear was observed in the athetoid group (54%). **CONCLUSION:** Spastic patients presented a high incidence of open bite and Class II malocclusion. A low level of malocclusion was observed in the ataxic group compared to the other groups studied. Further studies would be useful to determine if neurological injuries can be the cause of changes of the craniofacial growth and development patterns resulting in malocclusion in cerebral palsy patients.

PMID: 18430354 [PubMed - in process]

15: Medicina (B Aires). 2007;67(6 Pt 1):586-92.

Cerebral palsy [Article in Spanish]

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The term cerebral palsy (CP), is used for a great number of clinical neurological syndromes. The syndromes are characterized by having a common cause, motor defects. It is important, because they can cause a brain damage by presenting motor defects and some associated deficiencies, such as mental deficiency, epilepsy, language and visual defects and pseudobulbar paralysis, with the non-evolving fact. Some authors prefer using terms such as "non-evolving encephalopathies". In the treatment the utility of prevention programs of early stimulation and special rehabilitation methods, and treatment of associated deficiencies such as epilepsy, mental deficiency, language, audition and visual problems, and the attention deficit improve the prognosis in an important way. The prognosis depends on the severity of the disease and the associated manifestations.

Publication Types:
English Abstract

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16: Zh Nevrol Psikiatr Im S S Korsakova. 2007;107(12):45-49.

Magnetophoresis of glutaminic acid and magnesium sulfate in rehabilitation of children with cerebral palsy. [Article in Russian]

Gurova NI, Babina LM.

Piatigorskii gosudarstvennyi nauchno-issledovatel'skii institut kurortologii Roszdava.

Clinical efficacy of magnetophoresis of glutaminic acid and magnesium sulfate used in the rehabilitative complex for preschool children with spastic forms of cerebral palsy has been studied. The clinical and neurophysiological examination has been conducted in 40 children aged from 1 to 7 years. The higher efficacy of treatment with combination of running pulsed magnetic field and drugs as compared to magnetotherapy using the same procedure has been found.

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