CO57-004-e

Revisited pathophysiology of equinus gait in children with cerebral palsy
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Keywords: Locomotion; Equinus; Kinetics; Adaptation; Motor control;
Cerebral palsy

Introduction.—Children with cerebral palsy (CP) usually land their foot on the ground, flat or by forefoot, in equinus when walking. The associated early braking of ankle dorsiflexion might be an adaptive function instead of being imposed by triceps surae dysfunction. Thus, wearing negative heel shoes (NHS), allowing in dorsiflexion flat landing and braking, would induce quick adaptation decreasing equinus at initial contact.

Methods.—Eleven children with CP (8.5 ± 2.5 years of age, 5 diplegics and 3 hemiplegics) with spastic triceps that were not or a bit contracted and walking without aids underwent tridimensional gait analysis when walking barefoot, with standard shoes and with NHS of 10◦.

Results.—Within 2 to 5 gait cycles, the NHS touched the ground roughly as the barefoot did (flat or by the forefoot) but in dorsiflexion (7◦ ± 6◦) and not in plantar flexion (−6◦ ± 6◦), without alteration of knee flexion and walking speed and with maintained elevated early braking of dorsiflexion.

Discussion.—The early deceleration of dorsiflexion might play a functional role such as contributing to dynamic balance during gait. Thus it might be a primary regulated biomechanical variable explaining the quick adaptation of foot kinematics according to the shoe design.

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Is gait kinematics in children with cerebral palsy correlated with their lower limbs’ bone deformities?
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Keywords: Locomotion; Equinus; Kinetics; Adaptation; Motor control;
Cerebral palsy

Introduction.—Children with cerebral palsy (CP) develop abnormal walking patterns and bone deformities of the lower limbs. It is important to establish whether any relationship exists between these troubles, in order to better understand the evolution of these children.

Patients and methods.—Fifteen 3D bone morphological parameters and 58 spatiotemporal and kinematic 3D parameters were collected respectively with the EOS system and an optoelectronic system in 38 CP children. Correlations between bone morphology and walking characteristics of each limb were studied by calculating the Pearson correlation coefficients and multiple regression analysis.

Results.—Height and weight development were the main determinants of bone morphology, and were more correlated with gait parameters (0.57).

Discussion.—In general, correlations between structural bone deformities and kinematics in CP children were low to moderate (Carriero et al., 2009). The flexum and varus-valgus of the knee were the deformities that most affected the walking patterns of these children. These original data are relevant for therapeutic decision in CP children.

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Modulation of muscle activity of typically developing children changing direction during walking

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Keywords: Locomotion; Equinus; Kinetics; Adaptation; Motor control;
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Introduction.—We have performed a radiological evaluation of static data of spine-pelvis-femur complex in walking children with cerebral palsy (CP). The data are discussed about GMFCS and after about radiological data in asymptomatic subjects.

Results.—There is no significant difference concerning the form parameter (pelvic incidence = PI), on the other hand there is a significant difference on the pelvic parameters. A lumbar lordosis which is not correlated with PI has to be considered like a result of the disease (postural troubles, neuro-motor disorders related with growth...) and requires a specific and early evaluation and treatment.

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Analysis of the medical causes of death in cerebral palsy

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Keywords: Locomotion; Equinus; Kinetics; Adaptation; Motor control;
Cerebral palsy

Introduction.—We have performed a radiological evaluation of static data of spine-pelvis-femur complex in walking children with cerebral palsy (CP). The data are discussed about GMFCS and after about radiological data in asymptomatic subjects.

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