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Using the kinesio taping method in comprehensive rehabilitation of infants with abnormal joint settings

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Relevance. The presence of pathological settings in the joints in infants with perinatal damage of the central nervous system (CNS) is an actual problem of pediatric neurology. Even a short-term limited mobility of certain muscles of the extremities results in a reduction in their cortical representation in the brain. Imparting the physiological position to the joints with preserving freedom of active movements is one of the priorities in the formation of correct movement patterns. Currently, it has become possible thanks to the introduction of the kinesio taping method in child rehabilitation [1, 2].

The method was founded by Dr. Kenzo Kase, Japan [3]. He suggested the use of elastic tapes affixed to the skin in a particular direction and with a certain tension, depending on the purpose of treatment. Laid with a certain tension, the kinesio tape seeks to contract, stimulating mechanoreceptors depending on the degree of tension, and thus correcting the position in the joints. Not only are skin receptors stimulated when using this technique, but there also is a mediated impact affecting other structures, which happens through the skin and the surface and deep fascia, which are connected to it. The kinesio tape is not felt on the skin 10 min after fixation.

It is possible to optimize the rehabilitation process for each child using a variety of taping techniques.

Objective: To evaluate the effectiveness of the kinesio taping technique in the comprehensive rehabilitation of patients with consequences of perinatal CNS lesions with a pronation setting in the shoulder joints, functional hyperkyphosis of lower thoracic spine and thumb adduction.

Patients and methods. The study involved 80 children aged 1 to 3 years with perinatal CNS damage and with a spastic type increase in the muscle tonus. To evaluate the treatment results, goniometry (pronation angle measurement before and after the rehabilitation course) and video recording were used.

To correct the pronation setting in 17 children, we used the "static-dynamic adaptive load" technique (used to form motor stereotypes) 30 minutes per day every day for 10 days. In 9 patients of this group we additionally carried out a functional correction, which is a limitation of the shoulder joint abnormal pronation using kinesio taping. The tape, stretched by 50%, was bandaged to the shoulder and the scapular region with the pronation correction. We changed the applied tape every 2 days for 10 days.

We corrected the lower thoracic spine functional hyperkyphosis in 25 children. The muscle stimulation technique was applied to paravertebral muscle with 35% of tension. Tape was bandaged every 5 days during all the period of rehabilitation. After its termination, parents continued applications on their own within 3 weeks.

In 38 children with an abnormal I finger adduction on one or both hands due to spasticity of the hand and / or forearm muscles, we used two techniques. In 26 children we used the carpometacarpal joint axis' mechanical correction (application with 50% of tension in the middle third of tape for maximum abduction of the first metacarpal dice). In 12 others, we used a muscle stimulating method (application to *m. extensor pollicis brevis, m. extensor pollicis longus, m. abductor pollicis longus* with 25% of tension). The tape was changed daily, and after the course was completed, parents continued applications on their own.

Parents of patients were taught specific techniques of kinesio taping for their independent use at home after the basic rehabilitation course was completed.

We evaluated the results immediately after a course of rehabilitation and 3 weeks later.

1. In case of correcting the shoulder joint pronation setting, we noted a decrease in the pronation angle in both observation groups (with / without kinesio taping) immediately after the rehabilitation was completed. In the main group (with taping), the median of the initial pronation angle was 30°, and of pronation angle reduction - 16°. In the control group, the values were 28° and 12°, respectively. 3 weeks after the rehabilitation was completed, the pronation angle median was 20° in the study group (kinesio taping was continued independently by parents), and 28° in the control group.

2. In the group of patients who underwent mechanical correction for thumb abduction, there was a statistically significant increase in the I finger abduction angle: the median of thumb abduction angle was 40° (min 37; max 46) before the kinesio taping and 60° (54; 66) immediately after tape application. When comparing the thumb abduction index with a parallel index in the group of patients who underwent the muscle stimulation (applications to *m. Extensor pollicis brevis, m. Extensor pollicis longus, m. Abductor pollicis longus*), we defined significantly better thumb abduction when using the mechanical correction. During catamnestic examination, we noted that the thumb abduction index in the main group has not changed compared to the

indication immediately after the course, while in the group with muscle technique, the abduction angle declined almost to the initial value: the median was 42° before the course, 50° after a course, and 48° in catamnesis.

2. Immediately upon the course completion, angle of the functional hyperkyphosis significantly decreased to 27°. In 3 weeks after the course we noted significant decrease in hyperkyphosis angle median from 33° to 21° ($p < 0,05$) in a group with muscle stimulation on the paravertebral muscles projection for correcting the lower thoracic spine functional hyperkyphosis.

Conclusion. Application of the kinesio taping technique in patients with perinatal CNS effects and pathological settings in joints allows to optimize the rehabilitation process and to facilitate the formation of motor stereotypes.

Combination of techniques, aimed at forming and correcting motor stereotypes in children with cerebral palsy, with kinesio taping improves the treatment outcomes and increases the duration of impact.

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