

Rehabilitation of a Lower Limb Amputee

Mounguengui H*, Tendart V, Ammari M and Khalfaoui S

Rehabilitation and Functional Rehabilitation Center. Mohamed V. Rabat Military Instruction Hospital, Morocco

ABSTRACT

The rehabilitation of the amputee patient must be early and therefore begins immediately after the operation. In the pre-prosthetic phase, the first objective is to allow good healing and a reduction of the edema of the stump with trophic and circulatory massages ; in a second step it is a question of obtaining a toned stump by exercises of reinforcement and joint mobilization. In the post-prosthetic phase, the aim is to integrate the prosthesis into the patient's body diagram and to correct the gait pattern with the ultimate objective of greater patient autonomy.

*Corresponding author

Hartwig Mounguengui, Rehabilitation and Functional Rehabilitation Center. Mohamed V Rabat Military Instruction Hospital, Morocco.
Tel: +212776297361.

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Introduction

Amputation refers to a surgical operation which consists of the removal of a limb or a segment of a limb. Etiologically, the causes are diverse; they can be of vascular or traumatic etiologies; infectious or tumoral; in some of the etiologies may be intertwined (case of diabetic foot which can combine vascular and infectious causes). The leading cause of amputation remains vascular etiology and this risk is fourteen times higher in diabetic patients [1].

The stump is the remaining part of a limb after amputation; from a fitting point of view, it allows the attachment, support and mobilization of the prosthesis.

Note that different types of amputation can be carried out taking into account the injury assessment and the functional prognosis of the patient; we will mainly discuss tibial amputation as a type of description. Rehabilitation therefore occupies a major place in the care of the amputee patient throughout their care pathway. It begins from the peri-operative phase to the post-prosthetic phase (after installation of the device).

Research Support Therapeutic Education

Therapeutic patient education (TPE) plays an essential role throughout the care process. The latter will be carried out in several interviews concomitantly with the clinical assessment and functional assessment. It is based on practical, written and audiovisual supports.

It is important to explain hygiene measures to patients, in particular maintaining a correct weight because variations in the volume of the stump lead to poor adaptation of the prosthesis socket.

Note that it is also necessary to collect patients' expectations regarding the rehabilitation program before prosthetic rehabilitation

because it was found that patients did not know what to expect during this entire process [2].

It will be discussed with the patient and his entourage firstly the management of the stump (pain; local heat; a change in coloring) and his prosthesis then secondly for diabetic and arteritic patients awareness of the fight against the risk factors of their vascular and metabolic pathology [3].

After the occurrence of wounds or ulcers on the residual limbs, the healing of the lesions requiring the removal of the prosthesis; non-use of the latter may be associated with a reduction in balance confidence [4].



Figure 1: Awareness of the Appearance of the Stump

Pain Management

Post amputation pain of the residual limb is common among patients and causes functional limitation, thus disrupting their rehabilitation and daily life activities.

The causes of stump pain are multiple and it is necessary to eliminate a medical cause (infection; complex regional pain syndrome; neuroma; neuropathy) as well as a conflict with the

prosthesis. Once these causes have been ruled out, the physical treatment will combine trophic massage and circulatory massage techniques as well as scar massage.

Phantom pain is a particular entity felt by approximately sixty to eighty-five percent of amputee patients and persists on average one year later [5]. The treatment combines pharmacological means and physical means, notably massage and transcutaneous electrical stimulation (TENS).

Masso-Physiotherapy

➤ Pre-Prosthetic Phase

C'est la phase qui va préparer le moignon à l'appareillage ; elle permet également un entretien de la fonction articulaire du membre controlatéral et une rééducation du moignon.

➤ Immediate Post-Operative

Rehabilitation is started as soon as possible; pain must be respected and the fatigue threshold must be taken into account. The first week following the surgical procedure is devoted to healing and early rehabilitation of the stump. It is therefore a question of carrying out a trophic massage to allow good healing of the stump; a massage of the scar to limit or prevent the appearance of possible adhesions which could be sources of joint limitation; but also the massage of the scar which will be done carefully from the distal part to the proximal part so as not to hinder venous return.

Throughout the process the patient is educated on the correct alignment of the limbs to avoid the appearance of stiffness or flexure of the stump [6].

Short Term

This is to ensure a toned stump and fight against amyotrophy. The practitioner performs muscle strengthening by identifying two muscle groups; these are the motor muscles of the stump and the cushioning muscles which cover the bony segment and on which the prosthesis will rest.

Muscle Strengthening

Strengthening the motor muscles concerns the hamstrings, the gluteus medius, the gluteus maximus and the quadriceps which is the main motor muscle during a tibial amputation.

The simultaneous contraction of all the cushioning muscles is achieved by placing my hands around the stump in order to guide the patient in its contraction. Note that the contraction of these muscles is requested later because carried out too early it risks causing disunity of the scar.

Muscle strengthening of the contralateral limb and upper limbs is also carried out for ambulation with the walking frame.

Scar and trophic massage is associated with muscle strengthening in order to remove adhesions.



Photo 2: Strengthening the Upper Limbs in a Tibial Amputee

Recovery and Maintenance of Joint Range of Motion

This phase ensures good mobility of the stump but also of the contralateral limb and the rest of the body. The therapist performs both active and passive movements of the joint segments of the remaining limb (hip and knee) as part of a tibial amputation but also of the other joint segments.

We work on postural support; balance and transfers and walking with technical aids. The verticalization is continued; improving balance and transferring weight to the limb on the amputated lower limb; empower your transfers to eliminate the risk of falls.



Figure 3: Fight Against Knee Flexum (application of weight to the posterior surface of the knee and immobilization of the pelvis to avoid compensation).

Medium Term

It occurs around twenty-one post-operatively; during this phase the practitioner continues muscle strengthening; work on balance and posture as well as the walking pattern adapted to technical aids (English canes). Particular emphasis is placed on exercise rehabilitation because due to pain and immobilization a reduction in respiratory capacity can be observed [7]. At the end of this phase, a temporary prosthesis is placed once the stump has been stabilized; the latter will be in place for 06 months before putting on a definitive prosthesis.

➤ Post-Prosthetic Phase

During this phase the aim is to make the patient independent with their prosthesis; we thus work on balance; bipodal then unipodal support, walking with devices.

The prosthesis must be integrated into the patient's body plan to achieve satisfactory walking.

Throughout this process the patient is educated on the monitoring of their stump and their equipment [8].



Figure 4: walking work with fixed walker and Definitive Prosthesis

Conclusion

The rehabilitation of the amputee patient is a several-step process which begins with therapeutic education of the patient and whose goal is to obtain the patient's autonomy with his equipment. Active patient participation is the guarantee of a good result throughout the care process.

Conflict of Interest

The authors declare no conflict of interest.

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