

<https://doi.org/10.52449/1857-4114.2021.37-1.14>

CZU: 615.825:616-001

## APPLICATION OF KINESIOTHERAPY IN KNEE MENISCECTOMY

Zavalișca Aurica<sup>1</sup>  
 Pogorlețchi Ala<sup>2</sup>  
 Corman Mariana<sup>3</sup>

<sup>1,2,3</sup>State University of Physical Education and Sport, Chisinau, Republic of Moldova

**Abstract.** Rehabilitation of a patient with knee meniscectomy is a team effort, in which the kinesiotherapist has a special role, because exercise is the only therapeutic way to restore joint function. Kinetic treatment at the knee involves restoring the functionality of this segment, under conditions of muscle strength, stability and mobility controlled at this level, with the prevention of complications and increased quality of life. As a result, the treatment must be started early and performed according to the principle of its individualization. Kinesiotherapy through its specific means, methods and working techniques, offers us an excellent opportunity to improve joint function, reducing, reducing or eliminating pain and improving the patient's quality of life.

**Keywords:** meniscectomy, knee joint, soft tissues, traumas, kinesiotherapy methods and techniques.

**Actuality of the research.** The problem of postoperative knee recovery is part of the general problems of the quality of rehabilitation of patients after various operations. Due to its position, its role in the static and dynamic biomechanics of the lower limb, as well as its poor soft tissue coverage, the knee joint is particularly prone and vulnerable to both direct and indirect trauma, which is manifested by a destructive and defective aggression, being caused by a high energy coming from accelerating speeds that characterize daily life everywhere. In a special way, the lower limb is subjected to these destructions, which, despite its own anatomical peculiarities, highlights the anterior face of the leg and the knee, covered only by a thin skin, vulnerable to the slightest traumas [5].

This explains the frequency of lower limb injuries, complicated by primary or secondary defects. Meniscus rupture is one of the most common injuries that causes knee pain. Surgical, orthopedic technological progress offers the possibility of increasing the number

of survivors after various traumas, but generating a huge number of post-traumatic dysfunctions that require complex recovery, including kinesiotherapy methods and techniques. The most common traumas to the knee are contusions (36.2%), sprains (15.8%), injuries and muscle tears (8.5%), fractures (1.9%) and, last but not least, the injury of meniscus. The menisci are well anchored to the surrounding structures: femur, tibia, patella, cruciate ligaments, capsules, lateral and internal ligament. The internal meniscus is most exposed to trauma and constitutes 80% of meniscal injuries, due to its fixation to the surrounding structures as well as higher pressures exerted on it by the internal femoral condyle, through which passes the projection of the center of gravity of the body [4].

From a biomechanical point of view, the menisci, although solid at the tibia, move in forward-backward flexion on the tibial plateau and approach each other slightly through their posterior extremities, in complete flexion, the external meniscus reaches 1 cm and the internal one at 0, 8 cm from the front edge of

the plate in extension, the menisci move in the opposite direction, ie back-forward, touch the anterior edges of the tibial plateau and move slightly away from each other, during the movements, apart from these slides on the tibial plateau, the menisci also move with the plateau towards femoral condyles, always located on that side of the plateau that supports the pressure of the condyles. In extension, the condyles slide forward, pushing the menisci forward, and in flexion, the condyles slide backward, pushing the menisci back. The role of the menisci in the biomechanics of the knee joint is complex. According to some authors, these fibrocartilaginous formations have 5 important biomechanical functions: they fill the free space between the curved surface of the femur and the flat surface of the tibia, thus preventing the protrusion of the synovial and the capsule in the joint cavity, during movements; centers the support of the femur on the tibia during the movements is more resistant; participates in the lubrication of the articular surfaces, ensuring the uniform distribution of the synovium on the cartilage surface; plays the role of a shock absorber between bone extremities, especially in hyperextension and hyperflexion movements; significantly reduce friction between bone extremities.

Some authors have shown that each of the cartilaginous surfaces of a joint depends on the type of movement and from this point of view three varieties of movement can be described:

1. Rolling is like the movement of a wheel advancing on the ground.
2. Simple rubbing is like the movement of a wheel skating on the ground.
3. Accentuated friction is similar to the movement of a wheel attached to another mobile, which pulls it in the opposite direction to the one it must follow [1, 2, 3].

Like many other knee injuries, a meniscus rupture can be painful and debilitating and is one of the most common knee cartilage injuries. So the meniscus is a piece of cartilage in the knee that cushions and stabilizes the

joint. Protects bones from wear. But all it takes is a good twist of the knee to break the meniscus. In some cases, a piece of the cut cartilage comes off and gets caught in the knee joint, causing it to block [1, 4].

Most often, meniscus tears are found in contact sports, such as football, as well as sports that require jumping, such as volleyball, basketball, etc.

In all cases of trauma, patient rehabilitation is a complex process involving several specialists in various fields, such as surgery, orthopedics, psychology, physiotherapy. Physiotherapeutic recovery is the newest form of nursing that appeared in the second half of the twentieth century, being in a continuous development. It is a complex activity that aims to fully restore the functional capacity reduced or lost by a person, the development of compensation and adaptation mechanisms, which will ensure in the future the possibility of self-service, active life, independent economic and social [3, 4].

The **aim of the research** consists in demonstrating the efficiency of the complex recovery process of the operated knee, the role of kinesiotherapy in the rehabilitation of patients with soft tissue traumas, as well as in improving the functional capacity in patients with knee pathologies.

**Research hypothesis.** It is assumed that kinetic methods and joint protection techniques are effective in recovering meniscus trauma to the knee and the selection and application of kinetic methods must be performed based on the principle of individualization, by adapting to the type of trauma and severity of knee meniscus damage.

- In addition to physical therapy, the complex process of recovery of soft tissue injuries of the knee, may involve several specialists in various fields of activity: surgery, orthopedics, physiotherapy, technicians in the field of orthosis and prosthesis, as well as other medical and paramedical staff, each specialist returning to him the task of fulfilling some objectives.

**Research objectives:** 1. Selection of kinetic methods and joint protection techniques in the recovery of meniscus traumas of the knee. 2. Application of kinetic methods based on the principle of individualization, by adapting to the type of trauma and the severity of damage to the meniscus of the knee.

**Research organization:** The research was conducted in the form of a case study of a patient with meniscectomy. In the recovery process, the way in which the mobility of the knee joint was recovered and developed, the static and dynamic individualized balance in evolution, as well as the way in which they influenced the individual and global evaluation methods were followed. Physiotherapy took place in the Clinical Hospital of Traumatology and Orthopedics, Medical Rehabilitation Department, in the physiotherapy room, using gym equipment, trellis, gym benches, pulleys, melacart boards for ease of movement, bicycle ergometric, ergomet bicycle medicine balls, dumbbells, sandbags, metal pads, correction rolls, wheel plates and other devices created by personal or collective imagination.

**Evaluation methods.** A 23-year-old patient who had a definite diagnosis of post-traumatic algofunctional sequelae, left, external meniscus rupture served as a basis for the study; anterior cruciate ligament rupture, left. The patient was exposed to the following investigations: general examination, examination and clinical-functional evaluation of the knee, physical-objective examination, joint balance, muscle balance, evaluation scales. The results of the evaluations are presented in the following tables.

Taking into account the fact that medical recovery through physiotherapy and kinesiotherapy is the main problem to be

addressed and begins immediately after orthopedic or surgical treatment, for our case we set the following goals in knee recovery:

1. combating pain and the inflammatory process, preventing and combating vicious positions, joint realignment;

2. improving muscle tone, muscle strength and joint stability, softening soft tissues and joint mobility;

3. regaining bipodal and unipodal stability and walking safety.

To achieve these objectives we used a range of kinesiotherapy methods as follows:

- *joint rest* - the slightly flexed knee ( $25^{\circ}$  -  $35^{\circ}$ ) supported by a pillow is obtained in the supine position. In this position the joint capsule and ligaments are relaxed, and the intra-articular pressure decreases;

- *analgesic and anti-inflammatory medication:* it can be administered locally by intra and periarticular infiltrations, ointments, compresses;

- *physiotherapy through the forms of cold thermotherapy, cryotherapy:* ice massage; ice packs;

- *thermotherapy:* with sedative, spasmolytic effect; topical application in the form of poultices with  $40^{\circ}$  C paraffin for 20 minutes; general application in the form of baths at a temperature of  $37^{\circ}$  C.

- *Active and passive kinesiotherapy,* passive exercises; active exercises with help, resistance exercises; apparatus exercises; application exercises.

In order to be able to evaluate the results of the kinetic program integrated in the complex medical assistance, we compared a series of clinical-functional aspects found in the patient at the time of hospitalization and at the time of discharge. The results can be seen in the table below.

**Table 1. Values for testing functional indices during research**

<b>Pain</b>	Initial	Intermediate	The final
Spontaneous	Walking up the stairs; on flat ground; in stand by	Walking up the stairs;	-
Provoked	suprarotulian; mobilization of the patella articular interlinea	ball joint mobilization	-
Palpation	warm; patellar shock	-	-
<b>Measurements:</b>			
circum. patellar	39/41;	39.5/39	39.5/39.5
circum.thigh	44/42;	44.5/42.5	42.5/41.5
circum.calf	37/36	37/36	37.5/36.5
<b>Flexion mobility</b> (passive / active)	95/85	120/115	125/120
<b>Muscle retractions</b>	Yes	Yes	No
<b>Activity:</b>			
Standing on one leg (5'')	Impossible	Partly possible	Possible
go up, down the stairs	Impossible	Difficult	Easy
Walking	Impossible without support	in the walking stick	in crutches

Note: (-) lack of disability

### **Analysis and interpretation of data obtained from research.**

The functional assessment of gait was performed in order to analyze the degree of functional recovery of patients after meniscectomy, comparing the initial and final results of the patient. The gait was analyzed in the two stages: preoperative and postoperative. As well as the cases were distributed using the Lequesne Functional Index for the assessment of pain, the maximum distance of movement of the patient and difficulties in performing daily activities, comparatively, in the initial and final evaluation.

It was noticed that, at the hospitalization, the maximum travel distance was reduced, conditioned by the appearance of pain, which was intense, and in terms of daily activities were possible only those strictly necessary. At the final evaluation, there is a decrease in pain or even lack of it and discomfort, an increase in the maximum distance of travel and, at the

same time, an increase in the number of possible daily activities.

Table 2 shows that the parameters of the lower limb were evaluated in order to establish the degree of muscle damage in the preoperative phase and to evaluate the recovery process in the postoperative and recovery stage. The 5-step international quotation of the manual muscle balance was observed. Initial muscle deficit, quadriceps muscle testing showing the value of F3 and finally F5 which represents a total recovery of muscle strength. The obtained results allow to highlight the effectiveness of the kinetic treatment performed, given the fact that through the therapeutic methods used there was a decrease in pain at all times of evaluation. At the same time, these results highlight the role of the physiotherapist in the evaluation and functional recovery of meniscus traumas of the knee in order to substantiate the objectives, kinetic methods within the complex program of functional

recovery. The capacity of voluntary movement is determined by the existence of movement patterns, imprinted sensitively by sensory training, starting from childhood, in the sensory cortex. For the ability to move, however, it is necessary to print directly into

the motor cortex, where the voluntary movement takes place according to a pre-existing program, and the voluntary contribution consists only in initiating, supporting and stopping the movement.

**Table 2. Evaluation of lower limb parameters**

The stage of recovery / Value	Initial	Intermediate	Final
Medium patellar circumference (right / left)	39 cm/41 cm	39.5 cm/39 cm	39.5 cm/39.5 cm
Thigh circumference 10 cm adrenal (right / left)	44 cm/42 cm	44.5 cm/42.5 cm	42.5 cm/41.5 cm
Calf circumference 10 cm subtrotullian (left / dr)	37 cm/36 cm	37 cm/36 cm	37.5 cm/36.5 cm

All these results recommend physiotherapy as an important methods of treatment for patients with meniscectomy, having a real efficiency in improving the functionality of the musculoskeletal system and the quality of life of each individual patient.

#### **Conclusions:**

1. Rehabilitation of a patient with knee meniscectomy is a team effort, in which the physiotherapist has a special role, because physical exercise is the only therapeutic way to restore joint function.

2. In the recovery activity it is not obligatory to obtain superior indices, therefore the physiotherapist recommends, according to the patient's possibilities, daily activities that do not reach maximum values of the joint mobility.

3. The programs designed to combat muscle atrophy have proven their effectiveness through the results obtained, evaluated based on joint testing and the overall motor balance of locomotion.

#### **Recommendations:**

1. Protecting the post-traumatic knee with orthoses, when resuming training.

2. At the moment of reintegration in the sports activity, it will be considered to avoid the maximum stress of the post-traumatic limb, the reintegration to be done gradually.

3. Avoid running on rough terrain to avoid relapses.

4. Continuation of the kinetic program on specific muscle groups to improve muscle atrophy and to increase muscle mass.

#### **References:**

1. Trosc P., Radu D. (1978). *Genunchiul instabil dureros*. Iași: Editura Junimea.
2. Gudumac E. (2019). *Traumatismele aparatului locomotor la copii*. Chișinău: CEP Medicina. 23 p.
3. Zavalîșca A. (2016). *Gimnastica medicală. Îndrumar instructiv pentru instituțiile de învățământ superior de educație fizică*. Chișinău: Pontos. 324 p.
4. Zaharia C. (1994). *Elemente de patologie a aparatului locomotor*. București: Paideia.
5. Sbenge T. (1981). *Recuperarea medicală a sechelelor posttraumatice ale membrilor*. București: Editura Medicală. 465 p.