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Research Article

Effectiveness of the Complete Physical Rehabilitation Including Choreographic Elements for Children Under 4-6 years who have Come Through the Facture of Talocrural Joint

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Abstract

Traumatic injures of talocrural joint can often occur in the children age. They enable to cause long fixation of a joint in a definite position that in turn. Weakens always muscles requires a necessity for rehabilitation. The authors have worked out a method of physical rehabilitation for children after fracture of talocrural joint. This method can be applied under conditions of outpatient's polyclinic. The given method must be realized in three stages namely: preparation (2 weeks), basic (4 weeks) and closing (2 weeks). The given method consists of invigorating and relaxing exercises plus special ones with choreographic elements directed to developing muscles of food and joint. Appreciating the results of apprising the worked out methodic of physical rehabilitation showed that its effectiveness has exceeded all the results of traditional scheme of rehabilitation after f traumata of talocrural joint. The author's methodic of physical rehabilitation with applying the choreographic elements enables us (1) to accelerate and enhance the effectiveness of recovering the function of damaged talocrural joint with children, (2) to prevent muscular atrophy from children and (3) to enhance the suppot ability on the extremity (having been damaged before). Effectiveness of the worked out methodic enables the authors (1) to pay attention of a wide circle of professional rehabilitators and (2) to recommend it for application by special experts in their work.

Keywords

Children; Talocrural joint; Fracture; Physical rehabilitation; Choreography

Introduction

Progressive development of society is accompanied by gradual acquiring of medical knowledge [1-3], perfecting of methods of treating different pathology [4-6] on the basis of clinical [7-9] and experimental [10-12] researches.

Considering that in modern civilization noninfectious diseases have been widely spread [13], we always paid particular attention to problems of rehabilitation after having removed acute complication [14,15]. Taking into account that children are rather vulnerable category of persons [16]. Methodic of their treatment is being actively worked out [17]. Traumata injuries of the locomotors system with children have been known to be widely spread in present [18]. Besides injuries traumata talocrural joint are frequently received (abnormal states) in the childish age [19].

The Anatomic - functional peculiarities of the talocrural joint cause create varieties of its injuries, most of them are of intra-articular character [20]. So it is necessary to restore not only exact reposition of all breaks off with full restoration of articular osteoarticular surface and all the osteal ligamentous components, but with obligatory long and proper planed physical rehabilitation [21]. This is connected with the fact that long fixation of the given joint causes to muscular atrophy requiring necessity of the rehabilitative process in all cases [22].

Traditionally in the course of rehabilitating after traumata of talocrural joint with children the sessions of curative gymnastics, therapeutic massage and physiotherapy are complex applied. This enables specialists to speed up the process of rehabilitation and minimize after - effects of a fracture [23].

But at the same time the complex physical rehabilitation with children having fractures of talocrural joint has no satisfactory efficiency in all cases to achieve full recovery of functioning an extremity [24].

Proceeding from such a situation the vital question is to go on to search effective variance of physical rehabilitation and to works out the methodic of rehabilitating the injuries of talocrural joint for the pre-school children who have endured fracture of talocrural joint.

Purpose of the study is to estimate the variance of combined physical rehabilitation including the elements of choreography with children less than 4-6 years who have endured fracture of talocrural joint.

Materials and Methods

The conducted research has been approved by local ethical Committee under Russian state social University on the 15-th September 2016 (protocol No. 9). The specialist examined 64 children 4-6 years (average age of 5.2 ± 0.31 years), who have endured a fracture one of the two talocrural joint without displacement of a bone. The given children underwent successful children underwent successful conservative treatment resulted in adhesion of bone's all breaks off. The research was conducted on the base of Medical-rehabilitated center "Belyaevo" in Moscow.

Goniometry with all the examinees was provided. The standard of flexion in the talocrural joint was equal to: 20-30 degrees dorsal flexion; plantar flexion equal to 45-50 degrees.

Adduction of foot is combined with supination; adduction is combined with pronation and supination. Supination and pronation are measured in the initial position-standing one. Supination equals to 30 degrees, pronation equals to 20 degrees. Motion amplitude was

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determined is difference between extension of maximally possible and flexion in the joint.

The linear measurements were conducted with centimeter band: length and circumference were determined as for a damaged extremity as for unaffected one [25]. We also estimated a circumference as a damaged extremity as unaffected one in the course of measuring in the symmetric places at a definite distance from the bony identical points with measuring the grips of calf, coverage malleolus - plus an oblique [25].

The following test in supportability for a damaged lower extremity was conducted be means of leg dynamometer (ground type scales). The following parameters were measured in kg: a patient placed his/her damaged leg on scales maximally pressing with the whole foot on the scales surface up to a level of threshold of algesthesis and maganitude was recorded in kg. Measurement of one and the same motion was recorded three time, a maximal/ the best weight was final one [26].

All the examines were divided into two groups, 32 persons each control and experimental by means of random sample. The control group had its generally accepted programmer of physical rehabilitation including the elements of choreography. The experimental group its author's programmers of physical rehabilitation with three stages for realization.

Physical rehabilitation of children at the preparatory stage

Performance of physical exercises for all muscular group including static and dynamic ones for attention, coordination of movements and body posture [25]. On following the principle of scattered muscular load the active exercise with static tension and relaxation were alternated. Each exercise was repeated 3-4 times the duration of one lesson is 25 min. Three session held a week. Procedures of curative massage were held after every session of therapeutic gymnastics. Duration of a procedure was up to 25 minutes. Cervical region, thoracic and lumbar sections of spine column plus unaffected extremity was massaged. The massage manipulation such as stroking and rubbing were used [26]. The preparatory period lasted 2 weeks.

Physical rehabilitation of children at the basic stage

Activity of physical exercises is raising in this period. Physical load increased for all groups of muscles: (a) introducing new special exercises with choreographic emphasis, (b) performance of rhythmic movements with musical accompany, (c) teaching the choreography bow, (d) familiarizing and teaching classical positions of arm and legs, (e) performance of classical elements at the choreographic barre exercises, (f) Stand on the half tolls holding barre-exercises. (g) Studying the dancing elements, (h) parterre gymnastics (gymnastic elements, exercises for relaxing and stretching of muscles), (i) walking along a straight line, zigzag walking, diagonal walking; walking with stepping on artificial small "Islands", (k) slow light Jogging, (k) fun and move games for attention and consolidation of the studied choreography programmer.

Each exercise was repeated 4-6 times [27]. Duration of sessions was 30 minutes in the course of basic period of physical rehabilitation. They were held three times a week, and they lasted four weeks. Therapeutic massage was applied just after sessions of medical gymnastics. Duration of a massage procedure was up to 30 minutes in this period. The cervical zone, thoracic and lumbar regions of backbone, unaffected extremity and the sick, damages extremity were massaged. But a moderate, light regime manipulation was specially used for the sick, damaged extremity. The following massage manipulation such as stroking, rubbing, kneading were applied [26].

Physical Rehabilitation of Children at the Closing Stage

In the course of the given period of rehabilitation physical exercise were being performed with an increasing for all groups of muscles. All the previous exercises, increasing the dance ones were repeated. Real dance performance was created on the base of special parameters: (a) perfected excellent performance of each movement, (b) stand of half toes without support, (c) walking about the hall, application of movement with resistance, standing on one leg, running,; ride a bike, light jumping. The dance item was performed on count and to music accompaniment [27]. Each exercise was done 6-8 times. In the closing period of physical rehabilitation duration of session was 35 min. They were held 3 times a week and they lasted 2 weeks. After each session, the massage procedures were held, they lasted up to 40 minutes with applying all the massage manipulations in normal regime. These massage manipulation were applying on unaffected extremity and damage one as well plus cervical zone, thoracic and lumbar regions. The following massaged manipulations such as stroking, rubbing, kneading and vibrations [26].

In order to process the gathered information we used the methods of mathematical statistics with calculating an arithmetic mean (X) standard deviations from the mean (σ), Students criterion (t) at confidence level $p < 0.05$.

Results of the Researches and their Discussion

We achieved more preferable indices of morphological and functional abilities a of damaged extremity clue to applying author's variant of physical rehabilitation with the children who have endured fractures of the talocrural joint (Table 1).

Conventional symbols: p - reliability of differences of rehabilitating results in the control and the Experimental group (we did not detect significant discrepancies between our groups)

The best anthropometric parameters have been achieved as results of rehabilitation according to author's programmers. Significances of gastrocnemius muscle's circumference, malleolus's circumference, crus's circumference exceeded the significances of the control. The achieved results should be with more active stimulating influence of authors methodic on the osteo muscular and nervous system of an extremity. Probably the basis of achieved result is also explained by enhancing the trophicity of tissues in damaging zone simultaneously with enhancing synthesis of ATF and protein at the expense of activating blood flow and stimulating the neurotrophic influences [28,29].

In the experimental group more marked evident positive results of goniometry pointed out to intensification the anabolic processes in tissues of damaged joint at the expense of enhancing the transcribed and transmitted processes in the joint's tissues [30,31]. It is clear that the rehabilitating complex worked out by authors exerts combined strengthening influence on all the muscles of shin. This has been proved by discrepancies between our groups. Such progress has proved by promoted growth of support indices on the damaged extremity, such indicts have exceeded the level of the control group.

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Table 1 Dynamics of morphological and functional indices after having damaged the talocrural joint with children 4-6 years on the background of rehabilitation.

Indices	The beginning of the experiment X ± σ		After rehabilitation X ± σ	
	Control group, N=32	Experimental group, n=32	Control group, n=32	Experimental group, n=32
The circumference of calf muscle, cm	20.8 ± 0.13	20.6 ± 0.16	21.9 ± 0.15	23.9 ± 0.11 p<0.05
The circumference of the ankle, cm	16.0 ± 0.36	15.5 ± 0.32	17.0 ± 0.11	18.5 ± 0.14 P < 0.05
The circumference of the tibia, cm	13.9 ± 0.23	14.0 ± 0.26	14.5 ± 0.26	17.8 ± 0.22 P < 0.05
Oblique pass, cm	19.7 ± 0.33	20.1 ± 0.31	20.9 ± 0.33	24.3 ± 0.34 P < 0.05
Dorsal extension	15.2 ± 0.51	15.4 ± 0.42	20.3 ± 0.54	25.8 ± 0.37 P < 0.01
Planter extension in degrees,	36.0 ± 0.37	36.2 ± 0.29	40.2 ± 0.32	47.6 ± 0.44 P < 0.01
Force of support , kg	8.2 ± 0.21	7.1 ± 0.45	15.1 ± 0.29	20.4 ± 0.34 P < 0.01

Conclusion

With children different damages of talocrural joint cause not infrequently a long restriction of mobility in the lower extremity, exert negative influence on the lauding physical systems of organism and general level of health. The authors have worked out the methods of physical rehabilitation with applying the choreographic elements.

Such a methodic was being realized during the three periods of rehabilitation: preparation (2 weeks), basic (4 weeks) and closing (2 weeks). As a result of application they worked out methodic we have determined its high effectiveness.

This effectiveness has exceeded the traditional variant of rehabilitation. The author's method of physical rehabilitation with applying the choreographic elements has enables us to achieve more marked improvement of the considered anthropometric indices, support ability too of having been damaged lower extremity with children under 4-6 years.

Effectiveness of the worked out methodic enables author's to attract attention of a circle of experts in rehabilitation and to recommend it for application by the profile specialists in their work.

References

1. Mikhaylova IV, Shmeleva SV, Makhov AS (2015) Adaptive chess educational technology for disabled children. Teoriya i praktika fiz. kultury 7: 38-41.
2. Makhov AS, Stepanova ON, Shmeleva SV, Petrova EA, Dubrovinskaya EI (2015) Planning and Organization of Sports Competitions for Disabled People: Russian Experience. Biosci Biotech Res Asia 12: 34-44.
3. Medvedev IN, Danilenko OA (2010) Effectiveness of vascular wall activity correction in patients with arterial hypertension, metabolic syndrome, and oculo-vascular occlusion. Russian Journal of Cardiology 83: 64-67.
4. Bonkalo TI, Shmeleva SV, Zavarzina OO, Dubrovinskaya YeI, Orlova YuL (2016) Peculiarities of interactions within sibling subsystem of a family raising a child with disabilities. Res J Pharm Biol Chem Sci 7: 1929-1937.
5. Strelkov VI, Zavarzina OO, Shmeleva SV, Kartashev VP, Savchenko DV (2016) Psychological barriers in college teacher's career «Helping professions». Res J Pharm Biol Chem Sci 7: 1938-1945.
6. Mikhaylova IV, Shmeleva SV, Makhov AS (2015) Information communication teaching aids in long-term training of chess players. Theory and Practice of Physical Culture 5: 31.
7. Skoryatina IA, Zavalishina SYu, Makurina ON, Mal GS, Gamolina OV (2017) Some aspects of Treatment of Patients having Dislipidemia on the Background of Hypertension. Prensa Med Argent 103 : 3.
8. Skoryatina IA, Zavalishina SYu (2017) A Study of the Early Disturbances in Vascular Hemostasis in Experimentally Induced Metabolic Syndrome. Annu Res Rev Biol 15:1-9.
9. Skoryatina IA, Medvedev IN, Zavalishina SYu (2017) Antiplatelet control of vessels over the main blood cells in hypertensives with dyslipidemia in complex therapy. Cardiovascular therapy and prevention 16: 8-14.
10. Zavalishina SYu, Medvedev IN Comparison of opportunities from two therapeutical complexes for correction of vascular hemostasis in hypertensives with metabolic syndrome. Cardiovascular therapy and prevention 16: 15-21.
11. Zavalishina SYu (2017) Physiological Dynamics of Spontaneous Erythrocytes' Aggregation of Rats at Last Ontogenesis. Annu Res Rev Biol 13: 1-7.
12. Zavalishina SYu (2017) Physiological Features of Hemostasis in Newborn Calves Receiving Ferroglukin, Fosprenil and Hamavit, for Iron Deficiency. Annu Res Rev Biol 14: 1-8.
13. Skoryatina IA, Zavalishina SYu (2017) Impact of Experimental Development of Arterial Hypertension and Dyslipidemia on Intravascular Activity of Rats' Platelets. Annu Res Rev Biol 14: 1-9.
14. Medvedev IN, Zavalishina SYu (2016) Platelet Activity in Patients with Third Degree Arterial Hypertension and Metabolic Syndrome. Kardiologiia 56: 48.
15. Medvedev IN, Skoriatina IA (2010) Effect of lovastatin on adhesive and aggregation function of platelets in patients with arterial hypertension and dyslipidemia. Klinicheskaia meditsina 88:38-40.
16. Vorobyeva NV (2017) Physiological Reaction of Erythrocytes' Microrheological Properties on Hypodynamia in Persons of the Second Mature Age. Annu Res Rev Biol 20: 1-9.
17. Belozerova LM (2006) Healing physical culture in pediatrics: Rostov n/Don: Phoenix, 222.
18. Kavalerckiy GM, Silin LL, Garkavi AV (2008) Traumatology and orthopedics. Moscow: Publishing Center Academy, 624.
19. Epifanov VA, Epifanov AV (2009) Restorative treatment for injuries of the musculoskeletal system. Moscow: Geotard-honey, 480.
20. Bikbulatova AA, Andreeva EG (2017) Dynamics of Platelet Activity in 5-6-Year Old Children with Scoliosis against the Background of Daily Medicinal-Prophylactic Clothes' Wearing for Half A Year. Biomed Pharmacol J 10. 16546.
21. Bikbulatova AA (2017) Dynamics of Locomotor Apparatus' Indices of Preschoolers with Scoliosis of I-II Degree against the Background of Medicinal Physical Training. Biomed Pharmacol J 10:16762.
22. Kotelnikov GP (2006) Traumatology and orthopedics. Moscow: GEOTAR-Media, 400.
23. Kabarukhin BV (2010) Kinds of rehabilitation: physiotherapy, physiotherapy exercises, massage. Rostov n/Don: Phoenix, 557.
24. Kornilov NV (2011) Traumatology and orthopedics. Moscow: GEOTAR-Media, 592.

25. Krasnov AF, Arshin VM, Tseitlin MD (2008) Handbook of traumatology. Moscow: Medicine, 400.

26. Verbov AF (2002) Basics of therapeutic massage. Rostov n / Don: Phoenix, 320.

27. Kozlov VV, Girshon AE, Veremeenko NI (2010) Integral dance-motor therapy. St. Petersburg: Speech, 285.

28. Medvedev IN, Savchenko AP (2010) Platelet activity correction by regular physical training in young people with high normal blood pressure. Russian Journal of Cardiology 2: 35-40.

29. Medvedev IN, Savchenko AP, Kiperman YaV (2015) Dynamics of the Intravascular Activity of Platelets in Young Men with High Normal Blood Pressure Regularly Practicing Physical Activity. Biology and Medicine (Aligarh) 7: 1 BM-069-15.

30. Medvedev IN, Amelina IV (2010) Evaluation of the relationship between chromosome aberrations and transcription activity of nucleolus organizer regions in indigenous Population of the Kursk Region. Bull Exp Biol Med 149: 332-336.

31. Medvedev IN, Amelina IV (2012) An association between human morphological phenotypical characteristics and the activity of chromosomal nucleolar organizer regions in the interphase cell nucleus in the population of indigenous people of Kursk region. Morfologii 142: 87-91.

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