Characteristics of growth and development of children with cerebral palsy

Schurov VA*

The Federal State-Financed Institution, Russian Ilizarov Scientific Center for Restorative Traumatology and Orthopaedics, Russia

Abstract

A major problem in patients with 2 levels of movement disorders in cerebral palsy is the possibility of compensation of the morphological and functional deviations in the development process: low body MACS index, restoration of the reduced speed of cerebral blood flow, reduced velocities and constraints in implementation of co-coordinated movements. From 180 healthy individuals and 30 patients with CP in age from 4 to 40 years were investigated anthropometric indices, motor response speed, tapping, and speed of blood flow in median cerebral arteries and brachial arteries. Discovered that reduced at birth and body mass index in children (1.83) no further persists and is 1.42 g/cm². Reduced in patients with cerebral blood flow speed by the end of the growth period reaches a normal level. The lack of speed motor responses is reduced with age from 45% to 0%, the value of the tapping from 60% to 18% every 10 years. Execution of combined movements 2 and 3 fingers month after such an injury [2,8]. The aim of the study was to identify the nature of disorders in the growth and development of children with cerebral palsy level 2 MACS [5].

Introduction

The size of the lag of children with cerebral palsy (cerebral palsy) in longitudinal body growth and development is well documented [1-3]. However, it is important to assess the compensatory potential of the body in different age periods. It is necessary to know how the pathology of the Central nervous system affects longitudinal growth and weight gain, muscle contractility, speed of motor response and coordination of muscle efforts. It is known that the speed of movements is postulated by the presence of temporary programs in memory. At the same time, tumors of the brain, parasitic structures, cerebellum, spinal cord, as well as their inflammatory diseases do not violate the reaction time of the hand [4], since the control of the temporal characteristics of movements is carried out at a higher level of the Central nervous system than the distribution of movements to various Executive bodies. Tapping test using computer programs is now widely used to evaluate the types of the nervous system [5]. During the test, 3 factors are important: time, spatial amplitude and frequency of motion [1]. Options with different duration determine the maximum frequency of movements allow to evaluate the lability and because of the process of excitation of the nervous system, as well as the severity of psychomotor attitudes on optimization efforts, when the best results are achieved when a uniform rate of movement [6].

With increasing age, children are increasing the speed of the motor reactions, and rate of finger movements. In healthy subjects, the frequency response of tepping is 56±9 per 10 s for the right hand and 52±9 for the left. This frequency is slightly higher in men than in women. In patients with hemiparesis, the incidence of shock was reduced to 64% of normal [1]. To limit the maximum speed of finger tapping can damage joints, stimulate early training. In particular, pianists have a greater frequency of finger movements by 20-30% [7].

With the help of a tepping test, you can control the severity of lung and moderate traumatic brain injuries, for example, in boxers and football players and assess the dynamics of brain function recovery a month after such an injury [2,8]. The aim of the study was to identify
Results of the study and their discussion

In the group of newborns healthy children were the highest body weight and body mass index. In newborns with cerebral palsy revealed a natural lag the longitudinal body size by 12%, the indicator scale Apgar-1 by 25% and Apgar-2 by 21% and body weight by 33% [Table 1].

In newborns with cerebral palsy with large longitudinal body size was more lag in body weight, reaching 600 g (Figure 1).

In the postnatal period, the deficit of the body mass index of 1.42 kg was not compensated for during the subsequent life of children (Figure 2).

With increasing age in healthy subjects, the rate of blood flow through the middle cerebral arteries tended to decrease (Figure 3). This decrease is due to the need to maintain a stable level of autoregulation of the arteries. In children with cerebral palsy revealed a sharp decrease in the indicator of cerebral blood flow to 10 years of life, which was compensated by the end of the period of natural growth of the body.

During the same period, the rate of blood flow through other arteries, such as shoulder arteries, changed as well as in healthy children, increasing during the puberty period and decreasing over the next years of life (Figure 4).

Time simple visually-motor motor reaction in children with cerebral palsy was more than 2 times. However, with increasing age this difference is leveled (Figure 5).

Both healthy and patients with increasing age, the maximum frequency of finger movements (tapping) were increased. At the same time, patients with tepping index is lower by 50-25%. The highest values of the frequency of movements reached 15-20 years and then began to decline [9,10]. The difference between performance in the 2 groups was reduced to 15% (Figure 6).

In healthy subjects the rate of combined movement of 2 and 3 fingers in all age groups was reduced by 30% (Figure 7). the rate of asymmetry of the single movements of the right and left fingers was 7.3%, and the combined movements – 12.9% [11-13].

Thus, a common sign of functional disorders in patients with level 2 movement disorders in cerebral palsy is an uncompensated body mass

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N = 0.0025x^2 - 0.087x + 1.19 \\
R^2 = 0.994
\]

\[
N = 1.84x + 6.50 \\
R^2 = 0.980
\]

\[
D = 0.037x^2 - 0.223x + 4.43 \\
R^2 = 0.977
\]

\[
D = 1.84x + 5.08 \\
R^2 = 0.996
\]
deficit, a decrease in the speed of cerebral blood flow in the postnatal period of childhood, a decrease in the speed of movement and difficulty in performing combined coordinated movements.

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