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Original article

INFLUENCE OF THE ERGON TECHNIQUE ON THE PROPRIOCEPTION OF A PATIENT WITH A BIMALLEOLAR FRACTURE

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SUMMARY

Purpose: The aim of the study was to follow the influence of the Ergon Technique on proprioception in patients after surgical treatment of bimalleolar ankle fracture.

Material/Methods: 30 patients with a bimalleolar fracture in the subacute postoperative period were studied, divided as follows: control group (CG) - 15 patients and experimental group (EG) - 15 patients. In CG, a traditional model of kinesitherapy is applied, and in EG, an experimental model is applied, which includes twice a week and Ergon Technique. To monitor changes in proprioception, a test was conducted: a balanced stance on the injured leg on a hard and flat surface was performed, and the time the patient maintained balance (in seconds) was recorded.

Results: The mean values ($\overline{X}$ ±SD) after one month of kinesitherapy application are as follows: in the control group, 0,9333±0,88 sec. and 3,0 sec. in the experimental group. After three months of treatment, the results are as follows: in the control group, 3,93±2,49 sec. And 9,2±4,19 sec. in the experimental group. The values †of P show that the established difference in the mean values of the indicator in the two groups after three months of kinesitherapy is statistically significant and proves a higher efficiency of the experimental model compared to the traditional one applied in the control group at P<0.05.

Conclusion: In the conducted study, we found that there were statistically significant differences in both groups. In EG, we found that Ergon Tehnique has a better effect on proprioception in patients with bimalleolar fracture of the ankle joint compared to the applied traditional model of kinesitherapy in CG.

Keywords: Ergon Technique, ankle fractures, proprioception, physiotherapy,

INTRODUCTION:

Ankle joint injuries are among the most common injuries of the musculoskeletal system. They are the result of extreme forces causing a sudden and abnormally large range of motion in the joint [1]. This is primarily due to the mass involvement in sports - professionally and as a hobby. Playing football, alpine skiing, tennis, basketball is a prerequisite for traumatism of the ankle joint, including from sprains to ruptures of the muscle-tendon structures, dislocations and other injuries, the most severe of which are fractures. The first author who spoke about operative treatment with open repositioning was Lane Destot, who first used the term "fracture of the posterior tibial edge". The term "trimalleolar fracture" was defined by Henderson [2].

In a physical aspect, the ankle fracture is accompanied by pain, functional impairment, and the development of post-traumatic arthritis. From a psychological point of view, patients report fatigue, depression, anxiety, sleep disturbances, and the social component of the problem is expressed in difficulty in returning to usual activities long absence from the workplace [3].

Proprioception, also called kinesthesia, is the sense of self-motion and body position. Proprioception is mediated by proprioceptors, mechanosensory neurons located in muscles, tendons and joints. It is an important element in the kinesitherapeutic program in the recovery of patients after bimalleolar fractures of the ankle joint. Balancing on 1 leg trains and synchronizes the receptor regulation mechanism. Proprioception in an orthopedic contingent of patients is trained through the use of a balance board, bosu ball, and soft balance cushions.

Ergon®IASTM techniques represent a modern therapeutic approach for the rehabilitation of musculoskeletal dysfunctions. All soft tissue therapeutic procedures, different from classic massage, manipulations of myofascial trigger points, transverse friction and active release techniques to new techniques of manual myofascial release or with IASTM instruments, are associated with improving the patient's functional abilities, mainly by in relation to restoring the range of motion of the pe-

ripheral joints [4]. Soft tissue techniques using specialized equipment require tools designed to adapt to the different tissues, shapes and curves of the body. Each tool has several working surfaces [5]. They feature an ergonomic design that facilitates innovative grips and therapeutic applications. These tools are used for the following purposes:

(a) to detect and release scars, adhesions and fascial sclerosis;

(b) to increase blood circulation;

(c) to reduce muscle tone and pain [6].

MATERIAL/METHODS

Goal: The aim of the present study was to follow the influence of ERGON Tehnique on proprioception in patients after surgical treatment of bimalleolar ankle fracture.

Methodology: 30 patients with a bimalleolar fracture in the subacute postoperative period were studied, distributed as follows: control group – 15 patients and experimental group – 15 patients. The persons included meet the following requirements: presence of a diagnosed fracture;

assigned surgical treatment by an orthopedic traumatologist and treated by means of metal osteosynthesis, by means of implants; patients to be in a subacute postoperative period of recovery; availability of written informed consent.

The functional tests and kinesitherapeutic procedures were carried out at the general hospital for active treatment, Blagoevgrad, Department of Orthopedics and Traumatology.

Functional study: To monitor changes in proprioception, a test was conducted: the patient performs a balanced stance (on one leg) on the injured leg, on a hard and flat surface, and the time during which he maintains balance (in seconds) is recorded. The test assesses the patient's ability to maintain balance on the operated lower limb. The measurements were carried out as follows: before starting kinesitherapeutic procedures on the 1st day - to establish the initial state of the indicator, after the first and second week, after the end of the 1st month of kinesitherapy administration, after the 2nd month and after 3 month (final examination).

Methodology of Kinesitherapy

In CG, a traditional model of kinesitherapy is applied, and in EG, an experimental model is applied, which includes twice a week and Ergon Tehnique. In the experimental methodology of kinesitherapy, the following tools are applied: 1. Joint mobilization techniques. 2. Processing with Ergon Technique. 3. Techniques from proprioceptive neuromuscular facilitation. 4. Massage. 5. Exercises with equipment. 6. Kinesio taping.

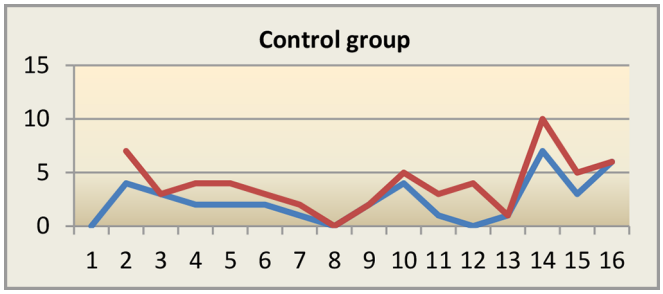
The Ergon technique is applied to every procedure with grips: ***rub, wave, excav, ciryax, sculpt, sep, switch, split*** [7, 8]. By means of Ergon instruments, the region of the lower leg and the foot is processed, and in the first period of the experimental methodology of kinesitherapy, the cicatrixes around the malleoli are not processed due to the increased sensitivity. Initial procedures are performed in an open kinetic circuit with light pressure and passive soft tissue treatment.

Gradually, we move to actively assisted treatment, such as during the intervention with Ergon - the tools, the patient supports his movements by means of elastic resistance bands, thus managing to reach the maximum range of motion that the ankle joint allows him. In the course of the therapy, the pressure force is gradually increased, and it goes from an open to a loaded kinetic circuit, with the patients performing active or passive movement while the therapist works on the lower leg region, the pressure force is strictly subjective depending on the tissue response and pain tolerance of each patient. Manipulation of the cicatrix helps reduce the growth of the underlying connective tissue and improves elasticity, reduces pain symptoms and improves revascularization in the region.

RESULTS AND ANALYSIS.

As a result of the study, it was found that patients with bimalleolar fracture of the ankle joint and subsequent surgery, on the first day of the study, as well as after the first and second week of the month, were not able to balance on the damaged lower limb, despite the applied kinesitherapy. The ability to balance the injured leg is established only at the end of the 1st month. The results show that after one month of kinesitherapy in the control group, the balance time of the injured lower limb was, on average, 0.9333±0.88 sec (Fig.1). In the experimental group, after one month of kinesitherapy, a mean balance time of 3.0 seconds was observed on the injured leg (Fig.2).

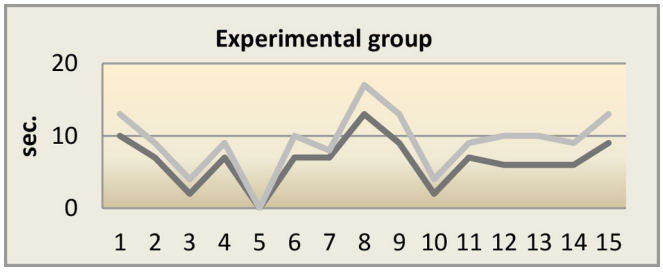
Fig. 1. Changes in the balance of the injured leg of patients from the control group in the 2nd and 3rd months after therapy (sec)



The values of P show (P=0.006) that the established difference in the mean values of the indicator in the two groups at the end of the 1st month of the study is statistically significant and certifies a higher efficiency of the experimental model compared to applications in the control group.

The results at the end of the 3rd month in the control group, the balance time of the injured lower limb was, on average 3.93±2.49 seconds (Fig. 1). In the same period, the reported results of the experimental group averaged 9.2±4.19 seconds. It is evident from the P-values that the better results of the indicator established in the experimental group patients are statistically significant at P=0.03 (Fig. 2).

Fig. 2. Changes in the balance of the injured leg of the patients of the experimental group at the end of the 2nd and 3rd months after therapy (sec)



DISCUSSION

No data were found in the literature on the impact of the Ergon technique on peak proprioception in patients with a bimalleolar fracture. The applied experimental methodology of kinesitherapy with Ergon-manipulations is more effective than the traditional one.

CONCLUSION

The Ergon IASTM technique is an innovative approach that enriches kinesitherapy practice and is successfully used in the treatment of various musculoskeletal dysfunctions [9, 10].

As a result of the study, it was found that patients with bimalleolar fracture of the ankle joint and subsequent surgery, on the first day of the study, as well as after the first and second week of the month, were not able to balance on the damaged lower limb, despite the applied kinesitherapy. The ability to balance the injured leg is established only at the end of the 1st month. In the conducted study, we found that there were statistically significant differences in both groups, in EG we found that Ergon Tehnique had a better effect on proprioception in patients with bimalleolar fracture of the ankle joint, compared to the applied traditional model of kinesitherapy in CG.

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