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Specificity of Physiotherapeutic Procedures in the Treatment of Progressive Muscle Wasting in Patients with Hemophilia Article

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Abstract: ***Hemophilic arthropathy is a common complication of hemophilia, characterized by recurrent joint bleeding leading to contractures and ankylosis. The treatment of these arthropathies is a significant challenge in clinical medicine, aiming to enhance patients' quality of life. Alongside traditional therapies like substitution and surgical treatments, physiotherapeutic methods have shown efficacy as adjuncts in managing hemophilic arthropathies across age groups. This study explores modern physiotherapeutic approaches, their effectiveness, combinations, and applicability at different stages of hemophilic arthropathy evolution, aiming to develop practical physiotherapy regimens for these conditions.***
Keywords: ***Hemophilic arthropathy, hemophilia, physiotherapy, joint bleeding, contractures, ankylosis, ultrahigh frequency current therapy, drug electrophoresis, massage, ultrasound, laser therapy, rehabilitation, quality of life.***

I. INTRODUCTION

Hemophilic arthropathy is a characteristic complication of hemophilia, manifested by recurrent hemorrhages into the joint cavity with the development of intraarticular adhesions and the formation of persistent contractures and ankylosis [4]. The treatment of hemophilic arthropathies is one of the serious problems of clinical medicine aimed at improving the quality of life of patients. Along with traditional substitution therapy, local invasive therapy and surgical treatment, the effectiveness of physiotherapeutic methods of treatment has been proven, which are an additional means of complex therapy of serious arthromiological complications of hemophilia in patients of various age categories [1, 2,3, 6].

The purpose of the work is to study, on the basis of literature data, modern methods of physiotherapeutic treatment and prevention of osteoarticular complications of hemophilia, their effectiveness and the possibility of combination, as well as the expediency of application in various periods of the evolution of hemophilic arthropathies, to develop a physiotherapeutic complex for practical use in the treatment of hemophilic arthropathies.

Currently, there are many different methods in the arsenal of physiotherapists, but not all of them can be used in the treatment of patients with hemophilic arthropathy due to the peculiarities of the course of the inflammatory reaction in the joint cavity, as well as imperfections of the hemostasis system. The analysis of the literature data showed that the Research Institute of Hematology and Blood Transfusion in Kirov has the greatest experience in the application of physiotherapy procedures. Based on their experience, a physiotherapy complex has been developed, supplemented and implemented into clinical practice (Table. 1) for the treatment of hemophilic arthropathies in adults. Here is a brief description of the treatment methods used.

Before starting physiotherapy treatment for recurrent hemarthrosis, joint puncture can be performed using chemosynovectomy on an outpatient basis to relieve and reduce hemarthrosis [3].

One of the physiotherapeutic methods possible for use in patients with hemophilia is ultrahigh frequency current (UHF) therapy [1]. UHF currents include electric currents with a frequency of oscillation from 30 to 300 MHz. The main therapeutic factor in UHF therapy is an ultra-high frequency electric field, which has a high penetrating power and causes the formation of endogenous heat in tissues. This helps to increase blood and lymph circulation, increase vascular permeability, which leads to a decrease in tissue swelling, which occurs in hemophilic arthropathies, and increases metabolism. In addition, UHF currents have an analgesic effect.

Ultrahigh frequency currents are indicated in patients with hemophilic arthropathies in the immediate period from the moment of hemorrhage (2-5days). The UHF electric field power is up to 40 watts, the duration of the procedure is 5-15 minutes. Electrodes with a diameter of up to 8 cm are located on the lateral surfaces of the joint at a distance of 1.5-2 cm from the skin.

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Most often, ultra-high frequency currents are used for 3-5 days, after which it is possible to switch to drug electrophoresis [2], which is advisable to use during the restoration of the functional ability of joints and use one of the drugs of hyaluronidase action (lidase, ronidase). These preparations contain the enzyme hyaluronidase, which cleaves hyaluronic acid, which is a "cementing" substance of connective tissue, which causes an increase in the permeability of tissues, including the synovial membrane, and promotes the resorption of colloidal substances. This leads to an improvement in the trophic tissues, as a result of which favorable conditions are created for redressation.

To reduce pain, the use of electrophoresis with novocaine is effective, which allows you to create the necessary concentration of novocaine locally in the affected joint without injection, as well as improve tissue trophism by relieving vascular spasms due to pain syndrome. It is recommended that electrophoresis alternate with hyaluronidase preparations and novocaine.

The peculiarity of the electrophoresis technique is the placement of the active electrode (anode) not only on the side surfaces of the joint, but also on the front surface, which provides a more energetic effect on the tissues of the affected joint. The duration of the drug electrophoresis procedure is on average 16 minutes. The average current is 3.2 mA. The number of sessions is up to 15.

Contraindications to the use of this method of treatment in patients with hemophilia are ongoing bleeding and hemorrhages of various origins, purulent necrotic processes in the joints, the presence of infectious diseases, individual intolerance to the drugs used, as well as acute liver and kidney diseases.

The literature describes the technique of alternating drug electrophoresis with massage as an effective option for physiotherapy treatment, which allows significantly faster restoration of joint function in hemarthrosis [5]. The mechanism of therapeutic effect of massage consists in mechanical irritation of skin and muscle receptors, which reflexively causes various reactions from the nervous system, blood circulation and lymph outflow.

The developed technique also includes the use of basic massage techniques for hemophilic arthropathies: stroking, rubbing, kneading. The use of kneading depends on the amount of time that has passed since the initial or recurrent hemorrhage in the joint – up to 7 days this technique is not used. The massaged limb should be in an average physiological position. The duration of one procedure is no more than 20 minutes. The number of sessions is individual and depends on the speed of blood resorption from the joint, the reaction of tissues to the procedure, but not less than 10.

In case of hemarthrosis, it is possible to use high–frequency mechanical vibrations (20-3000 kHz) - ultrasound for therapeutic purposes [6]. Such fluctuations cause complex physico-chemical processes in tissues. As a result of alternating positive and negative pressures leading to compression and stretching of tissues, the interstitial movement of particles occurs, which is accompanied by a decrease in their electrical and isoelectric state.

Biochemical processes are activated, which leads to the expansion of blood vessels throughout the tissue thickness in the area of exposure, blood flow increases, nervous structures are excited, and repair processes are activated.

Ultrasound effects: analgesic, absorbant, antispasmodic, anti-inflammatory, as well as acceleration of blood and lymph flow. In hemophilic arthropathies, ultrasound prevents the formation of adhesions and scars, which underlies the therapeutic effect in contractures and ankylosis.

Ultrasound is used in doses of 0.05-0.7 W/ cm2 with a predominance of pulsed effects and short exposures. The effect is carried out through an oily or aqueous medium. The duration of exposure to each field is 3-5 minutes. The total duration of the procedure is from 6 to 10-15 minutes.

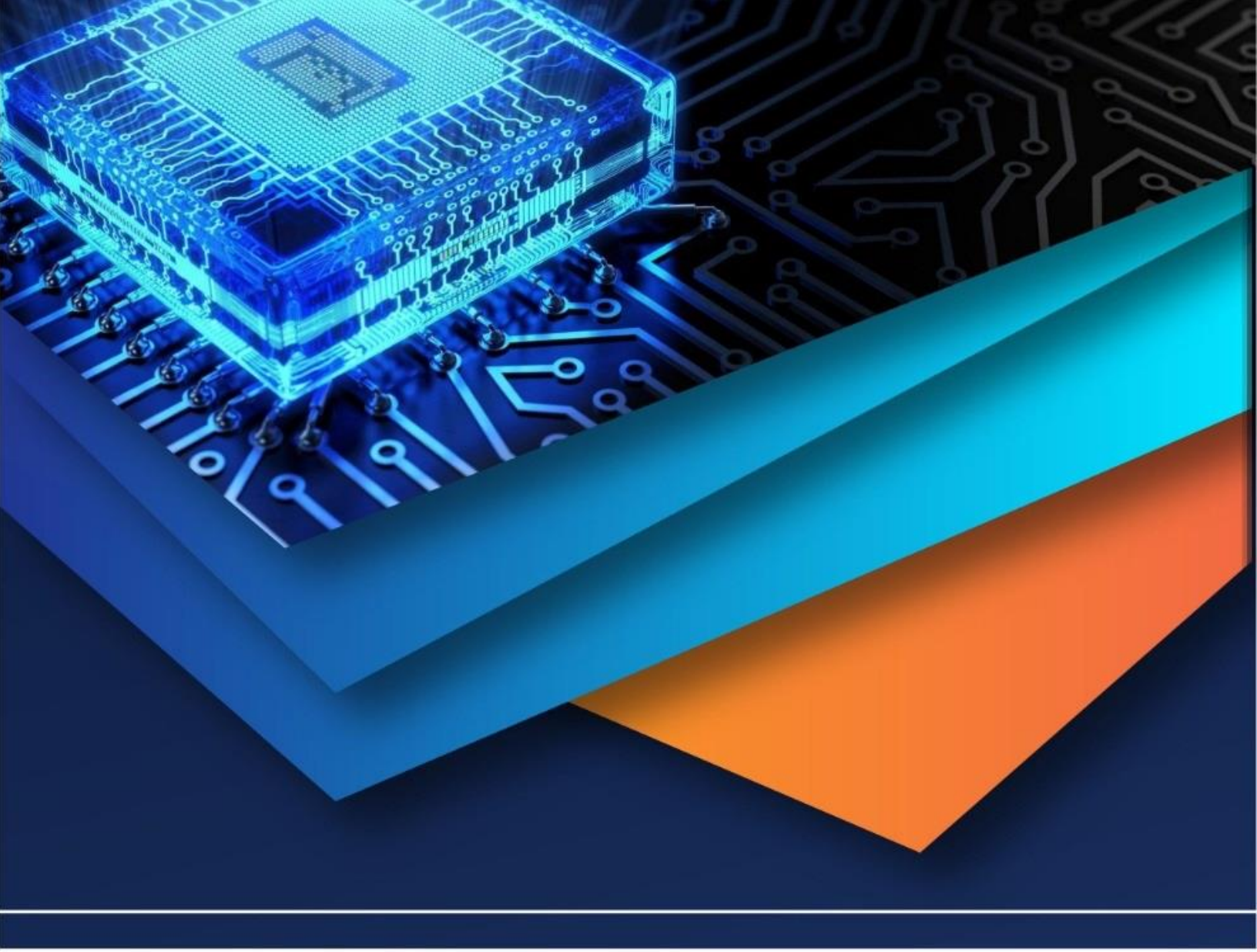
Laser radiation occupies a special place in the complex therapy of hemophilic arthropathies [6]. Low-energy radiation (1-6 MW/cm2) is used for physiotherapy purposes. Such laser radiation does not cause thermal sensations, and the therapeutic effect is associated with the activation of microcirculation, regulation of protective systems, stimulation of cell growth, and regenerative processes in cells.

The data of modern literature prove the effectiveness of the use of physiotherapeutic methods in combination with adequate replacement therapy in the treatment of acute and chronic hemarthrosis in patients with hemophilia. The described physiotherapeutic manipulations can be recommended for patients with hemophilia in any hospital with an equipped physiotherapy room and qualified medical staff. Competent selection of doses of physiotherapeutic effects, as well as ensuring reliable hemostasis during the entire treatment, make it possible to reduce pain syndrome, early restoration of functional activity of the affected joint after acute hemarthrosis and serve as a measure for the prevention of severe disabling consequences of hemophilic arthropathies.

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