

Case study – Rehabilitation of an adult with bilateral clubfoot after surgical correction

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INTRODUCTION

Clubfoot or congenital talipes equinovarus is a common congenital pediatric condition, occurring in 1 to 2 per 1000 newborns [4]. The clinical condition consists in a foot deformity characterized by hindfoot varus, forefoot (metatarsus) adductus, an augmented midfoot arch (cavus), and equinus [6]. It is more common in males (2:1) and more prevalent in underdeveloped countries or closed communities. Its diagnosis can be made by ultrasound from 12 weeks of gestation and its treatment starts at 6 months, being neglected if not started until 2 years old [4, 6]. If the condition is not corrected during the first months of life, the patient may develop a long-term functional disability with permanent deformity and pain [4]. There are several risk factors that may be associated with this clinical condition, such as: smoking, maternal obesity, family history, amniocentesis and some selective serotonin reuptake inhibitor exposures [1].

It is possible to find some scientific literature available on treatment of clubfoot in the first months of life [4, 6]. However, there are very little information about the condition treatment in adulthood. The Ilizarov method is a surgical procedure that combines soft tissue traction, bone stretching and arthrodesis techniques and can treat complex foot deformities in adult age. Its main advantages are the possibility to treat every bone deformities in simultaneous and the fact that is not limited by the magnitude of deformity. The main limitations are the long duration of the treatment and the high risk of possible infections and other clinical complications [5]. After the orthopaedic corrective method, the patient is referred to physiotherapy, but no data on the expected clinical evolution were found. Therefore, the report of this type of clinical cases is considered relevant for the physiotherapy community knowledge.

OBJECTIVE

To report the clinical evolution during the rehabilitation process of a 25-year-old male with a diagnosis of bilateral equinus varus clubfoot submitted to two surgical interventions using the Ilizarov method.

METHODOLOGY

Clinical evaluation | Once a week

- **Perception of pain** | Use of the Visual Analog Scale (0-10) to assess the perception of pain in the foot.
- **Edema** | Circumference measurements were performed at the distal border of the internal and external malleolus and in the proximal border of metatarsals [2].
- **ROM** | Evaluation of active flexion-extension, inversion-eversion of the ankle and flexion-extension of the metatarsophalangeal joints of the 5 fingers through the goniometry.
- **Strength** | Manual muscle tests of the leg and foot.
- **Gait and others activities of daily living** | Qualitative motion assessment and video analysis.
- **Self-reported health status** | Application of the SF-36 v2 [3] (only in initial and final evaluation).

Clinical goals

In the absence of bibliographic references, the following clinical goals and treatment were elaborated with the main objective of **restoring previous functionality levels existing before surgery**.

- Total reduction of pain perception to 0 in VAS.
- Total reduction of edema to equal perimeters on both sides.
- Increase the foot and toes physiological ROM as much as possible.
- Increase strength of the leg and foot muscles as much as possible.
- Non-stop walking for 1 hour.
- Non-stop running for 10 minutes.

Treatment performed | Three times a week

- **Medical correction using the Ilizarov method** | Duration: 3 months | Before physiotherapy treatment
After the surgery, every day the patient has to improve 1° of ROM on the medical device.

- **Therapeutic massage** | Duration: 10 minutes | Week 1 to 6
Local massage on the scars resulting from the Ilizarov method.

- **Cryotherapy** | Duration: 5-10 minutes | Week 4 to 12
Foot immersion in ice cold water, performed at the end of the treatment in order to reduce the pain feeling of the session.

- **Passive accessory mobility according to Maitland** | Duration: 10-20 minutes | Week 1 to 10
Anteroposterior and cephalocaudal movements performed in the ankle and toes joints.

- **Mobility exercises** | Duration: 10 minutes | Week 1 to 12
Active mobility exercises of flexion-extension and inversion-eversion of the ankle and flexion-extension of the toes.

- **Strength training** | Duration: 10 a 30 minutes | Week 1 to 16
Strength exercises for the different thigh, leg and foot muscles. Use of 3 sets of 10 repetitions at 80% of RM.

- **Balance exercises** | Duration: 10-20 minutes | Week 1 to 12
Performed mostly in a standing position. Progressions were made from static to dynamic balance.

- **Hydrotherapy** | Duration: 60 minutes | Week 4 to 12 (once a week)
Mobility and strength exercises, sensorimotor training, gait and run.

- **Functional training** | Duration: 10-40 minutes | Week 4 to 22
Training of daily living activities with an emphasis on walking. Progressions were made in the activities trained over the weeks.

- **Home exercise plan** | Duration: 20-60 minutes | Week 1 to 22 (twice a week)
On days without a presential physiotherapy session, the patient performed two different exercise plans at home, based on the work developed during the week.

RESULTS

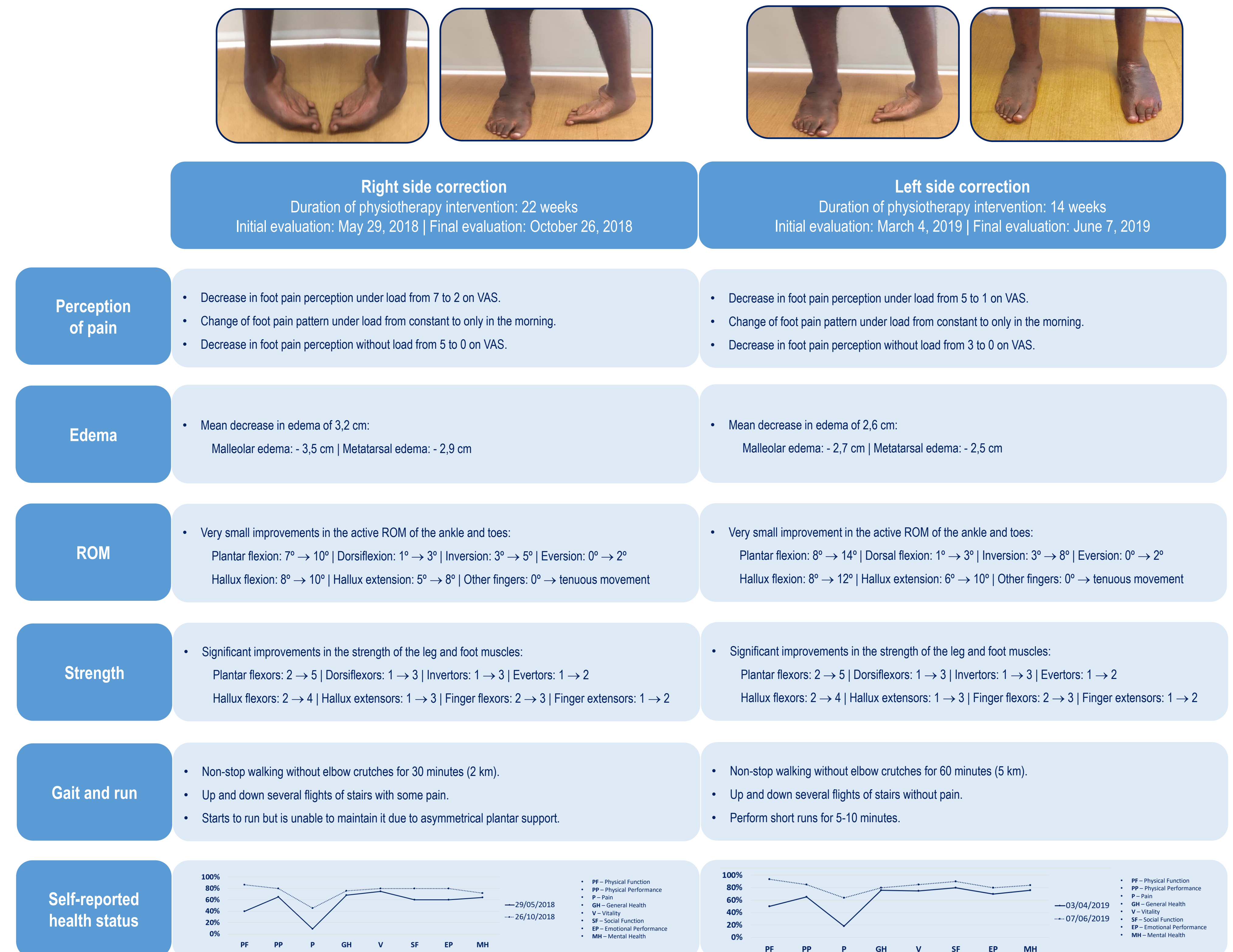


Table 1: Physiotherapy evaluation before and after the treatment performed after 1st and 2nd surgery.

CONCLUSIONS

- After surgical correction using the Ilizarov method, the rehabilitation of an adult with bilateral equinus varus clubfoot took between 14 and 22 weeks until he reached total independence.
- There was a decrease in recovery time from the 1st to the 2nd surgery. This may be due to an effect of learning in rehabilitation process or the fact that the 1st surgery was performed on the patient's dominant foot.
- Most of the previous treatment goals were met. There were clinically significant improvements in the perception of pain, edema, strength, gait, run, other activities of daily living and self-reported health status. No clinically significant improvements in active ROM of ankle and toes.
- Currently, the patient exhibits superior levels of functionality compared to the moment before the 1st surgery. It is considered relevant to maintain a clinical control over time, especially due to the postural implications and its possible future consequences after the change of plantar support.

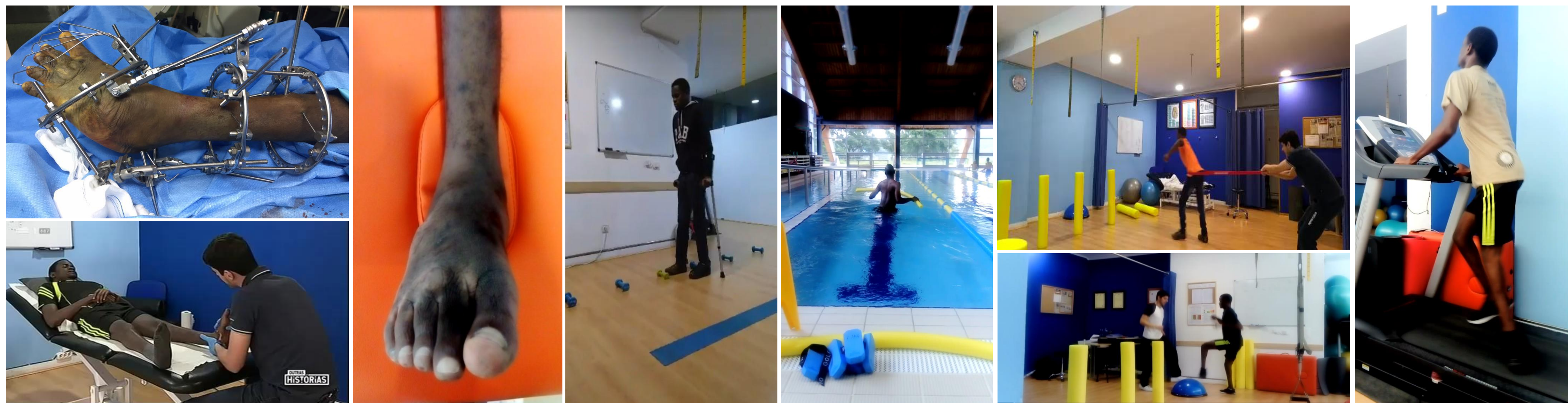


Figure 1: Treatment performed during the rehabilitation process.



Figure 2: Emblematic Mozambique race performed before and after corrective surgery.

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