



*Original Contribution*

**PHYSIOTHERAPY AFTER SURGICALLY STABILIZED PROXIMAL TIBIA FRACTURE**

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**ABSTRACT**

**THE AIM OF THIS STUDY** is to present the physiotherapy for overcoming the substitution movements and to restore the correct function in the phase of relative protection after surgical stabilized proximal tibia fracture. **MATERIAL AND METHOD** Seven patients after fracture in the proximal lateral compartment of the tibia (type b1 in AO classification) with an average age of 42, 9 years were treated. After surgery, an average of 30 days of the brace was used for relative protection. The aim of the physiotherapy was to overcome muscle imbalance to achieve proper movement in the respective planes. Emphasis on recovery was the proper weight bearing on the operated lower limb. **RESULTS** The results of the first recovery phase demonstrated very limited knee flexion in range of 22, 7°, and knee extension deficit in the range of -15°. After two weeks the results progressed to 115, 5° flexion and full restoration of the extension. Control of edema and hypotrophy of the thigh were proven by circumference. **CONCLUSION** The adequate physiotherapy provides overcoming of the substitution movements and to restore the correct knee function in the phase of relative protection after surgical stabilized fracture in the proximal tibia.

**Key words:** physiotherapy, proximal tibia fracture, substitution movements

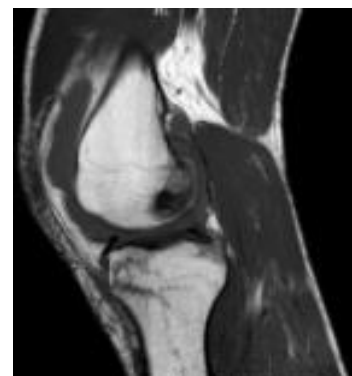
Proximal tibiae fractures are specific for restoration according to their location and involvement of the knee joint. The surgical stabilization is an improved method for the treatment of the fractures in the proximal tibia (1, 2). Physiotherapy is essential for the recovery of patients after surgery.

**THE PURPOSE OF THIS STUDY** is to present the developed physiotherapy program for overcoming the substitution movements and to restore the correct muscle reactivation during the early phase after surgical stabilized proximal tibia fracture.

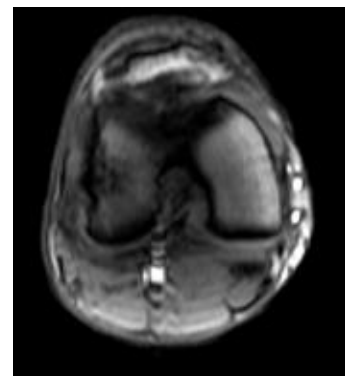
**MATERIAL AND METHOD**

Seven patients were treated at the average age of 42, 9 years after proximal lateral tibia fracture (type b1 regarding AO classification) (**Figure 1, Figure 2**).

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**Figure 1.** Sagittal view dextral tibia fracture



**Figure 2.** Axial view dextral tibia fracture

The surgical stabilizations were made during the period June 2008 – June 2018. The brace was used for the relative immobilization after the surgery for 30 days. Walk on two crutches was encouraged by the 1st post-surgery month and gradually was leaving the one and both of them.

The primary goal of the physiotherapy in the early phase was to correct the performance of the analytical exercises in low repetitions without any pain.

Substitution movements were manifested during the knee range of motion with the diversion from the vertical line, hip flexion and internal rotation (**Figure 3**).



**Figure 3.** Knee flexion with lateral deviation of the tibia

The physiotherapy was directed to overcome the substitution movements by restoring of:

- Correct knee range motion in side (performing knee flexion and extension without the action of gravity) and prone initial positions, and correct pelvis and hip stabilization (**Figure 4**, **Figure 5**).



**Figure 4.** Knee flexion in prone position



**Figure 5.** Knee extension lying sideways

Performing knee extension is with dorsal flexion.

- Post isometric relaxation for hamstrings, m. rectus femoris and iliotibial band, and isometric stimulation of m. vastus medialis with dorsal flexion (**Figure 6**).



**Figure 6.** Isometric stimulation of m. vastus medialis

➤ Muscle reactivation by applying neuromuscular proprioceptive facilitate technique (**Figure 7**):



**Figure 7.** Rhythmic stabilization

➤ Weight bearing the operated lower limb with two and one crutches by controlling the triple lower limb flexion, lumbar lordosis and pelvis tilt (**Figure 8**):



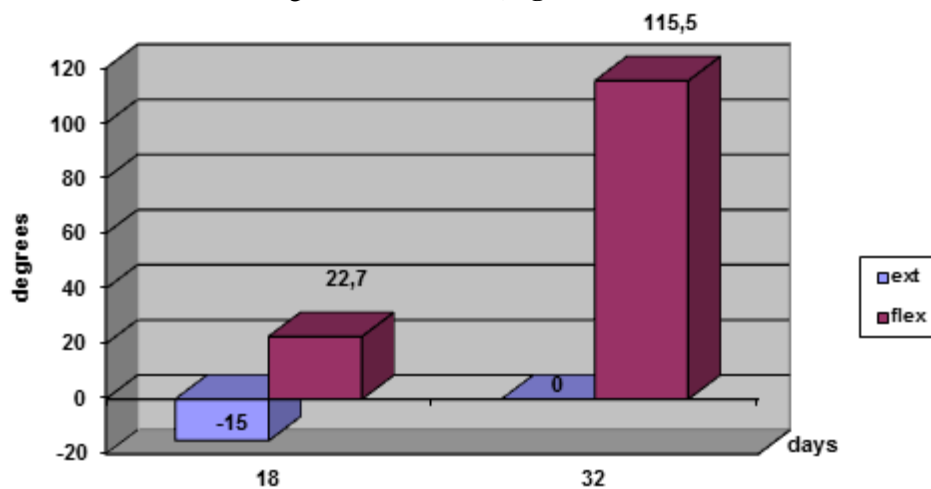
**Figure 8.** Weight bearing with two crutches

**RESULTS**

The results of the first recovery phase demonstrated:

1. Eighteen days after the surgery knee range of motion was: knee flexion – average 22, 7°

and deficit of knee extension with average - 15°. After seven procedures (after 2 weeks) the knee range of motion progressed to 115, 5° flexion and full restoration of the extension (**Figure 9**).



**Figure 9.** Knee range of motion

2. The circumference data in cm manifested reducing the knee effusion, but in being the

muscle thigh hypotrophy of 10 cm and 20 cm above the knee (**Figure 10**).

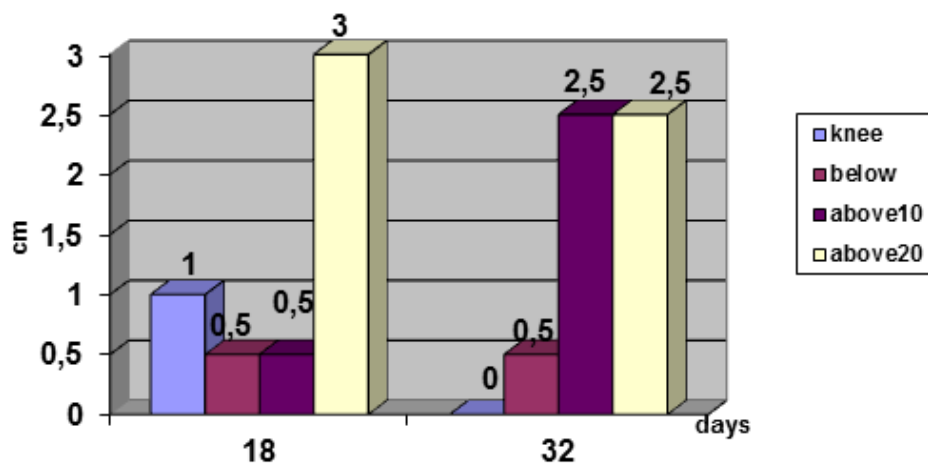


Figure 10. Circumference of the lower limbs

The results showed that the circumference of 10 cm above the knee was progressed with 2 cm for this short period, which is explained by the reduction of edema in soft tissues. At the same time, there is a reduction of the swelling in the knee and a decrease in the hypertrophy at the level of 20 cm above the knee.

3. The weight bearing was improved with two and one crutches an even distribution of both lower limbs and rhythm at doing the daily activities.

### DISCUSSION

The progression of the surgical techniques reveals a tendency towards early mobilization and weight bearing (1-3). Postoperative pain and effusion as well as impaired exercise tolerance remain a serious problem for patients (4-6). The observation and early diagnostic of the substitution movements and overcoming them by applying analytical physiotherapy techniques and educating patients are the base of the correct restoring the knee function in the early phase.

### CONCLUSION

The precise physiotherapy leads to correct of the substitution movements and to progress the opportunely recovery of the patient after surgical stabilized proximal lateral tibia fracture.

### REFERENCES

1. Oatis, C., *Kinesiology: the Mechanics and Pathomechanics of Human Movement*. Philadelphia, PA: *Lippincott Williams and Wilkins*: 11-92, 2004.
2. Richardson, M., Iglarsh, Z., *Clinical Orthopaedic Physical Therapist*. 2<sup>nd</sup> ed. Philadelphia, PA: *W. B. Saunders*: 63-153, 1994.
3. Vieira, E., et al., An anatomic study of the iliotibial tract. *J Arthroscopy*, 23: 269-274, 2007.
4. Cleland, J., *Orthopaedic Clinical Examination: An evidence-Based Approach for Physical Therapists*. Carlstadt, NJ: *Icon Learning Systems*: 47-89, 2005.
5. Janda, V., Evaluation of muscle imbalance. In: Liebensohn C. *Rehabilitation of the spine: A practitioner's Manual*. *Williams and Wilkins*, Baltimore, 1996.
6. Levit, K., *Manial therapy*. *Medicine and Physical Activity*, Sofia, 1981.