



COMPLEX REHABILITATION AND ERGOTHERAPY IN DIAPHYSEAL FEMUR FRACTURES - PRESENTATION OF A CLINICAL CASE

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ABSTRACT

Femur fractures are the result of severe traumatic impacts associated with transport, industrial and household injuries. The force causing the fracture may act in a direct and an indirect mechanism. Treatment is primarily surgical, providing a stable bone and early rehabilitation.

Objective is tracking the effects of complex rehabilitation for functional recovery of the lower limb in a patient after a thigh surgery with the presence of hip joint endoprosthesis.

Methods. Object of the study was a patient with postoperative thigh intervention by applying a complex rehabilitation in the conduct of two treatment courses within four months. Before the rehabilitation measurements and tests were done - , manual muscle testing, and testing of activities of daily living.

Results. As a result of the complex rehabilitation and Ergotherapy the desired effect in the reconstruction of the affected lower limb was achieved. The functional condition of the patient was significantly improved. The amount of movement of joints in the affected limb has increased /ankle joint, knee joint and hip joint/; the muscle imbalances was overcome, reduced were aches and pains, the gait was improved.

Conclusion. As a result of the complex rehabilitation and Ergotherapy we achieved the desired effect in the recovery of the affected lower limb.

Key words: lower limb, endoprosthesis, comprehensive rehabilitation, Kinesitherapy, Ergotherapy.

INTRODUCTION

The fractures of the thigh bone are the result of severe traumatic impacts associated with transport, industrial and household injuries. The force causing the fracture may act in a direct and an indirect mechanism. The treatment is primarily surgical with the help of osteosynthesis providing a stable bone coalescence and early rehabilitation.

Endoprosthesis of hip joint has become a routine procedure that is applied mainly to severe degenerative changes and fractures in which conservative approach and other surgical interventions are not effective enough.

The functional life of the artificial joint depends on the adaptation of muscular-ligamentous apparatus to it which requires the application of adequate rehabilitation (1).

The recovery of patients with endoprosthesis and thigh bone fracture requires a long and complex rehabilitation, Ergotherapy and training in activities of daily living, consistent with the age and the rehabilitation potential of the patient to improve the quality of life and social adaptation.

In the complex rehabilitation the recovery activities take place most actively in early and late postoperative periods.

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During the early postoperative period Kinesitherapy is aimed at improving the amount of movement of the joints in the affected limb, standing up and training with

walking aids. This is achieved through: treatment from a position at which the limb is in a lifted- up position; analytical exercises for the hip joint with eliminated gravity, isometric contractions of thigh and seat muscles, breathing exercises, progressive standing up, and training with walking aids.

During the late period the focus is on the maximum recovery of the affected limb by applying: a massage for the entire lower leg and seat muscles, exercises in the open and closed kinetic chain, analytical exercises for the hip and knee joints from an antigravity position; exercises with equipment, PIR for muscle with increased muscle tone - m. iliopsoas, m. piriformis, m. rectus femoris; breathing exercises and analytical exercises as assessed by MMT (2, 3).

An important step in the recovery process is training in self- service and in activities of daily living : dressing, undressing, eating, toileting (brushing, washing, shaving), as different devices are used in modern Ergotherapy (for bathroom, dining, for medicines, for lifting and getting out of bed and chair, for mobility - walkers, wheelchairs, tutors, crutches). It begins at an early stage of the disease, beside the bed of the patient and continues in the subsequent stages of the recovery process (4, 5).

For accurate report of the effect of complex rehabilitation it is necessary to make a complex functional assessment of rehabilitation potential of the patients using anthropometric measurements, goniometry, manual muscle testing, and testing of daily

living activities (DLA) at the beginning and end of treatment (6).

In practice it is important to use DLA test containing 4 cards - toileting and personal hygiene, clothing - shoes, cooking and eating, other household activities, as the assessment is from 0 to 5. At the beginning of the rehabilitation course the efforts are aimed at giving guidance to facilitate self-service (Ergotherapy), involving the basic activities of personal hygiene and other daily household activities (7, 8). The patient is taught to wash and dress the operated leg first, using support tools so as to avoid excessive flexion in the hip joint and crossing the legs; to use aids in dressing and undressing - hooks and pinches to put on socks, pants and shoes (1). The training in all these activities improves the quality of life of the patients.

The objective is tracking the effects of complex rehabilitation and DLA for functional recovery of the lower limb of the patient after thigh surgery with the presence of hip joint endoprosthesis.

MATERIALS AND METHODS

Object of the study was a patient with thigh postoperative intervention by applying complex rehabilitation and Ergotherapy in the late postoperative period during pre-graduate experience of students from third grade in specialty "Rehabilitation therapist".

Before the beginning of the rehabilitation the necessary measurements and tests were done – anthropometrics and goniometry measurements, , manual muscle test, DLA test and a study on the scale of Harris Hip Score.

Assessment Scale of Harris Hip Score

<u>□ 70</u>	<u>70- 79</u>	<u>80- 89</u>	<u>90-100</u>
Poor	Satisfactory	Good	Excellent

The result of the survey on 06/03/2012 on the scale Harris Hip Score was 83 (Good)

A study of gait abnormalities was carried out when walking, climbing up and down stairs, sitting and standing.

From the measurements and tests (anthropometric measurements, goniometry and MMT) the following have been identified:

- extension of the left lower limb with 1 cm.;
- limited range of motion in left hip joint;

- Shortened were m. iliopsoas, m. piriformis, m. rectus femoris and ischiocrural muscles, gluteal muscles, weakness of abdominal muscles;

- There is swelling around the left thigh and lower leg;

- Pain in the inguinal crease and left thigh during locomotion;

- The gait is changed because of the pain with a tendency to asymmetry of stride;

- When walking the patient moves with two walking aids – crutches, in the recovery after fracture of the left thigh.

The patient's recovery was followed in the conduct of two treatment courses of 10 treatments within four months, once a day, lasting 40-60 minutes.

For the patient a **rehabilitation program in late postoperative period** was created and implemented:

1. Kinesitherapy (KT):

The aim of KT is the maximal functional recovery of the affected limb, strengthening the muscles around the hip joint and helping the healing process.

Means of KT:

- Elective massage for the entire lower limb muscles and seat muscles;
- Exercise in an open and closed kinetic chain;

- Analytical exercises for hip and knee joints from antigravity position;
- Exercises with equipment;
- PIR for muscles with increased muscle tone without stretching, through the restrictive barrier-m. iliopsoas, m. piriformis, m. rectus femoris (9);
- Breathing exercises;
- Analytical exercises against dosed resistance for the weak muscles - extensor of hip and knee joints;
- Pulley therapy for the weak muscles;
- DLA - training in activities of daily living (activities of toileting, feeding and cleaning the house); proper implementation of these activities and adapting the environment to the needs of the patient.

RESULTS AND DISCUSSION

As a result of the complex rehabilitation and Ergotherapy we achieved the desired effect in the recovery of the affected lower limb.

Table 1. Length of lower limb

Length of lower limb	Dex	Sin 22/ 02/12	Sin 06/ 03/12
Measurement of overall length			
-relative	106.5cm	107cm	107cm
-absolute	85cm	85cm	85cm
Length of thigh	43cm	43cm	43cm
Length of shank	42cm	42cm	42cm
Length of foot	25.5cm	25.5cm	25.5cm
Height of foot	9.5cm	10cm	10cm

The functional condition of the patient was significantly improved. The amount of movement of joints in the affected limb has increased – ankle joint, knee joint and hip joint; overcome was the muscle imbalances,

reduced were aches and pains, improved was the gait. The data from **Table 1** is an evidence of the extension of the affected limb with about 1cm, and this leads to the use of special equipment to compensate for this difference.

Table 2. Circumference of the lower limb

Circumference of the lower limb	Dex	Sin 22. 02.12	Sin 06. 03.12
Circumference of the thigh			
–5cm	37.5cm	39 cm	38 cm
–12cm	40.5cm	43.5cm	41.5 cm
–20cm	45.5 cm	47.5 cm	46.5 cm
– Inguinal crease	50.5 cm	52.5 cm	51.5 cm
Circumference of knee joint	37 cm	38.5 cm	37.5 cm
Circumference of shank	32.5cm	33.5 cm	33 cm
Circumference of ankle joint			
– through malleolus	28 cm	27.5 cm	27.5 cm
– through heel	36 cm	35 cm	35 cm
Circumference of foot	26.5 cm	26 cm	26 cm
Circumference of Metatarsal Phalangeal Joints	25 cm	25 cm	25 cm

The anthropometric measurements in **Table 2** show that the thigh circumferences were positively influenced, and had increased by about 1 cm at all levels of measurement. Some of the hypotrophy of m.quadriceps femoris was overcome. Data from the table indicate a

reduction of swelling in the knee and hip joint also by 1 cm. The pain was reduced in the active movement of the joint.

Table 3. Goniometry of hip joint (HJ) and knee joint (KJ)

Goniometry of lower limb	Dex	Sin 22/ 02/12	Sin 06/ 03/12
Ext-Flex B (HJ)	S: 15 ⁰ -0-120 ⁰	S: 10 ⁰ -0-100 ⁰	S: 15 ⁰ -0-115 ⁰
Abd-Add B (HJ)	F: 45 ⁰ -0-15 ⁰	F: 35 ⁰ -0-10 ⁰	F: 45 ⁰ -0-15 ⁰
Rot B (HJ)	R: 45 ⁰ -0-45 ⁰	R: 30 ⁰ -0-30 ⁰	R: 40 ⁰ -0-35 ⁰
Ext-Flex B (KJ)	S: 0 ⁰ -0-120 ⁰	S: 0 ⁰ -0-110 ⁰	S: 0 ⁰ -0-115 ⁰

As a result of application of special exercises to restore damaged hip and knee joints (**Table 3**) improved were: active range of motion on

flexion with 15⁰, the stability of the joint during walking and stair climbing, active movements when overcoming a resistance.

Table 4. MMT of hip and knee joints

Movement	Dex	Sin 22/ 02.12	Sin 06/ 03.12
Flex B (HJ)	Assesment-5	Assessment -3	Assessment -4
Ext B (HJ)	Assessment -4	Assessment -3	Assessment -4
Test for m.gluteus maximus	Assessment- 4	Assessment -2	Assessment -3
Abd in (HJ)	Assessment - 4	Assessment -3	Assessment -3
Add in (HJ)	Assessment - 4	Assessment -3	Assessment -4
Interior "R" in (HJ)	Assessment - 4	Assessment -3	Assessment -3
Exterior "R" in (HJ)	Assessment - 4	Assessment -3	Assessment -3
Test for m.tensor fascia latae	Assessment - 4	Assessment -3	Assessment -3
Test for m.sartorius	Assessment -5	Assessment -4	Assessment -4
Flex in (KJ)	Assessment -5	Assessment -2	Assessment -3+
Ext in (KJ)	Assessment -5	Assessment -3	Assessment -3+

Data from Table 4 are a proof for improved muscle strength of flexor muscles and extensors in the hip and knee joints, as the movements of these muscles were performed in full volume against a moderate resistance. As a result, the gait was improved. With regard to proper walking and loading of the limb a good effect was made by climbing stairs, walking and overcoming obstacles, and walking on a slope.

IMPLICATIONS AND CONCLUSION

As a result of the surgery, a comprehensive and timely rehabilitation the following results were achieved:

- Restored to the maximum was the volume of movement of affected joints of the left lower limb;
- Improved was the muscle strength of flexor muscles and extensor in the hip and knee joints;
- Active movements of these muscles were performed in full volume against a moderate resistance;
- Improved was the locomotion, the climbing up and down stairs using walking aids;
- The left lower limb was fully involved in DLA.

It is recommended continued treatment at home or in specialized sanatorium rehabilitation centers.

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