THE ANNALS OF THE "STEFAN CEL MARE" UNIVERSITY
ISSN – 1844 – 9131, Volum III issue 1/ 2010

INJURIES OF THE KNEE LIGAMENTS – KINETOTHERAPY RECOVERY PROGRAMS

***Francisc Tadeus Danelciuc*[1]**
[1]*Stefan cel Mare University of Suceava, Romania*

Keywords: joint**,** trauma, stretching, mobility, recovery.
Abstract: The knee is the biggest joint of our body. Through its position and role in the static and dynamic biomechanics of lower limb and through its thin covering with mild tissues, the knee is one of the most liable joint prone to injuries and some pathological conditions. The knee also suffers in the case of immobilizations post traumas. From all traumas of the knees, ligaments lesions are more and more frequently. Those are produced as a result of the overuse through excessive forces, which causes tears of fibers. We distinguish three grades of ligaments lesions: a) lesions of 1st grade through stretching, without tears, b) lesions of 2nd degree - partial tears, c) complete lesions of 3rd grade. The goals in recovery programs of post-traumatic knee are: 1. To lower the pain; II. To stabilize the joint III. To reestablish joint ROM(Range of Motion), IV. Coordination of lower limb . Recovery of post-traumatic knee can be total if treatment and kinetics programs are well selected and right applied. Exceptions are done by old people whom osteoporosis and osteosclerosis processes can appear.

Introduction

The knee, the biggest joint of the body, is one more prone to injuries and pathological conditions than other joints. Without taking into consideration direct blow, the knee suffers post immobilizations due to different conditions. The knee represents the mobile segment of the musculoskeletal system connecting the leg thigh. Knee has gone a dual role: to provide static stability in a time of support and leg elevation to provide for orientation according to terrain irregularities. At the same time, the knee has an important role in usual activities (sitting on stool, lifting an object, shoes, etc..) and professional activities.

Ligaments are very common structures affected joints in sports injuries. Ligaments injuries occur as a result of overload by excessive force, determining the rupture of fibers. We can distinguish three degrees of ligament injuries:

a) Grade I injuries occur by stretching, without tearing and without significant instability;

b) Grade II injuries - the partial rupture of ligaments and meet some instability;
c)Lesions of grade III - they consist of complete rupture of ligament structure, which causes a greater degree of joint instability.

In complicated cases (ligament rupture) is recommended for emergency transport to a specialized service for reparative surgery. The ligament stretches applied immediately on the affected leg immobilized in a plaster device. Upper leg and fingers remain outside such restraint becomes available passive and active mobilization, which is performed in order to avoid playback joint development at that level. Thigh muscles are maintained by tonic isometric exercises that promote venous-lymphatic circulation return.

Material-method

Objectives of the knee post-traumatic recovery programs are:
1. Fighting pain (decrease pain
2. Obtaining joint stability;
3. Recovering joint mobility;
4. Coordination;

I. Decreasing pain is achieved by:
- Anti-inflammatory drugs and pain killers, generally administered (pills, injections) or local (infiltration, ointments, compresses).
- Cryotherapy - an early application of ice packs, which has the effect of reducing the inflammatory process, pain and stop the extension of lesions and consequently intra-joint fluid accumulation.
- Electrotherapy (IFC, UUS,TENS etc..).
- Joint rest - in cases of acute, recent injuries, resting in bed is required, with lower members above the horizontal plane and use of the crutches , for shorter or longer periods, depending on the stage of the lesion.

Best position is with the knee bent slightly, supported by a pillow, a position that reduces intra-joint pressure. This position may become dangerous in the knee inflammatory processes, inducing the formation of inflammatory edema, stiffness, contracture, requiring surgery. To reduce edema light compression using stretching bandages it was proved to help a lot.
- Acupuncture may be useful also in controlling pain during the recovery process.

Pain control is necessary not only in the acute phase, but still, since decrease of pain is a prerequisite for the application of physical therapy programs for recovery. Depending on circumstances, may be called the pharmacological methods as well as the physiotherapy, the

goal is to create conditions for application of active kinetotherapy - recovery methods.

II. Collection passive-active stability is a passive and active one.

a) passive-stability is ensured by capsule-ligament apparatus, consisting of (internal lateral ligament, the external lateral ligament, the posterior ligament, ligament above and cross ligaments) and the joint surfaces (joint- cartilage and meniscus).

b) active stability - quadriceps role in knee stability is generally recognized.

Any injury affecting the knee of a motor and quickly determine the quadriceps hypotrophy. Quadriceps toning is a primary goal in recovering knee and will never be neglected.

What muscle groups do not act in isolation, but in chains muscle reflex contractions occur so triple flexors chain and triple extension chain of the lower leg.

1. Toning quadriceps- quadriceps muscles provide "locking" the knee.

a) isometric exercises:

Lie flat dorsal:

- Progressive resistance exercises with active or healthy leg;
- Contract strongly the quadriceps of the affected lower limb (2-3 min.) Rest (l minute);
- Raising the calf from the ground (bed), the knee is extended;
- The knee is placed on a small sack of sand or a cushion of 8-10 cm, by raising the calf, is strongly contracting the quadriceps;
- The active mobilization of the ankle in all directions;
- Lifting the stretched leg in the vertical return without placing foot on foot rest;
- The kinetotherapist with one hand on the ground keep pressing quadriceps, thigh and the other hand under the heel. The patient tries to raise extended leg;
- The same as above, but one leg running strong dorsal flexion and inversion;
- Rise leg with hip and knee in flexion, then left on the ground with the knee in extension;
- Internal and external rotation in the hip joint;

Lying facial:

- Bending the knee affected by returning to the ground;
- Lifting the stretched leg to back;
- Shear legs extended;
- Raising the affected leg the knee properly and maintain position (l0 times) repeat (l0 times);

- Internal and external rotation in the hip joint, with the affected leg;

Sitting

- The leg in extension, run contractions;
- With knees bent, stuck together. The control contraction to expansion without shin-run, continuing to keep tight paste knees;
- Lifting leg extended, distance and arrangement on the floor, return to starting position;
- Lifting leg lying, remote and near the foot to return to the ground;

Standing

-support the healthy leg, affected leg with the knee extended, the lead just before and implemented isometric contractions.

b) counter-resistance exercises:

Lie flat dorsal:

- Implemented extension, while teacher resistance to the 1 / 3 lower calf. Counter resistance will apply to varying degrees of knee fIexion ;
- To support hands and knees. Knees to extend support to reach the hands and feet peaks;
- Plant with pulleys and counterweights or elastic bands, which cling to ankle, pull

knee to chest with return without placing foot on foot rest;

- lifting the leg stretched vertically without contact with the ground return;

Lie flat ventral-2 the same previous year;

Sitting:

- Healthy leg over the affected member running counter resistance;
- Take the ankle weights are set to progressive values and amounts (knee extension) until muscle fatigue occurs.

Note that in this kind of exercise maximum force applied to fIexio, on the quadriceps is 90 to 45 and decreases as the request to reach full extension.

For quadriceps, the adults in the progressive loads can reach 12-15 kg. In sports and more.

Take the effort to gain strength exercises are introduced counter resistance less, but repeated many times. It is recommended:

- Exercises to stationary bicycle or cycling, field slope;
- Flexions of the knees (up to 50% of total fIexion) with or without a leg attachment strap to espalier;
- Running forward, back, side steps etc easily crossed.;
- Running on varied terrain;
- Climbing stairs and descending;

2. Toning of the ischiogambiers muscles. In general, the force of ischiogambiers after knee trauma is not much compromised. Ischiogambiers have more tendency to get contractured. However, the knee should be unstable, as shown, ischiogambiers muscles, get involved at level of 15 to 20 for final extension.

a) isometric exercises:

Lie on supine position:

- Above the ankle to put a bag of sand so that knee bent to 15 to 20.

Professor resistance applied by hand in popliteal space an patient trying to extend the knee against resistance hand;

Lie on your back:

- Teacher placed a hand on the front of the ankle and the other under his knees trying to bent, but keeping it stretched patient, b) exercises counter resistance:

Lie on your back:

- Exercises to pulleys or elastic bands, sitting

-legs crossed (the affected member above), is running counter resistance the healthy leg.

3. Toning triceps- sural muscles. Hypotrophy of those muscles after immobilization is almost just as fast as the quadriceps.

Lie flat ventral:

- On an inclined plane (variable from horizontal to vertical), lift the body by pushing the foot in plantar flexion. At first with both feet, then only the affected leg;

Sitting:

- On one leg, lifting the summit and then return to the Isometric contraction;

- With the fixed scale, with injured knee bent, foot resting on the stage of 6-8-a, grabbed her arms stretched above scale, the extent of the knee by lifting the torso's standing on one foot on the ladder, return;

- Lifting the edges with dumbbells in hand and then with a halter on her shoulders, with progressive difficulty.

4. Toning the tensor fascia lata muscle- have important role in stabilizing foreign and knee locking.

Lie flat same side :

- Lower limb abduction of hip;

– First flex and then extend the hip. At first, without loading, then gradually made available to the ankle, weights.

– Flexions and full knee extensions. Exercise of "dynamic stability":

- Foot rests on the "oscillating support, is looking for a balanced growing for periods of time

- Idem, but with certain degrees of knee flexion;
- Idem, with a weight tied to the leg unsupported.
- Roll a ball of medicinal (3-5 kg), forward, with the corresponding leg traumatized knee.

By toning the muscles of the knee ensures good stability of the joints. In the muscle training is recommended and rotation exercises to stimulate specific muscles selectively, as follows:

- The lie flat side or sitting, running rotation (internal and external) of the foot and lower leg with the knee in different angles of flexion;
- Idem, with counter resistance applied by the physical therapist with one hand ,and the other is catching the forefoot, above the knee;
– The same , but during the rotation of the physical therapist contract runs flexible steps: A - 30, 30 to 60, 60 to 90 and back extension shank.

III. Achieve Mobility

Both direct trauma and physical restraint as a fracture or other causes usually causes knee stiffness and limit mobility.

a) Reducing flexion:

- Applies intermittent sand bags on his knees (1 / 3 lower calf was resting on a pillow or patient seated leg stretches to another seat). The procedure can be painful. As previously indicated to be prepared with heat for 30 to 40 minutes, or compress the ice if the joint is inflamed. Sand bags have progressive difficulty.
- Active extension movements.
- Adjuvant methods: massage,(electrotherapy) ultrasound, diadynamic , anti-inflammatory medication and pain killer medication:

b) Increased amplitude of the flexion:

Widely used is the extent of the progression of knee trouble. By an angle of 80-90, you can run the edge of the bed, the weight attached to the ankle. Over this amplitude have to install a drive pulley.

Stretching under the weight method is applied 3-4 times per day, up to an hour in duration or pain Get up. Not apply this method when the knee is inflamed or is incomplete post fracture strengthened.

Active Movement:

Lie flat in dorsal:

• Flexions-extensions of the shank, with or without roller skates, slipping on a plate;
• Pedaling forwards, backwards;
•Thigh at 90 , is left leg to fall freely, then full extension;

Lie flat in prone position:

• Flex the calf, and extension (below the knee, the front put a pillow) with a weight on the ankle flexion is fast (inertia increased weight will run until the end of the race);

Of sitting:

•Flexions - extensions;

• Weighing the ankle, calf wobbles in flexion-extension;

• Pedaling in empty or cycling;

• Knee goes from flexion forces chest and shin;

From standing on her knees:

•Try putting the seat on the heel and return;

• Support hands, goes to the healthy leg stretched back, resting on top of the foot. Lunge on the knee are sick - thus forcing his flexion.

From standing:

• Hands on the bar, run fast bending the knees;

• Flexion of one leg (it remains in support singer leg) Almost all of these moves can be executed and pools. Hydrokinetoherapy has the following advantages:

- Hot water effects: pain-killer, and muscle relaxant;

- Facilitate movement by downloading the weight of limbs and hydrostatic force of water, etc.. It is recommended in early stages of recovery program, especially in lower limb injuries, to maintain muscle strength, improve joint mobility and muscle aerobic resistance.

Also, plants from all positions of pulleys allow exercises with balances above that, whether facilitates movement, leading to increased traction-stretch flexion or help flexor muscle toning.

Results

The exercises are common gesture for physiotherapy knee, especially walking, ascending and descending stairs, stepping over obstacles, bending.

Climbing and descending - start on slopes inclined, then proceed to the steps of and I graduated. For increasing the strength, the exercises are repeated loading (weightlifting shoulders).

Walked over - will be used to lift the patient leg and to overcome an obstacle.

This involves flexion angle, stability, balance. Be exercised over obstacles ever higher.

Bending - flexion movement of the whole body , often performed in normal daily activities (wearing footwear, lifting an object from below, etc.).

Extension exercises of mobilization, indicate: swimming (correct processes and back crawl), cycling, and to allow basketball, volleyball, etc..

Usually, the traumatized leg reach 80% to start a more vigorous program of training or return to sports activity (In the knee ligament injury), the athlete wearing knee protection.

References:

1. Elena Sabau - Recovery - Recovery, Physical Therapy in sports, Publishing Foundation Romania of Tomorrow ", Bucharest 2008
2. Pasta Zoltan - Physical therapy in post-traumatic functional recovery of locomotors-University of Oradea Publishing House, 2001
3. Petrescu P., Poenaru D. - Trauma and functional recovery in athletes, Ed: Junimea Bucharest, 2002
4. Todea, Septimius, Florian Exercise in Physical Education, Sport and Physical Therapy, Publishing House of Tomorrow Foundation Romania, Bucharest, 2003

Titlu: Leziuni ale ligamentelor genunchiului - programe de recuperare kinetoterapeutice.

Cuvinte cheie: articulaţie, traumatism, întindere, mobilitate, recuperare.

Rezumat: Genunchiul este cea mai mare articulatie a corpului. Datorita pozitiei si rolului sau in cadrul biomecanicii statice si dinamice ale membrelor inferioare si a acoperirii sale cu tesut moale, genunchiul reprezinta una dintre articulatiile cele mai sensibile la traume directe si indirecte. Din totalul traumelor pe care le poate suferi genunchiul leziunile ligamentelor sunt cele mai frecvente. Acestea se produc ca rezultat al suprafortarii prin aplicare de forte excesive ce poate cauza ruperea fibrelor. Se pot distinge 3 grade ale leziunilor de ligamenteŞ a. leziuni de gradul I prin intindere fara rupere, b. lezini de gradul II cu rupere partiala, c. leziuni de gradul III cu rupere completa. Obiectivele programelor de recuperare postraumatica ale genunchiului sunt: 1. Combaterea durerii, 2. Obtinerea stabilitatii, 3. Obtinerea mobilitatii, 4. Coordonarea miscarilor membrului inferior. Recuperarea post traumatica a genunchiului poate fi totala daca tratamentul si kinetoterapia sunt cele potrivite si aplicate corespunzator. Exceptiile sunt cele care se intalnesc la batrani la care poate apare procesul de osteoporoza si osteschleroza.

Titre: Les blessures aux ligaments du genou - les programmes de récupération thérapeute.
Mots-clés: commune, les traumatismes, la mobilité de récupération, de la tension.
Résumé: L'articulation du genou est la plus importante du corps. Parce que la position et le rôle de la biomécanique statique et dynamique des membres inférieurs et sa couverture des tissus mous, les articulations du genou sont l'un des plus sensibles aux traumatismes directs et indirects. Du traumatisme total ils peuvent subir des blessures aux ligaments du genou sont les plus courants. Elles surviennent à la suite de l'application de force excessive peut provoquer une rupture de la fibre. On peut distinguer trois degrés de lésions a. des lésions blessures degré par l'étirement sans rupture, b. lezini Grade II: rupture partielle, c. Grade III avec lésions rupture complète. Objectifs des programmes de réhabilitation post-traumatique du genou sont les suivants: 1. Soulagement de la douleur, 2. La réalisation de la stabilité, 3. La réalisation de la mobilité, 4. Coordination des mouvements des membres. La récupération du genou post-traumatique peut être totale si et traitements de physiothérapie sont appropriées et correctement appliquées. Les exceptions sont ceux qui répondent à l'ancien processus qui peuvent se produire le ostéoporose et ostescleroza.