ANALYSIS OF GAIT KINEMATICS IN CHILDREN WITH CP, TREATED WITH BOTULINUM TOXIN PRELIMINARY REPORT

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Introduction

The progress of medicine enables saving lives of the growing number of premature infants and newborns with malformations. The World Health Organization estimates that about 7% of the world children population suffers from some persisted, irreversible disorders of the central nervous system [Dudek, 2009]. In this group a special place takes a central neuron injury, in the form of cerebral palsy. Early correct diagnosis, enabling proper stimulation of child's development, began before fixation of disorders in the CNS, is very important. Evaluation of patient's pathology can be performed basing on visual observations of realized locomotive functions or by kinematic gait analysis, performed by specialized systems. Kinematic analysis enables more objective evaluation and better adjustment of the therapy and rehabilitation to patient's needs.

Methods

Research was conducted in John Paul II Upper-Silesian Centre of Child Health in Katowice, with the use of three-dimensional motion analysis system BTS Smart. The research group consisted of children suffering from different type and degree cerebral palsy. All children moved unaided, or using tools (crutches, walker, etc.).The paper presents preliminary results, obtained for 3 patients with diplegia, 8 with hemiplegia and 1 with quadriplegia. Each patient was tested before starting botulinum toxin therapy and intensive rehabilitation. Three children have been tested three times, before medicine administration, and then after 3 and 6 months. All obtained test results were related to children's walk standards, developed by the authors [Jochymczyk-Woźniak, 2011].
Functional analysis of patient's gait was performed using indicative method of gait assessment [Suchtte, 2000]. Results of therapy were evaluated, comparing values of indicator GGI and 16 other analyzed parameters in the consecutive tests and referring them to the control results of healthy kids group [Jochymczyk-Woźniak, 2011].

Results and Discussion

All tested children have problems with bending at the hip joint, with bending of the knee at the beginning of contact with the ground, and with pelvis anteversion. Most of the analyzed parameters showed also some asymmetry between the two limbs.

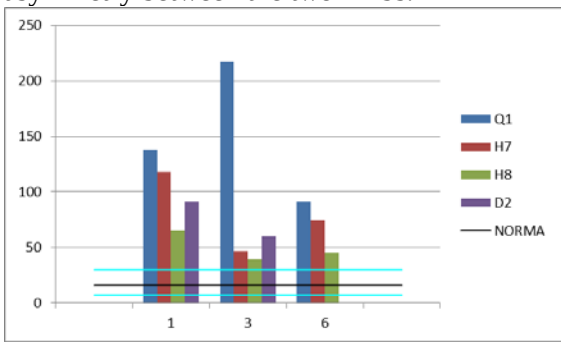

Figure 1: The values of the Gillete Gait Index in three consecutive tests, related to values obtained for the control group of healthy children.

The analysis of the tests results proves significant improvement of locomotive functions after application of botulinum toxin. GGI values were lowered and the other analyzed parameters improved, 6 months after the toxin administration.The method of the locomotive functions evaluation, based on GGI, presented in the paper, facilitates the analysis of the results of the kinematics of gait.

References

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