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**Cerebral palsy**

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Over the past decades, perinatal care for infants with cerebral palsy has improved and premature infants have tended to survive for longer. As a result, the number of children with the condition increased during the 1980s and 1990s. However, it has fallen ever since and in this article, researchers suggest that this decline is due to improvements in protecting the developing brain and ensuring lung function in premature and sick neonat


**Factors Associated with Respiratory Illness in Children and Young Adults with Cerebral Palsy.**

Blackmore  AM¹, Bear  N², Blair  E³, Gibson  N⁴, Jalla  C⁵, Langdon  K⁶, Moshovis  L⁷, Steer
Abstract

OBJECTIVE:
To describe associations between respiratory illness and its potential predictors in children and young adults with cerebral palsy (CP).

STUDY DESIGN:
Cross-sectional survey of self- and caregiver-reported respiratory symptoms for individuals aged up to 26 years with CP. Respiratory illness was indicated by 2 outcomes: (1) \( \geq 1 \) respiratory hospitalizations in the past year; and (2) \( \geq 2 \) courses of antibiotics for respiratory symptoms in the past year. ORs were calculated using univariate and multivariate logistic regression.

RESULTS:
There were 551 participants, aged 1-26 years, distributed across all gross motor function classification scale (GMFCS) levels. In univariate analyses, factors significantly associated with respiratory hospitalizations were weekly respiratory symptoms (OR 2.31, 95% CI 1.78-3.00), respiratory symptoms during meals (OR 3.23, 95% CI 1.50-5.80), gastroesophageal reflux (OR 3.01, 95% CI 1.71-5.31), coughing or choking on saliva (OR 4.36, 95% CI 2.38-8.01), current asthma (OR 3.56, 95% CI 1.97-6.42), age (0-3 years) (OR 3.24, 95% CI 1.19-8.80, compared with 13-17 years), seizures (OR 3.45, 95% CI 1.96-6.08), and scoliosis (OR 2.14, 95% CI 1.16-3.97). Nonambulatory individuals (GMFCS IV-V) were at significantly increased risk of hospitalizations only if they had food modifications and/or nasogastric or gastrostomy tube feeds (OR 5.36, 95% CI 2.89-9.96, compared with GMFCS I-III with no food modifications and no tube). All factors, except seizures and scoliosis, were significantly associated with multiple courses of antibiotics in univariate analyses.

CONCLUSIONS:
Oromotor dysfunction is strongly associated with respiratory illness in patients with CP.

Title: Severe acute phase response after intravenous zoledronic acid in adult patients with cerebral palsy

Citation: Internal Medicine Journal, April 2016, vol./is. 46/4(506-507), 1444-0903;1445-5994 (01 Apr 2016)

Author(s): Trinh A., Wong P., Ebeling P.R., Fuller P.J., Milat F.
Language: English

Publication Type: Journal: Letter

Source: EMBASE

Title: Change of direction ability performance in cerebral palsy football players according to functional profiles

Citation: Frontiers in Physiology, January 2016, vol./is. 6/JAN(no pagination), 1664-042X (January 06, 2016)

Author(s): Reina R., Sarabia J.M., Yanci J., Garcia-Vaquero M.P., Campayo-Piernas M.

Language: English

Abstract: The aims of the present study were to evaluate the validity and reliability of the two different change of direction ability (CODA) tests in elite football players with cerebral palsy (CP) and to analyse the differences in performance of this ability between current functional classes (FT) and controls. The sample consisted of 96 international cerebral palsy football players (FPCP) and 37 football players. Participants were divided into four different groups according to the International Federation of Cerebral Palsy Football (IFCPF) classes and a control group (CG): FT5 (n = 8); FT6 (n = 12); FT7 (n = 62); FT8 (n = 14); and CG (n = 37). The reproducibility of Modified Agility Test (MAT) and Illinois Agility Test (IAT) (ICC = 0.82-0.95, SEM = 2.5-5.8%) showed excellent to good values. In two CODA tests, CG performed faster scores compared with FPCP classes (p < 0.01, d = 1.76-3.26). In IAT, FT8 class comparisons regarding the other classes were: FT5 (p = 0.047, d = 1.05), FT6 (p = 0.055, d = 1.19), and FT7 (p = 0.396, d = 0.56). With regard to MAT, FT8 class was also compared with FT5 (p = 0.006, d = 1.30), FT6 (p = 0.061, d = 0.93), and FT7 (p = 0.033, d = 1.01). No significant differences have been found between FT5, FT6, and FT7 classes. According to these results, IAT and MAT could be useful and reliable and valid tests to analyse CODA in FPCP. Each test (IAT and MAT) could be applied considering the cut point that classifiers need to make a decision about the FT8 class and the other FT classes (FT5, FT6, and FT7).
Title: Good outcome of total hip replacement in patients with cerebral palsy

Citation: Acta Orthopaedica, March 2016, vol./is. 87/2(93-99), 1745-3674;1745-3682 (03 Mar 2016)

Author(s): King G., Hunt L.P., Wilkinson J.M., Blom A.W.

Language: English

Abstract: Background and purpose - People with cerebral palsy (CP) often have painful deformed hips, but they are seldom treated with hip replacement as the surgery is considered to be high risk. However, few data are available on the outcome of hip replacement in these patients. Patients and methods - We linked Hospital Episode Statistics (HES) records to the National Joint Registry for England and Wales to identify 389 patients with CP who had undergone hip replacement. Their treatment and outcomes were compared with those of 425,813 patients who did not have CP. Kaplan-Meier estimates were calculated to describe implant survivorship and the curves were compared using log-rank tests, with further stratification for age and implant type. Reasons for revision were quantified as patient-time incidence rates (PTIRs). Nationally collected patient-reported outcomes (PROMS) before and 6 months after operation were compared if available. Cumulative mortality (Kaplan-Meier) was estimated at 90 days and at 1, 3, and 5 years. Results - The cumulative probability of revision at 5 years post-surgery was 6.4% (95% CI: 3.8-11) in the CP cohort as opposed to 2.9% (CI 2.9-3%) in the non-CP cohort (p < 0.001). Patient-reported outcomes showed that CP patients had worse pain and function preoperatively, but had equivalent postoperative improvement. The median improvement in Oxford hip score at 6 months was 23 (IQR: 14-28) in CP and it was 21 (14-28) in non-CP patients. 91% of CP patients reported good or excellent satisfaction with their outcome. The cumulative probability of mortality for CP up to 7
years was similar to that in the controls after stratification for age and sex.

**Interpretation** - Hip replacement for cerebral palsy appears to be safe and effective, although implant revision rates are higher than those in patients without cerebral palsy.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Full Text:** Available from National Library of Medicine in Acta Orthopaedica

**Title:** Muscle strength and anaerobic performance in football players with cerebral palsy

**Citation:** Disability and Health Journal, April 2016, vol./is. 9/2(313-319), 1936-6574; 1876-7583 (01 Apr 2016)

**Author(s):** Yanci J., Castagna C., Los Arcos A., Santalla A., Grande I., Figueroa J., Camara J.

**Language:** English

**Abstract:** Background: This is the first study that quantified the anaerobic performance in football players with cerebral palsy (CP). Objective: This study aimed to examine anaerobic fitness in a population of football players with CP using vertical jumping (VJ) and Wingate tests. Methods: Twelve players (age 26.8 +/- 4.8 yr, body mass 66.2 +/- 4.8 kg, height 173.7 +/- 6.4 cm, body mass index 22.2 +/- 1.9 kg m^-2) from the Spanish National Football Team with CP which had 9.4 +/- 3.7 years of playing experience performed the VJ and Wingate anaerobic tests. Results: Vertical jump height was 20.0 +/- 1.2 cm for squat jump (HSJ) and 23.9 +/- 5.4 cm for countermovement jump (HCMJ). Wingate test peak power (PPOW) was 490.6 +/- 125.8 W (7.35 +/- 1.53 W kg^-1). HCMJ was largely (r = -0.631, p = 0.028) and very-largely (r = -0.710, p = 0.01) associated with PPOW (W kg^-1) and mean power output (MPOW) (W kg^-1), respectively. Squat jump test peak power (W) showed a large association (r = -0.656, p = 0.021) with MPOW (W and W kg^-1). The CMJ height resulted 19.5% higher than SJ. Conclusions: Results
showed low VJ and anaerobic capacity of football players with CP compared to national players without CP and the general population. In football players with CP the difference (19.5%) between VJ with or without countermovement (CMJ-SJ) was higher than reported for national players without CP. Further studies examining the effect of football practice on neuromuscular performance in subjects with CP are warranted.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Title:** The impact of walking devices on kinematics in patients with spastic bilateral cerebral palsy

**Citation:** Gait and Posture, May 2016, vol./is. 46/(184-187), 0966-6362;1879-2219 (May 01, 2016)

**Author(s):** Krautwurst B.K., Dreher T., Wolf S.I.

**Language:** English

**Abstract:** Increased anterior pelvic and trunk tilt is a common finding in patients with bilateral cerebral palsy especially during walking with assistive devices. As previous studies demonstrate various gait alterations when using assistive devices, the assessment of surgical interventions may be biased when the patients become independent of (or dependent on) assistive devices after therapy. Furthermore, some of these patients in fact are able to walk without devices even though in daily life they prefer to use them. Consequently, for such patients the classification into GMFCS level II or III may be ambiguous. The specific aim of this study was therefore to assess the influence of the use of forearm crutches and posterior walker during walking and to set this influence in relation to outcome effects of surgical intervention studies. 26 ambulatory patients with spastic bilateral CP (GMFCS II-III) were included who underwent 3D gait analysis. All patients used forearm crutches or posterior walkers in everyday life even though they were able to walk without assistive devices for short distances. Independent of the type of assistive devices, the patients walk on average with more anterior trunk tilt and pelvic tilt (7degree +/- 6degree and 3degree +/- 2degree) and with a maximum ankle dorsiflexion decreased by 2degree (+/-3degree) when walking with
assistive devices, enhancing the mal-positioning present without device. Oppositely, the knees on average are more extended by 6 degree (+/-4 degree) when using the assistive devices. These effects have to be taken into account when assessing gait patterns or when monitoring the outcome after intervention as assistive devices may partially hide or exaggerate therapeutic effects.

**Publication Type:** Journal: Article

**Source:** EMBASE

**Title:** Musculoskeletal and endocrine health in adults with cerebral palsy: New opportunities for intervention

**Citation:** Journal of Clinical Endocrinology and Metabolism, March 2016, vol./is. 101/3(1190-1197), 0021-972X;1945-7197 (March 2016)

**Author(s):** Trinh A., Wong P., Fahey M.C., Brown J., Churchyard A., Strauss B.J., Ebeling P.R., Fuller P.J., Milat F.

**Language:** English

**Abstract:** Context: Cerebral palsy (CP) increases fracture risk through diminished ambulation, nutritional deficiencies, and anticonvulsant medication use. Studies examining bone mineral density (BMD) in adults with CP are limited. Objective: To examine the relationship between body composition, BMD, and fractures in adults with CP. The effect of functional, nutritional, and endocrine factors on BMD and body composition is also explored. Design: Retrospective cross-sectional study. Setting and Participants: Forty-five adults with CP (mean age, 28.3 +/- 11.0 years) who had dual-energy X-ray absorptiometry imaging at a single tertiary hospital between 2005 and 2015. Results: Seventeen (38%) had a past history of fragility fracture; 43% had a Z-score of +/-2.0 at the lumbar spine (LS) and 41% at the femoral neck (FN). In nonambulatory patients, every one unit decrease in FN Z-score increased the risk of fracture 3.2-fold (95% confidence interval, 1.07-9.70; P = .044). Stepwise linear regression revealed that the Gross Motor Function Classification System was the best predictor of LS Z-score ($R^2$ = 0.55; $P$ = .002) and FN Z-score ($R^2$ = 0.42; $P$ = .004); 35.7% of the variance in BMD was accounted
for by lean tissue mass. Hypogonadism, present in 20% of patients, was associated with reduced lean tissue mass and reduced LS BMD. Lean tissue mass positively correlated with BMD in eugonadal patients, but not in hypogonadal patients. Conclusions: Low BMD and fractures are common in adults with CP. This is the first study to document hypogonadism in adults with CP with detrimental changes in body composition and BMD.

Publication Type: Journal: Article

Source: EMBASE

Title: Urodynamic findings in adults with moderate to severe cerebral palsy

Citation: Journal of Urology, April 2016, vol./is. 195/4 SUPPL. 1(e185), 0022-5347 (April 2016)

Author(s): Levy M., Cotter K., Goldfarb R., Katorski J., Liberman D., Elliott S.P.

Language: English

Abstract: INTRODUCTION AND OBJECTIVES: Cerebral palsy (CP) is a heterogeneous congenital syndrome unified by abnormalities in movement and posture. Patients may also suffer from cognitive impairment and voiding dysfunction. According to the literature, urodynamics (UDS) in children with CP has been consistent with an upper motor neuron bladder with DSD; however, little is known about UDS findings in adults with CP. METHODS: Patients from our Gillette Lifetime Specialty Healthcare Transitional Urology Clinic were included if they were ≥ 18 years old, had a diagnosis of CP and underwent UDS between 2011-2014. When more than one UDS was performed, we include only the most recent. RESULTS: Of 211 patients seen in clinic between 2011-2014, 49 underwent UDS. Their average age was 30; 55% men and 45% women. 98% had Gross Motor Functioning Classification System (GMFCS) scores of 3-5 out of 5, indicative of moderate to severe CP. UDS was initiated for irritative voiding symptoms in 55%, obstructive voiding symptoms in 25%, hydronephrosis in 18%, and other reasons in 2%; 57% also had incontinence. Detrusor sphincter dyssynergia (DSD) was seen in 10% and detrusor overactivity (DO) in 30%. DLPP >40 mm Hg was seen in 12%; however, premicturition resting detrusor pressure (PMDP) was...
>40 mm Hg in 39%. The median compliance ratio for the entire population was 18 (0.78 - 365) and was <20 in 47%. Maximum cystometric capacity (MCC) ranged from 80-1400 and was <300 mL in 30% and >1000 mL in 6%. 19% had a MCC <300 mL and a compliance less than 20. 12% had a MCC <300 and PMDP >40 or DLPP >40. Pathology on UDS was seen in all GMFCS levels. CONCLUSIONS: UDS findings in symptomatic adult CP patients are varied. Although some have large flaccid bladders, almost half had compliance ratios <20 or premicturition resting detrusor pressure of >40 mm Hg. We found 19% that had small bladders with poor compliance. This suggests that if left unmonitored or without intervention, upper urinary tract damage could ensue. Further characterization of this population is needed in order to correlate these UDS findings with clinical outcomes.

**Publication Type:** Journal: Conference Abstract

**Source:** EMBASE

**Title:** Osteoporosis in adults with cerebral palsy: feasibility of DXA screening and risk factors for low bone density

**Citation:** Osteoporosis International, April 2016, vol./is. 27/4(1477-1484), 0937-941X;1433-2965 (01 Apr 2016)

**Author(s):** Marciniak C., Gabet J., Lee J., Ma M., Brander K., Wysocki N.

**Language:** English

**Abstract:** Summary: This study aims to describe osteoporosis screening in adults with cerebral palsy (CP) and identify any associated factors. Bone mineral density (BMD) was often lower than expected-for-age in these adults, and present even in young adulthood, particularly at the spine. Low BMD is frequent in adults with CP. Introduction: This study aims to describe the feasibility of dual-energy X-Ray absorptiometry (DXA) screening in adults with cerebral palsy (CP) and identify factors associated with low bone mineral density (BMD), including longitudinal changes. Methods: A retrospective chart review study of these adults seen at an urban academic rehabilitation clinic and who underwent DXA scan(s). BMD and Z-scores for the lumbar spine, hips, and femoral (neck and total) were recorded. The change in BMD and Z-scores from baseline to follow-up DEXA, Gross Motor Functional Classification
System (GMFCS), CP pattern (hemiplegic, diplegic, or quadriplegic), body mass index (BMI), and transfer and ambulation status were assessed. Results: Forty-two patients (83 % less than age 50 years) had at least one DXA. Seventeen had at least two studies, 15 without pharmacologic interventions between studies. Thirteen fractures in eight subjects were noted, most often lower limb. Fifty percent of spine studies in individuals under 50 had a Z-score of less than -2, while 25 and 30.8 % of these individuals had such scores at the right and left total hip sites, respectively. Need for transfer assistance was associated with lower BMD and Z-scores at all hip sites, but not the lumbar spine. Progressive abnormalities were seen at follow-up DXAs at some sites, however these were not statistically significant. Conclusions: Lower than expected-for-age BMD was very frequent in adults with CP with mobility limitations, present at both spine and hip sites. Low BMI and need for transfer assistance had a negative impact on BMD. Although not statistically significant, progression of abnormalities was seen at follow-up for DXAs Z-scores at some sites, which suggests longitudinal studies in this population are needed.

Publication Type: Journal: Article