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Original article

THE KINETIC REHABILITATION AFTER AMPUTATION INJURIES

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Abstract

Objective. The study deals with the whole kinetics rehabilitation process after amputation injuries of the right leg. The aim assumes that the application of a specific kinetic program after amputation surgery is useful for the recovery of muscle and articular tone in order to reeducate the walking.

Methods. The research is based on a case study, R.S. it was being conducted at the patient's home. Given the objectives of the research will established as variables to be researched in the study the following parameters: for testing of the right amputated, but also of the healthy, articular balance-sheet methods and muscular balance sheet.

Results. The recorded results show considerable progress in the level of joint mobility, improving muscle tone, developing muscle strength and correct posture in the amputated leg.

Conclusions. Following the evaluation of the results in the process of recovering patients with right leg amputation is effective due to the use of kinetic programs beneficial to the improvement of joint mobility, strength and muscle tone.

Key Words: amputation operation, kinetic program, right leg.

Introduction

In modern society, medical recovery is a highly topical area, which is in continuous development. Reasons are readily understandable if we consider two essential aspects: the increasing incidence of chronic illness and trauma.

It also contributes to raising awareness of the importance of reintegration of the individual affected by illness or trauma into the family and socio-professional environment.

In recent decades, there has been a growing concern of decision-makers in the health system to promote patient autonomy in everyday life. This is precisely the ultimate goal of medical recovery: optimizing the quality of life by increasing the degree of functional independence (Apostu, 2015).

Human anatomy is the science that studies the shape, structure and macroscopic organization of the human body.

Lower limb amputation causes distortion of muscular balance by altering the center of gravity, the tendency of the basin to retract the part of the amputated segment. Preparing for active prosthetic gymnastics, massage, hydro-thermotherapy, aims at strengthening muscles of the blunt, trunk and thoracic limbs, removing the contractions and strengthening the static-dynamic function.

Loss of a member alters patient mobility and changes body image, which is important at

psychological, family, social and professional level, so I think, it is necessary to discuss the anatomy and the biomechanics of the healthy lower limb.

Rehabilitative intervention aims primarily at reducing the functional deficit, in order to allow the patient to regain the maximum independence: if complete recovery is impossible, then the objectives of therapy focus on adapting the individual to the conditions of disability.

The inferior or pelvic limbs are body segments that detach from the inferior sides of the trunk. They are primarily adapted for the bipedal and locomotive resort.

The amputation of the classified can be as follows:

• *After circumstances:*

- Traumatic or accidental (occurs through accidental breakdown as a result of accidents, work;
- Surgical or surgical procedure (it is necessary following traumas with crushing, gangrene or very serious, irreversible vascular-nerve lesions, etc.);

• *After position, articular area:*

- Disarticulation, which represents amputation in contiguity at the level of the joint;
- Amputation itself which is it carried out continuously;

• *After the amputation time:*

- In an emergency, hot;



- Cold (amputation levels are chosen and known techniques are used and not dictated by the blunt).

The etiology of the amputation:

- Severe infections resistant to any treatment and endangering the general condition of the patient;
- Severe trauma, with the destruction of soft tissues, nerves and major arteries;
- Peripheral, irreversible vascular diseases such as simple or diabetic arteriosclerosis;
- Definitive peripheral nerve injuries, with severe trophic disorders and congestive ulcerated infections;
- Malignant tumors of the locomotor apparatus, where osteoplastic resection and reconstruction is not possible;
- Severe post-cumulative sequelae with loss of limb function (sensory and motor) and in which prosthesis would be more useful;
- Retrieving vicious and non-protective collars for prosthesis or cinematography;
- Congenital anomalies that are supernumerary or that cause functional discomfort.

Amputation results in profound changes:

- At the level of the abutment of the amputated member;
- In the patient's relationship with the environment.
- In the rest of the body.

The blunt will undergo a long evolution until it becomes definitive. At the beginning, it is bulky, showing at the extremity an excess of soft parts, with its volume decreasing, during this period the edema disappears, the muscles that have a sectioned extremity retract and fix a new insertion, the medullary channel closes the bone end is being restructured.

These changes last for an average of 12-18 months, but they can be reduce to only a few months, if the surgery will performed in good conditions and followed by functional treatment.

The adaptation processes continue in the bony and the rest of the body throughout life, depending on various general and local factors and, especially depending on the condition, the quality of the denture.

Following the lower limb amputations, the terminal supports allow safer walking and allow for a lighter prosthesis.

"Ghost member" sensations can sometimes persist in children for 6-12 months after amputation, but are more attenuated than in adults and disappear more quickly as functional treatment and immediate prostheses are use on time.

The lower amputated member loses the support segment to the ground, and by adapting and exercising, new support surfaces, capable of supporting the weight of the body in static and walking, will need obtained. The lower limb, on the opposite side to the amputation, will sometimes be overloaded and with time a flats leg pain may appear.

After the amputation of the inferior limb, the static-dynamic balance conditions change, the trunk muscles are overloaded, the center of gravity moves towards the healthy side, and there are a number of compensatory disorders depending on the member and level of amputation, date and quality of the prosthesis.

Through the loss of body integrity, the normal possibility of locomotion, the new relations with the social environment, and sometimes the loss of the possibility of continuing professional activity, the psyche of amputations is strongly influenced, for this reason their loved ones must always be with them supports it, a very important thing in the evolution of recovery.

The ghost member is a particular form of amputation sensitivity disorders and consists of the false perception of missing body segments (Baciu, 1975).

In order to diminish the traumatism secondary to falling, the kinetic program will be adapted to the conditions and needs within the patient's domicile, recommending exercises for training the balance, the force, the coordination and the reaction times of moderate intensity. To what diminishing fracture is concerned, the training will include charging exercises. Removing obstacles, safely positioning the furniture will represent necessary interventions in the case of certain obstacles altering the environment. Training the balance, recharging the trunk's muscularity and the inferior limbs, as well as using the mechanisms for assisting walking (sticks, crutches, walking frames, wheelchairs), all of these will be necessary in case of walking and balancing disorders (Lazăr, Marcu, Cioară and Rus, 2008).

In recent years, the literature has presented a number of arguments regarding the use of various physical means to alleviate certain conditions. In most of these studies, the kinetic exercises used was based on appropriate terminology specific to the physical condition (Nechita, 2013, 2016)

The objectives of the kinetotherapy in preventing falling are: improving the balance; increasing the muscular force; increasing the tonus; increasing the mobility; improving coordination; decreasing anxiety

and increasing the trust in own's strength. (Ciobanu, Dan, Lozincă, et al., 2007)

Methods

The study, was conducted in 2017 at the patient's home for 4 months, following the effects of the applied kinetic program. The subject of the case study was (R.S.) aged 35 years.

The research included two evaluation moments: articular balance and muscle balance (scale 0-5) for testing the lower and lower amputee, as well as the healthy one

The exercise program has been taking place in a rather slow pace, interspersed with resting periods and relaxation, the structure of the exercises combining the isotonic muscular work with the isometric one. In the beginning, the exercises were analytical; afterwards one has moved to exercises that would stimulate as many groups as muscular chains as possible.

I am reproducing an exercise program within a kinetotherapy session with patient R.S.

a) Indications for banding of the blunt at the amputation of the collar:

On the back, under the knee, the face will directed towards the end of the blunt. Covering the end of the blunt, run the face up to the knee (fig.1)



Figure 1. Blunt bandage procedure, R.S.

Move the elastic waistband on the thigh to the "eight" thigh on the back, without covering the wheel (fig. 2).



Figure. 2. Fastening procedure for the elastic waistband, R.S.

Until the elastic waistband is finished, its application will repeated according to the model mentioned in the above paragraphs. If an elastic waistband is not long enough due to the volume of the blunt, a second elastic waistband will used until the above steps are will repeated at least three times;

The pressure by applying the elastic waistband gradually decreases from the end of the bobbin upwards (fig.3).



Figure. 3. Ultimate banding procedure for the blunt, R.S.

b) Adopting a correct post

When the patient sits, he must ensure that the weight is equally distribute between the two buttocks and thighs. It is advisable to use only straight seats so he will be obliged to maintain this posture.

When the patient is in dorsal decubitus, he / she must maintain his / her remaining limb parallel to the plane of the bed with the glued lower limbs.

When the patient is in bed, he will be told to stay as far as his stomach to stretch the hip joint, preventing his flexion from contracting.

b) Directions when walking with Canadian or axillary crutches

First, the patient must take the crutches forward, about 30 cm then make a step forward with the resting leg resting against the crutches (fig.4).



Figure 4. Use of independent crutches, R. S.

Ultimately, the goal is to raise the lean member and step down to the crutches or beyond (fig. 5).



Figure 5. Use of independent crutches, R. S.

The crutches are one a step ahead (the leg and the crutches must not be on the same line). By supporting the crutches with both hands and forearms, the patient has to step slowly, avoiding jumping (jumping) (fig.6).



Figure 6. Use of independent crutches, R. S.

c) Reeducation of walking to the patient with inferior limb amputation under external conditions

It will train on longer distances without rest, with Canadian crutches or with a cane.

Walking on varied terrain without support:

- On flat land with different textures (grass, bitumen tracks, gravel,);
- Ascents and descents of slopes with different inclinations, with and without support on the railing;
- Climbs and downhill will be executed with and without a handrail;
- It will try to execute a more accelerated journey.

Exercises of postures to avoid contractions and vicious position of the blunt

Working position - In the sitting position with the extended knee press the anterior knee of the knee and place a pillow beneath the collar to facilitate the tension of the tendons. This position will be maintained for 10-15 minutes, with small breaks, within the limit of supportability (fig. 7).



Figure 7. Postural exercise, R. S.

The patient is seating at the edge of the bed. It performs the extent of the amputee foot, thus contracting the thigh. Keep the position for 6-8 seconds. Repeat this exercise is required 6-8 times (fig. 8).



Figure 8. Postural exercise, R. S.

The patient is in the dorsal decubitus, he will flake the healthy lower limb and lift the pelvis, maintaining the position 6-7 seconds.

Ask the patient to repeat this exercise 8-10 times (fig. 9)



Figure 9. Postural exercise, R.S.

Results

The data gathered from the initial and final evaluation of the articulate and muscular testing are present in the following table 1.

Table 1 presents the results obtained in evaluating the initial and final results case study, R.S.

Movement	Right	Left	R. Force	L. Force
Initial Flexion	110°	90°	4	2
Final Flexion	115°	110°	5	3
Initial Abduction	30°	25°	5	3
Final Abduction	30°	30°	5	4

Table notes: R. – right, L.- left

Following the summative assessment, there was a significant increase in abduction and flexion in the coxo-femoral joint from initial testing to final testing due to the kinetic program performed.

The limitation of the hip joint has occurred due to the appearance of pain, the affected limb of the

affected hip, is being immobilized to the patient's possibilities. The muscular force to mobilize the limbs was initially don only against gravitational force, compared to the healthy limb, which the patient managed to mobilize to a maximum muscular force (Sbenghe, 1981; Cordun et al, 2008).

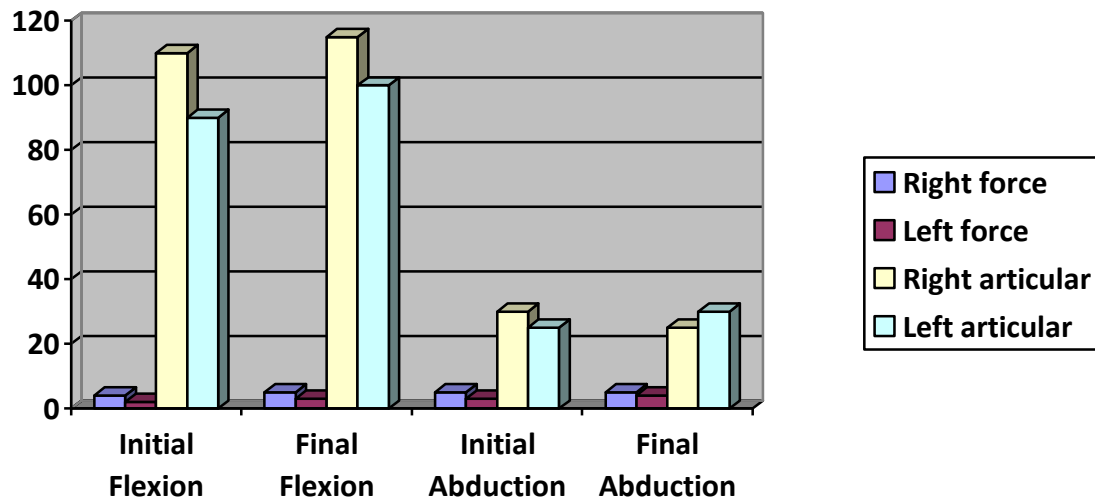


Figure 10. Representing the evolution of the articulate balance, articular testing and muscular testing, R.S.

The articular mobility increased 5-10 degrees on the coxo-femoral joint, and in terms of muscle strength, it increased on average from 2-3 (moderate value) to wave. 3-4 (average to good).

Discussion

The kinetic program has achieved its goals by raising the artificial amplitude and muscular force of the affected limbs to a value much closer to the healthy one, reducing the back pain and training the patient to return to balance using his reflexes.

Therefore, in view of the final of the results the patient has an average risk of falling, requiring support during the movement and always dependent on crutches.

The indications given to the patient at the end of the recovery treatment included:

- Preventing the fall by removing obstacles and using the hooks while moving.
- Maintaining body mass, walking through the park, repeating the series of exercises at home.

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