Case Report

Physical Therapy Rehabilitation and Care in Post Operative Trans-Tibial Amputation Patient

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Abstract

Introduction: The case study is focused on the treatment of an individual with a residual limb after a transtibial amputation. The main goal is to help provide a greater understanding of how to treat the residual limb after transtibial amputation.

Case Description: The case study focuses on a 65 year old female who recently underwent a transtibial amputation of the left lower extremity because of chondrosarcoma of distal tibia. The patient was mesomorphic and had a history of tumor. Physical therapy provided care in ways including wound care, therapeutic exercise, gait training and prosthetic fitting and training.

Conclusion: The patient progressed well because of her motivation to continue physical therapy and the proper management. After much hard work, by both the patient and the therapist, the patient was able to ambulate house distances without assistance. For the patient's age, it was remarkable to be able to progress to the current functional status which she attained.

Key words: *Transtibial, amputation, treatment, rehabilitation.*

Introduction

The case of a 65 year old female is reported, who underwent below knee amputation following the diagnosis of chondrosarcoma in lateral malleolus of left fibula. Patients that need care after amputation have been a main stay of the medical community for many years, but new research and treatment methods need to be pioneered for the comfort and functionality of amputees. A lot of research has been done recently with the use of 3D printers and their application to the amputee treatment process but there are still many areas of treatment that need improvement, especially surgical procedure, wound healing, prosthetic fitting and prosthetic gait training. The primary aim of the physiotherapy rehabilitation in case of amputation is to improve the community mobility of amputees. To attain this goal, it is necessary to design individual rehabilitation protocols specifically for each patient depending upon his or her functional ability, societal requirements, and motivation. Initially when transtibial prosthesis is fit, the patient finds it difficult to regain his function and mobility.

Maintenance of ambulation with the use of a prosthetic limb is seen as an important factor associated with preserving independence. Normally, patients who require a transtibial amputation are older in age and there is a high chance for them to suffer from clinically depressed after the surgical procedure. So, it is necessary for the physical therapist to be caring, competent, and have an understanding of the patient's emotions. Also critical are the knowledge and skills for providing the patient with the best treatment possible.(1)

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The patient normally starts pre-prosthetic physical therapy immediately after the transtibial amputation. Pre-prosthetic rehabilitation includes upper and lower body strengthening exercises while maintaining range of motion in the lower extremity. This can be difficult as a result of changes in the leg musculature during the amputation surgery, which can either be from being cleaved or atrophied from inactivity. The physical therapist will perform desensitizing the patient's residual limb by using skin rolling, tapotement, and soft tissue mobilizations.(2)

Patient Information: A 65 years old female farmer with normal body mass index and right hand dominance complained of pain and burning sensation and swelling at the lateral malleolus which later spread to the whole foot. With these complaints, she visited AVBRH where radiological investigations were done along with other investigations. She was diagnosed with chondrosarcoma and planned for below knee amputation, i.e., transtibial amputation so as to control the spread of the pain and swelling due to the tumor. She had a history of tobacco chewing since 20 years with no other addictions. She had a past history of hospitalization for the same complaint 1 year earlier to the surgery. At that time, excision biopsy was performed but the patient and her family refused to undergo operative treatment. She lives in the ground floor of her 2 storey house, so that she isn't required to climb stairs. She has her 2 sons and 2 daughter-in-laws to take care of her. Transtibial amputation was performed on 22nd September 2019. Post-operatively, she was referred to physiotherapy department with the complaint of pain at the suturing site and difficulty in performing functional activities.

Clinical findings:

On post- operative day 1 after the amputation, the patient's heart rate was 74 bpm, respiratory rate was 18 breaths per minute, blood pressure was 110/70 mmHg. The patient was alert and oriented with time, place and person. The patient's overall posture was assessed and no abnormalities were detected besides loss of her left leg. Her residual limb was warm to the touch and swollen, showing cardinal signs of inflammation. The residual limb measured 34 centimeters in girth at the level of 15 centimeters below the patella and her wound was closed with sutures. Since it takes time to know how the incision site will seal or if it will seal completely at all, hence monitoring was done regularly. Pain stated by the patient was 4/10 on NPRS scale. Measurements of the active range of motion (ROM) using goniometer at the hip joint were: 100◦of hip flexion, 30◦of hip extension, 25◦ of hip adduction and 40◦ of hip abduction. She showed an extension lag of 15◦. The patient was unable to perform flexion beyond 110◦.

Manual muscle tests for right lower extremity were performed. Her strength was 3+/5 for hip flexion, 4+/5 for knee extension, 5/5 for knee flexion, 3/5 for dorsiflexion and 4/5 for plantar flexion. Manual muscle tests of the left lower extremity were deferred due to pain. The Functional Independence Measure (FIM) was the primary tool used to evaluate changes in areas such as ambulation, bed mobility and balance for the patient because of its reliability and validity. The patient was unable to go from sit to stand independently. She required max assist of 1 or a moderated assist of 2 to stand, making her a FIM Level 2. The patient required minimal assistance with all bed mobility skills making her a FIM Level 4. Her balance in the seated position was reduced; however she did not require assist to maintain an upright sitting posture. She needed supervision for safety while sitting, making her a FIM Level 5. Balance in standing was not tested.

The patient's upper extremity strength and range of motion were adequate to carry out the activities of daily living. Her lower extremity strength in her uninvolved limb was functional as evaluated by MMT and she had no previous history of weakness in the same. The main problems as per standard International Classification of Functioning, Disability and Health (ICF) model were: decreased strength of both involved and uninvolved lower extremity, decreased ROM in extension of involved hip and bilateral upper extremity, decreased balance/postural control in both sitting and standing, decreased endurance because of bed rest and loss of limb, loss of ankle joint which makes ambulation with prosthesis difficult.

Therapeutic intervention:

Intervention consisted of two phases.

In the first phase, pre-prosthetic training and emphasized range of motion stretching, especially

hip and knee flexion stretching were done. Strength training was performed for her residual limb and sound limb, particularly strengthening the hip abductors of her residual limb to assist with maintaining proper stability in gait. Scar and soft tissue mobility were performed on the patient's residual limb for gait training and weight bearing in the prosthesis, ensuring proper mobility of the skin on the residual limb stump and reducing pain. In addition, transfer training, wheelchair negotiation training and standing balance training were performed.[3]

In the second phase of therapy, donning and doffing training of the patient's lower extremity prosthesis was performed along with application of socks. Weight shift training was practiced while standing in the prosthesis in a lateral and diagonal fashion. More challenging exercises were added progressively to increase the patient's single leg stance ability [4]

Gait training was initiated within the parallel bars, progressing to walker and then cane as an assistive device. Stairs, ramps, outdoor gait and functional training such as lifting heavy items off the floor, reaching for higher shelves, etc were also performed. [5]

Follow up and outcome:

By the end of the sessions, she was able to walk without any assistance and was independent in mobility. The patient came for physical therapy with motivation and was readily willing to do whatever she was asked. She was taught home exercise programmes, which she performed sincerely and came for follow up weekly. She started with her full Functional activities and activities of daily living within 4 months. The patient's psychological well being was also a positive factor which helped the treatment plan to work with the time of recovery estimated for her.

Discussion and Conclusion

This patient is a great example of what the prognosis after an amputation should look like. Motivation plays a huge role in the improving the outcomes of any treatment. This patient's family's and her own will to recover faster helped play a big part. As the patient suffered for a year prior to the elective procedure to ampute, she was mentally ready to face all the challenges in the path of recovery. She complied with the physiotherapist better due to her past references with pain. All these factors counteracted the barrier of age and easy accessibility of the physiotherapy.[6]

The patient opted for no prosthetic fitting due to her poor economic condition. This did not hamper much of her life as she was a home maker with her daughter-in-laws for support. But would that be a case where the social life and economic necessity in reference to job would have come, then counseling for a proper prosthetic fitting and budgeting the cost of the prosthetics be the agendas in the therapist goals. That would lead to prosthetic training and ergonomic transformations in home and workplace. Transportation facilities and daily commute with public transport would also be important [7]

Ethical Clearance: Theinstitution Ethics committee clearance is obtained.

Conflict of Interest: Nil.

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