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Effective Implementation of Comprehensive Medical Rehabilitation of Children with Diseases of the Peripheral Nervous System

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Abstract The goal is to improve the criteria for the rehabilitation of children with limited mobility due to damage to the neuromotor system (PNS). **Purpose of the study.** Introduction of the principles of complex step-by-step, continuous rehabilitation of children with diseases of the peripheral nervous system, use of the drug Ipigrix in medical complex rehabilitation of diseases of the musculoskeletal system of children, study of its effectiveness in medical rehabilitation. **Materials and methods of research.** 100 children aged 3 to 18 years with various types of neuropathies were examined. All children were divided into 2 groups: main - 64, control - 36. In the main group, an improved rehabilitation method was used with the addition of standard treatment. In the control group, only the standard rehabilitation method was used. All patients were examined using complex diagnostic methods, including clinical, neurological, anthropometric and neurophysiological research methods. Statistical processing of materials was carried out on the basis of Student-Fisher tests, non-parametric Mann-Vane tests, etc [1,2]. **Research results.** The control group included 36 children with an average age of 10 years, the main group - 64 children with an average age of 9 years. During clinical neurological examination, patients complained of numbness in the legs, paresthesia, loss of mobility in the legs, and pain in the direction of the affected nerve [3]. Complaints of young children were limited movements (53.1%) and pain in the heel of the foot (42.2%), pain in the legs (31.5%). Among children aged 7-11 years, the number of children with the above complaints decreased significantly ($p = 0.05$) from 41.6% to 32.8%, pain due to damage to the nerve of the leg was -23.4%. **Conclusions:** Prevention of exacerbation of disease complications as a result of the earliest possible start of the practice of medical rehabilitation for neuropathies of the peripheral nervous system, taking full control over the monitoring of sick children through a continuous, comprehensive unified system program of medical rehabilitation, carrying out the planned process of medical rehabilitation individually, continuously, and step by step.

Keywords Neuromotor system, PNS, Treatment criteria, Rehabilitation measures, Children, Ipigrix

1. Relevance

To date, pediatric patients with PNT diseases have a complex of clinical symptoms, namely: pain, partial motor disturbances of the corresponding myotome, a decrease or sharp decrease in the proprioreflex, often depending on the type of the corresponding dermatome, sensory disturbances, positive signs [4]. Tension is a symptom of this problem and determines its relevance. The most common cases in patients are loss of mobility in the affected leg, disruption of the patient's usual lifestyle, social isolation, disability, deterioration in quality of life [5,6], which determines the relevance of the study. The main complaints were tingling in the legs, hypoesthesia, dysesthesia, pain in the direction of the affected nerve of the leg [7]. In the younger age group, complaints of hypoesthesia (3.1%) and pain in the calf area (9.2%) were minor. Among boys this was 29.0%, and among children 7-11 years old - 29.5% of the above complaints. Moreover, children aged 7-11 years are a statistically significant risk factor for the development of pathology of the peripheral nervous system (relative risk 3.2-9.4). Among children, the most common neurological complaints occurred mainly at the age of 11-17 years. The relative risk (according to the indicators of the first group) ranged from 4.0 to 12.8.

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2. Purpose of the Study

Introduction of the principles of complex step-by-step, continuous rehabilitation of children with diseases of the peripheral nervous system, use of the drug Ipigrix in medical complex rehabilitation of diseases of the musculoskeletal system of children, study of its effectiveness in medical rehabilitation.

3. Materials and Methods of Research

100 children aged 3 to 18 years with various types of neuropathies were examined. All children were divided into 2 groups: main - 64, control - 36. In the main group, an improved rehabilitation method was used with the addition of standard treatment. In the control group, only the standard rehabilitation method was used. All patients were examined using comprehensive diagnostic methods, including clinical, neurological, anthropometric and neurophysiological research methods [8]. Statistical processing of materials was carried out on the basis of Student-Fisher tests, non-parametric Mann -Vane tests, etc. [9].

4. Research Results

The control group included 36 children with an average age of 10 years, the main group - 64 children with an average age of 9 years. During clinical neurological examination, patients complained of numbness in the legs, paresthesia, loss of mobility in the legs, and pain in the direction of the affected nerve. Complaints of young children were limited movements (53.1%) and pain in the heel of the foot (42.2%), pain in the legs (31.5%). Among children aged 7-11 years, the number of children with the above complaints decreased significantly ($p = 0.05$) from 41.6% to 32.8%, pain due to damage to the nerve of the leg was -23.4%. In the last group of young people in the "11-18 years old" category, complaints decreased by 26.2-34.5%, which is less than the previous figure, and the increase in pathology does not correspond to age. Thus, the disease is associated with children's complaints of pain in the palms of the feet, and loss of movement occurs in the form of hypoesthesia [10]. The rate of vegetative tests (Aschner test, Kerdo index) [11] was 81.4±7.6% in the main group and 56.8±5.7% in the comparison group ($r<0.05$).

Summarizing the data obtained during the clinical and neurological examination of patients in the main group, these patients have common characteristics: average (77.1%) constant (22.9%) spread of pain is observed mainly during movements, daily loads, static loads and restrictions [12,13]. Movement in BDS is combined with anamnesis data showed that in 88.2% of cases the disease is chronic. An objective examination revealed different levels of leg muscle tension, positive reactions to functional tests, and limitation of active movements [14]. After complete rehabilitation of patients in the main group, a complete decrease in acute pain syndrome was noted, average pain decreased by 78.9%, constant pain by 92.6%, periodic pain by 75%.

After the rehabilitation measures, improvement in the main group was noted after 2-3 days: there was a decrease in neuropathy of the legs, swelling of the right side of the body (by 34.8±5.6%). In addition, swelling of the left leg in the main group decreased by 45.8±4.7% compared to the control group (23.7±3.8%). Sensitivity on the right increased by 56.8±3.2% in the control group and by 21.4±4.1% in the control group. In the main group, the level of sensitivity on the left decreased by 41.5±3.6%, and in the comparison group by 17.8±2.1%. In the main group, the frequency of right-sided night cramps decreased by 43.9±3.6%, and in the comparison group by 23.8±2.7%. In the main group, left-sided night cramps decreased by 43.2±3.6%, and in the comparison group - by 25.6±1.2%. Overall, right-sided strabismus decreased by 45.6 ± 5.2% in the study group and by 27.1 ± 3.7% in the control group. It was found that the left side of the main group decreased by 34.9±3.3%, and in the comparison group by 13.6±1.8%. After extensive rehabilitation in the main group, BDS reduced movement restrictions by 6.6 times, increased muscle strength in the legs by 3.5 times, reduced responses to functional tests by 11.5 times, and also restored clinical and neurological parameters. There were no changes in reflexes, muscle strength or sensation in the legs.

After rehabilitation measures in the main group, the frequency of symptoms of neuropathy due to incorrectly performed injections was 46.8±7.4% compared to 23.5±2.6% in the control group. Neuropathy and legs - 37.8% ± 3.0% compared to up to 15 decreased by 0.6 ± 1.7%.

In the main group, after rehabilitation measures, the detection of positive tests for leg neuropathies decreased by an average of 71.4 ± 6.0%. Specifically, the Duncan test decreased to 80.8 ± 3.5%, the Phalen test to 35.7 ± 4.1%, and the Elevation test to 51.2 ± 4.8%.

To diagnose post-injection mononeuropathies, the Phalen test was performed [15,16]; a positive test on the right was found in 44% of cases ($p <0.001$). Other positive provocative tests for the diagnosis of right-sided sciatic neuropathy were found in 22.7% of children. A positive Tinel test was found in 5.3% of results, a positive Elevation test in 6.7% and a positive Durkan test in 1.3%.

Summarizing the data obtained during the clinical and neurological examination of patients in the main group, these patients have common characteristics: average (77.1%) constant (22.9%) spread of pain is observed mainly during movements, daily loads, static loads and restrictions. Movement in BDS is combined with anamnesis data showed that in 88.2% of cases the disease is chronic. An objective examination revealed different levels of leg muscle tension, positive reactions to functional tests, and limitation of active movements.

After complete rehabilitation of patients in the main group, a complete decrease in acute pain syndrome was noted, average pain decreased by 78.9%, constant pain by 92.6%, periodic pain by 75%.

5. Conclusions

As a result of the earliest possible start of the practice of medical rehabilitation for neuropathies of the peripheral nervous system, taking full control over the monitoring of sick children through a continuous, comprehensive unified system program of medical rehabilitation, carrying out the process of planned medical rehabilitation.

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