



Pre-Prosthetic Rehabilitation in Post-operative Transtibial Amputation Patient: A Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. All authors made best contribution for the concept, evaluation and assessment, interpretation of the data analysis and data acquisition. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Background: Amputation is that the removal of injury by, undue constriction, surgical condition or surgery of associate degree extremity. Below-knee amputation (BKA) may be a transtibial amputation that involves separating the foot, ankle joint, and distal shinbone and leg bone from associated soft tissue structures. This surgical treatment carries wide morbidity, but, provided adequate indications; it remains a therapeutic tool with very important clinical price and generally life-saving importance. The majority of transtibial amputations is due to peripheral vascular disease or lower limb circulation disease (60 percent -70 percent).The main goal of rehabilitation procedures is to generally increase healthy and impaired limb strength, patient flexibility, cardiovascular ability, and equilibrium. . Health care is burdened by comprehensive recovery and long-term care. Mobility is essential to independence recovery; however, the effect of multiple comorbidities in this patient population will render mobility recovery a particularly difficult task

Clinical Finding: An 65 year old male complains of pain in right foot since 3 month. Swelling was

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appeared and skin over the black lower leg turned black with foul smelling discharge from foot. He was diagnosed with right lower limb gangrene and referred to Physiotherapy department for prosthetic prescription and rehabilitation after trans tibial amputation.

Diagnosis: Duplex colour Doppler study of left lower limb show triphasic flow in CIA, EIA, IIA, SFA, POP, ATA, PTA arteries of right lower limb, dampened flow noted in right dorsalis pedis artery and atherosclerosis wall thickening in the arteries of right lower limb.

Conclusion: This case report provides patient with inclusive recovery which help to decide on a patient's suitability for a prosthetic limb prosthetic fitting.

Keywords: Transtibial amputation; Preprosthesis; Artificial Limb; rehabilitation; Physiotherapy.

ABBREVIATIONS

TTA : *Transtibial Amputation*

VAC : *Vacuum assisted closure wound therapy*

1. INTRODUCTION

A transtibial amputation requiring the separation of the foot, mortise joint joint, and distal shinbone and leg bone with connected soft tissue structures could be a below-knee amputation (BKA). In general, since the previous has higher recovery and useful U.S. there still are 3500 trauma-related amputations. This operation has extensive morbidity performance, a BKA is desirable over AN above-knee amputation (AKA). In recent times, Lower extremity amputation rate has been declining, however every year within the, but it ought to remains a treatment modality of significant clinical and sometimes life-saving importance if acceptable warnings are given [1].

Elderly individuals with lower limb amputations are difficult to manage. Health care is burdened by comprehensive recovery and long-term care. Mobility is essential to independence recovery; however, the effect of multiple comorbidities in this patient population will render mobility recovery a particularly difficult task. The specific appearance of lower-limb amputated elderly people with numerous physical, cognitive, psychological, and social comorbidities imposes particular obstacles to continuing treatment [2].

Chronic DM complications are arteria coronaria disease, retinopathy, nephropathy, peripheral tube malady and neuropathy. Peripheral neuropathy is directly relating to injury to the lower limb, and one in every of the most complications of DM is diabetic foot harm. This ends up in a major range of amputations and hospital admissions during this population [3-4].

After amputation, the issue is edema and reduced muscle mass. Edema can generally

subside within the first two postoperative months, assisted by the shrinking program, although muscle atrophy will continue for several months. Individuals with unilateral amputation of the lower extremity often experience osteoarthritis throughout the intact arm [5-6]. During the post-operative process after the amputation, the operation presents many limiting obstacles, including restoration of the phantom limb, coordination problems, muscle weakness and instability, and the presence of neurons, stump deformities, bone spurs and ulcers at the end of the stump. the strength of a stable and remaining leg, the patient's resistance, the cardiovascular function and the patient's balance[7].

More than half of the patients had multiple lower limb pain with the greatest incidence of knee pain (both sound and amputated limbs), and no significant association was found between age and contralateral knee pain or BMI. Transtibial amputation was linked with Patellofemoral osteoarthritic degeneration in the intact leg [8].

2. PATIENT INFORMATION

A 65 year old self supportive male was referred to Physiotherapy department for prosthetic prescription and rehabilitation after trans-tibial amputation (TTA). He has his own salon due to prolong standing posture the pain was started in both limb, Patient also had history of left leg fracture and which was operated 5 years before. Then he used right leg maximally and whole weight bearing was on right leg due to prolong standing. A TTA was done on his right leg as a lifesaving procedure after severe infection and gangrene. He also suffered initially from uncontrolled diabetes.

Operative notes: The patient is under treatment after trans-tibial amputation, on suspicion of contaminated foot wound and surgical flap dehiscence (Fig. 1), this integumentary complication remained in the setting.

Additionally, due to progressive losing weight, depression and type 2 diabetes, the patient presented with severe wasting malnutrition.

A third irrigation and debridement of the right foot wound occurred in the patient. A wound vacuum is applied during surgical proceedings. He has been scheduled for follow-up consultations with the wound clinic to monitor the progress of healing and the wound vacuum changes.

Clinical finding: A 65 year old male complains of pain in right foot since 3 month. Swelling was appeared and skin over the black lower leg turned black with foul smelling discharge from foot. He was diagnosed with right lower limb gangrene. Patient was operated on 28th December 2020. Transtibial amputation was done. Patient has history of hypertension and diabetes since 10 years.

On observation, the body type was ectomorph appearance. Posture is normal.

The range of motion was evaluated and within normal limits, as evaluated by the goniometer, which is shown in Table 1. Manual Muscle Testing (MMT) was evaluated, which is shown in Table 2. For activities of daily living assessment, the Barthel Index scale has been used and the score for the patient was 7. During activities such as eating, bathing, personal hygiene, dressing, emptying, urinating, going to the toilet, climbing stairs and walking, this tool can assess the degree of addiction.

Pain Assessment: Pre-rehab VAS: 7/10 at rest, 8/10 on slight movement.

Post-rehab VAS: 2/10 at rest, 3/10 on slight movement. The limb length measurement non affected leg was 34 inches and affected leg was 21 inches.

Neurologic Examination was done where Dermatomes and myotomes was evaluated and there were no diminished or absent sensation, nerve roots were intact. Reflexes were intact



Fig. 1. Show integumentary complication remained in the setting

Table 1. Pain assessment

Movement	Pre-rehab ROM- right side	Pre-rehab ROM- left side	Post-rehab ROM- right side	Post-rehab ROM- left side
Hip flexion	0-50 ⁰	0-100 ⁰	0-70 ⁰	0-120 ⁰
Hip extension	0	0-20 ⁰	0-10 ⁰	0-30 ⁰
Hip abduction	0-20 ⁰	0-40 ⁰	0-30 ⁰	0-50 ⁰
Hip adduction	0-10 ⁰	0-20 ⁰	0-20 ⁰	0-30 ⁰
Knee flexion	0	0-120 ⁰	0-5 ⁰	0-130 ⁰
Knee extension	0	0	0	0
Ankle plantarflexion	-	0-40 ⁰	-	0-50 ⁰
Ankle dorsiflexion	-	0-10 ⁰	-	0-15 ⁰

Table 2. Pre and post rehab for muscles

Muscles	Pre rehab	Post rehab
Quadriceps	3	4
Hamstring	2	3
Abductors thigh	2	3
Adductors thigh	3	4
Gluteus medius	2	3
Gluteus maximus	2	3

Diagnosis: Duplex color Doppler study of left lower limb show triphasic flow in CIA, EIA, IIA, SFA, POP, ATA, PTA arteries of right lower limb, dampened flow noted in right dorsalis pedis artery and atherosclerosis wall thickening in the arteries of right lower limb.

Left lower limb angiogram show thrombotic occlusion of left tibioperoneal trunk with narrowing in proximal ATA and PTA.

Without contrast, the CT brain reveals chronic small vessel ischemic changes in bilateral deep white matter periventricular, generalized cerebral atrophy.

Therapeutic intervention: medicine were given cap juviana, tab stilo, tab complamina, tab clopitab, tab ecosprin.

Week 1-2: Initially the scar management was provided with proper dressing. Limb kept in elevation to prevent edema. Proper positioning was given to prevent contracture and advice to change the positioning every 2hr to prevent bed sore. TENS was applied to reduce pain and medication was given.

Bed mobility exercise was started such as rolling, bridging, moving up and down on the bed, balance in sitting on the side or with legs on the bed, Push-ups using arms (after drain has been removed).The ankle toe movement, heel slide, hip abduction, adduction is started to unaffected leg and pelvic bridging was also perform with the help of unaffected leg. The active assisted upper limb mobility was performing to maintain joint integrity.

Week 2-4: The first two weeks of physical therapy focused on preparing for the left / right study. Fifty limb images showing the amputated limb and the intact limb were displayed in various positions and orientations on a tablet carried by the comfortably seated participant. Each limb photo was displayed for five seconds, with the participant marking the limb as right or left by

pressing a button on the tablet. The assessment tasks were repeated less than a minute between cycles for 30 minutes per treatment session. At this stage, the patient needs psychological support. Therefore, we recommend that you follow the previously suggested actions to repeat them more frequently. Active accessory strengthening, quadriceps and active isometric tests, Ham hamstring, adductor, abductor and gluteal muscles 10 times, twice a day, 3 pounds each time, hip flexor stretch series, quadriceps, rope Muscle and Viscosity were repeated 10 times for 10 seconds and three times a day to find muscle balance. The transfer of the skateboard used to convert the bed into a wheelchair must be started. Let the patient stand up for 30 seconds, and then increase the time to 2 minutes.

Week 5-8: Walking aids is taught to the patient for preventing fall and started ambulation training with the help of walker. Performed parallel bar gait training. The exercise performed the proprioceptive type. Initially, ambulation is started in 100m and then gradually progress in hall and continues to increase the distance of walking and progress to stair climb.

3. DISCUSSION

Muscle strengthening, gait preparation, balance exercises, and functional training programs were the objective of physical therapy during the recovery process, showing improvements in gait performance from minimal to major impact size in people with lower limb amputation. However, necrosis is seen during the first step of treatment in order to administer the VAC (vacuum assisted closure wound therapy) unit, create negative pressure and assist in the healing process [2,9]. If the amputated limb has been the dominant hand prior to the actual injury, early retraining of dominance could begin. This training will include writing practice, guidance for the paper role, and fine-motor coordination exercises. At this point, coaching in one-handed strategies and helpful devices for ADL independence is necessary.

Each unfortunate should be independent while not the prosthesis in everyday life, because the unfortunate will select not to wear the prosthesis in the slightest degree times or it should not be accessible because of breakage or repairs. Preparation of the single-handed footwear tie and also the use of the residual limb to balance artifacts are beneficial [10].

The role of progressive motion imaging in reducing phantom pain in amputees: A randomized controlled study: Katilehol Imakatso, Victoria Madden Mirror therapy is another effective pain management tool for healthy hands in amputees put it in front of the mirror with the temples facing the temples [11-12]. The hand of the disabled is hidden behind the mirror. When the patient sees two hands moving in the action area, he will make various gestures in the mirror. It is important to understand the purpose of this process and the need for continuity in the family program [13].

Physical medical aid within the Pre and Post rehab the Transfemoral Amputation results to successful recovery. This report is that the initial to indicate that physical therapy offers sensible ends up in the pre-amputation cycle once the muscle enhances strength, balance, flexibility, gait coaching and proprioceptive training, yet as a more robust balance, a maintained muscle mass, was discovered once amputation time, promoting fitting and strength coaching with the prosthesis at associate degree increasing rate [14-16].

4. CONCLUSION

Strengthening, positional flexibility, and dynamic equilibrium pre-rehabilitation therapies. These patients also prepare for the prosthesis fitting and ultimately contribute to an enhanced quality of life. To help determine on the suitability of a patient for a prosthetic leg, early walking aids may be used.

LIMITATION

Patient had difficulty to bear weight. As he was operated previously. Maximally he was not cooperative to perform exercise for prolong period.

CONSENT

Proper consent was taken from patient for writing case report.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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