

The efficiency of balneokinetic rehabilitation therapy for the post-traumatic hip

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ABSTRACT

The aim of this study was to determine the efficiency of balneokinetic therapy for post-traumatic hip disorders in Calimanesti-Caciulata spa and climatic resort. **Material and method:** the case study of a 23-year-old man with post-traumatic hip sequelae following an airplane accident, present in our clinic in the period April-October 2014, who attended a complex rehabilitation program including drug therapy, massage, kinesiotherapy and hydrokinesiotherapy. Functional assessment was performed at admission, at 4 months, and at discharge. **Results:** An obvious improvement of joint mobility and muscle recovery was obtained. **Conclusions:** The time required for recovery and socio-professional reintegration depends on the collaboration between the patient and the rehabilitation team, as well as on the timely and correct referral of the patient by the orthopedist to rehabilitation services.

Key words: hip, post-traumatic sequelae, rehabilitation

Introduction

Post-traumatic sequelae of the lower limb and particularly of the hip are one of the many causes of temporary or permanent work incapacity, because this joint plays an important role during both static conditions and locomotion. The methodological approach to the rehabilitation of these disorders represents the topic of the current study, the main objective of complex rehabilitation therapy being the patient's socio-professional integration [1, 2].

Material and method

We will present for illustration the case of a 23-year-old man who suffered multiple trauma in an airplane accident (Apuseni Mountains – January 2014): transverse fracture of the posterior wall of the right acetabulum, with displacement; open diaphyseal fracture in the distal 1/3 of the left femur with an intermediate segment; transverse fracture in the proximal 1/3 of the left peroneal bone,

without displacement; posterior dislocation of the right hip; fracture in the middle third of the left clavicle, with displacement; fracture of the 2nd, 3rd, 4th left anterior costal arches, with displacement and overriding; fracture of the 5th left anterior costal arch with chondrocostal disjunction; multifragmentary fracture of the nasal bones with impaction.

In the post-traumatic stage, the patient underwent orthopedic-surgical treatment, as follows:

- closed reduction and osteosynthesis with an interlocking centromedullary nail in the left femur;
- open reduction, osteosynthesis with a reconstruction plate and screws in the right acetabulum;
- reduction of the nasal bone fracture;
- the clavicular fracture was immobilized in an Orliman orthosis.

The patient was discharged with the recommendation of kinesiotherapy for joint

mobilization and muscle tone recovery, and the interdiction of weight-bearing on the lower limbs for at least 2 months postoperatively.

The first stage of the rehabilitation program was initiated (3 weeks after orthopedic-surgical treatment), with the following objectives: fighting pain and reducing inflammation; restoration of correct breathing capacity and reeducation of costal muscles; prevention of edema and venous stasis; maintenance of joint mobility and muscle tone.

To fight pain, analgesics such as paracetamol were used. Electrotherapy could not be applied because of the osteosynthesis material present in both lower limbs.

The kinesiotherapy program consisted of: breathing exercises for complete recovery of costal movements and increase of inspiratory and expiratory muscle strength; passive mobilization of the ankles by low-amplitude flexion, extension, inversion and eversion, circumduction movements at a slow pace, without increasing pain (10-15 repetitions for each movement); flexion and extension of the knee joints (right knee = 60 g, left knee = 90 g); isometric contractions, 3 series of 8-10 repetitions for all the muscles of the lower limbs, including gluteal muscles.

These series of exercises were performed for 30 days. The number of repetitions and the difficulty of the exercises were increased depending on the patient's general status.

Functional assessment and radiographic control showed: an increase of exercise capacity; an improvement of right hip mobility; inflammation in the right knee disappeared; radiographic control in the left clavicle showed callus in the process of formation; poor callus formation in the left femoral diaphysis because of the great distance between the intermediate segment and the femur at both ends of the fracture.

Based on this medical information, the orthopedist decided that the patient could bear weight on the right lower limb using crutches (a walker), the interdiction of weight-bearing on the left lower limb being maintained.

At this point, the second rehabilitation stage started, when hydrokinesiotherapy was also allowed.

The aims of this stage were the following: maintaining and reinforcing hip stability; maintaining and increasing joint mobility; reeducation of walking.

Maintaining and reinforcing joint stability was performed by using free and fixed postural treatment, passive and active movements and, most importantly, toning of abductor, pelvitrochanteric, gluteus maximus, quadriceps, hamstring, hip adductor and flexor muscles.

Maintaining and increasing mobility was achieved by using a complex kinesiotherapy program, which consisted of passive, active-passive, passive-active and free active mobilizations, while engaging the joints in all forms of movement allowed.

Individual hydrokinesiotherapy in a pool with sulfurous thermal water, at the treatment facility of Calimanesti-Caciulata spa resort, was included in the program. The advantages of this procedure consist of a reduction of gravitational stress, a decrease of pain, contractures and muscle overstrain. The same exercises as those performed in the gym were practiced: flexion, extension, rotation, circumduction, cycling, walking forward-back, left-right, with the mention that abduction of the right coxofemoral joint did not exceed 25 degrees, and adduction was initiated from 25 degrees abduction, with the right hip loaded in deep water (1.70 m). Exercises for the upper limbs, torso and lumbar spine were also executed.

Special attention was also paid to the left knee, while avoiding secondary stiffness and quadriceps hypotrophy.

This rehabilitation stage lasted 4 months. Functional assessment was favorable through an increase of joint mobility and muscle strength in the lower limbs. Walking was gradually resumed without the help of the crutches (walker).

Radiographic control still showed a delay in the consolidation of the fracture of the left femoral diaphysis. In fact, objective examination also evidenced a moderate instability of the left hip and knee, which is why surgery through debridement of interfragmentary fibrous tissue was decided and an iliac crest bone autograft was performed. Postoperatively, partial weight-bearing (30-40 kg) on the left lower limb was recommended for another 4 weeks, with the help of crutches (a walker).

The patient returned to the spa resort to continue the rehabilitation program for 30 days, at which point the third rehabilitation stage started, with the same objectives as those of the second stage and the practice of the same exercises in the gym and the pool, the difference consisting of the difficulty and the number of repetitions of the exercises.

Results and discussions

Joint mobility was assessed by goniometry, and muscle testing was performed in the usual way, by scoring muscle tone from 1 to 5.

Considering the objectives of rehabilitation therapy, the patient's evolution was recorded in the chart presented below.

CONCLUSIONS:

After 7 months of rehabilitation treatment, the following could be concluded:

1. The patient underwent a complex (kinesiotherapeutic and balneoclimatic) treatment in Calimanesti-Caciulata spa resort.

The rehabilitation treatment mainly consisted of kinesiotherapy and hydrokinesiotherapy.

2. The beneficial action of the thermal mineral water was due to both the thermal factor and chemical composition (chlorine, sodium, iodine, sulfur), being an important link in the appropriate management of joint symptoms.

3. The patient resumed his activity 9 months after the airplane accident, with a 95% recovery index, the activity resumption index being a real success considering that the patient is at an active age, 24 years.

4. The role of a multidisciplinary team including a specialist in medical rehabilitation, an orthopedist and a kinesiotherapist is essential for the improvement of the patient's functional prognosis and his professional reintegration.

By presenting this case, we succeeded in demonstrating that rehabilitation treatment in traumatic hip disorders is extremely important and yields very good results when it is correctly applied throughout the stages of rehabilitation and its objectives are achieved stage by stage.

Bibliography

1. Sbenge T. Bazele teoretice și practice ale kinetoterapiei. București: Editura Medicală; 1999

2. Sbenge T. Kinetologie profilactică, terapeutică și de recuperare. București: Editura Medicală; 1987

Joint assessment

JOINT	MOVEMENT	INITIAL	After the second surgery	FINAL
COXOFEMORAL	FLEXION	30° on the right/ impossible on the left	90° right/ 90° left	90° right/ 125° left
	EXTENSION	10° on the right/ impossible on the left	20° right/ 10° left	20° right/ 30° left
	ABDUCTION	20° on the right/ impossible on the left	40° right/ 30° left	43° right/ 45° left
	ADDUCTION	Forbidden from position 0, only from abduction on the right	25° right/ 15° left	25° right/ 27° left
	INTERNAL ROTATION	5° on the right/ impossible on the left	35°/ impossible on the left	35° right/ 35° left
	EXTERNAL ROTATION	5° on the right/ impossible on the left	35°/ impossible on the left	35° right/ 30° left
KNEE	FLEXION	/ 30° left	120° right/ 25° left	120° right/ 120° left
	EXTENSION	/ 20° left	Complete right/ incomplete left (10° flexum)	Complete/ complete

Muscle testing

Joint	Movement	Muscle	Initial	After the second surgery	Final
COXO-FEMORAL	Flexion	Psoas-iliac	2 right/impossible to test on the left	4 right/ 2 left	5 right/ 4 left
	Extension	Gluteus maximus	1 right/impossible to test on the left	4 right/ 2 left	5 right/ 5 left
	Abduction	Gluteus minimus, medius TFL	1 right/impossible to test on the left	4 right/ 2 left	5 right/ 4 left
	Adduction	Adductor muscles	1 right/impossible to test on the left	4 right/ 2 left	5 right/ 4 left
KNEE	Flexion	Harmstring	-/2 left	4 right/ 2 left	5 right/ 4 left
		Quadriceps	-/2 left	5 right/ 1 left	5 right/ 4 left