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(CASE REPORT)

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Early physiotherapy in rehabilitation hospital for severe traumatic brain injury: A case study of dynamic lady

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Abstract

Background: Physiotherapy is an integral component of the management of patients with traumatic injuries. This case study discusses possible interventions for restoring physical and cognitive function during an inpatient rehabilitation program of 63years female who presented with slip and fall from running train with hypovolemic shock and sever crushing, traumatic amputation left upper arm, Multiple fractures and open wounds.

Methods: Underwent many surgical procedure and rehabilitation for 5 month, Initial assessment was taken for pain, range of motion, Limited ambulation because of open wounds, Task specific exercises, postural corrections, residual limb exercises, activities in sitting, standing were done for 4 weeks, 3 sessions per day for 45mins, after 4 weeks of the surgeries.

Outcome measures: Harris hip score, Functional Independence Measure (FIM), VAS, Berg Balance scales were used to assess the patient before and after the 4weeks program.

Results: Post operative treatment there was decrease in pain, increase in hip mobility and overall functional ability. There was significant improvement in Gait and the patient was able to perform her ADLs independently.

Conclusion: Physiotherapy arises as a possible and safe complementary treatment, Exercises and physiotherapy in Rehabilitation appear to be beneficial for patients with amputation, fractures Healing, Hip replacements, wound healing by enhancing their functionality and quality of life.

Keywords: Mobility exercises; Pain management; Core strengthening; Posture correction; Gait training and Quality of life

1. Introduction

Early rehabilitation is important in the prevention of sever mobility and self-care limitation, postural disorders, reduction in body endurance and inability to tolerate physical activities. Before rushing into assessment and treatment check for the patients Psychological / emotional response to the current situation of life and understanding about their amputation procedure, cognitive status, motivation to recover, depression levels .Goals are set using SMART (specific , measurable , achievable ,realistic, time sensitive) which helped the patient and the caregiver as well as the rehabilitation team to reach the maximum outcome, make the patient independently perform the daily tasks. The purpose of treatment was to teach the patient to perform exercises routinely to improve overall muscle strength, mobility, reduce muscle atrophy, oedema. Help to achieve independent transfers, functional independence and psychological adjustments.

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2. Case presentation

A case of 62-year-old female had slip and fall from running train at Kakinada had hypovolemic shock and sever crushing with traumatic amputation of left upper arm associated with hip, humerus fractures, multiple rib fractures. Deep tissues of left leg exposed, wounds over temporal region. The patient was taken to local railway hospital and initial treatment was given on 13/10/2022.Shifted to Apollo Hospitals Hyderabad, underwent many surgeries. Initially right hip was replaced on 14/11/22 and then left hip dislocation with acetabular fracture was corrected by plating on 10/4/23. Came to ApoKos rehabilitation center for further treatment. Initially she had 2 sessions of physiotherapy for 45 minutes for about 4 weeks. Bed mobility, isometric exercises, minimal range of motion exercises and breathing exercises were given. The loss of limb has severe implication for a person's mobility and ability to perform activities of daily living, which can negatively impact their participation and integration into society.

Table 1 Physiotherapy protocol

Goals	Physiotherapy intervention	Intervention regime
To reduce pain and swelling	Cryotherapy	10 minutes twice a day
Positioning	Pillow should be placed between both the legs to avoid adduction of hip	Done in supine and side lying, long sitting on bed
To improve hip mobility and strength	Assisted SLR, hip abduction in side lying, bridging	1set with10 reps initially, then 5sec hold to 10 sec hold (1st week) progressing by adding ½ kg weight (2nd week), increased to 15 reps by 3rd week
To improve core strength B/L of lower limbs	Pelvic tilt on swiss ball, dynamic quadriceps, squatting, lunges	1set with 10 reps (2nd week) progressed to 15 reps (3rd ,4th week)
To improve balance and proprioception	SLR, toe and heel standing, standing and squatting on Bosu ball	1 set with 10 reps (3rd week)
to improve gait and stair climbing	Ambulation in hallway using walker, then cane. Stair climbing (step up and down) progressed to stepping on Bosu ball	2 rounds for 15mins (3rd week) 1set for 10reps (3rd week)

3. Discussion

Wound healing is a complex multistep process involving biological pathways, mechanisms classically divided into phases including hemostasis/ inflammatory stage, proliferation, remodeling. A failure of wound healing could lead to chronic wound with major comorbities like leg venous ulcers, diabetic foot ulcers, pressure sores. Excessive scaring leads to kelosis, lypertrophic scars causing disfiguration and sometimes itchiness, pain. Treatment includes cleaning and careful handling of the injured tissue; early treatment leads to prevention of infections and promotion of healing. Photodynamic therapy, electrical stimulation, ultrasound therapy are highlighted in practical and comprehensive approaches of wound healing. Endogenous bioelectric field occurs during wound healing producing Na+ /K+ ATPase in the epidermis by the cells.

Ultrasound therapy consists of sound waves that cause thermal and non-thermal effects in the tissues. when applied to the skin there is rise in the skin temperature to 40 degrees producing the increased vessel flow, cell proliferation, collagen synthesis and tissue regeneration. It has anti-inflammatory properties. The non thermal effects comply with acoustic streaming with displacement of particles and cavitation by cleaning the necrotic tissues preserving the healthy ones. Low frequency ultrasound is used directly around the wound for 5-10 mins. A tropical gel is usually needed between the skin surface and it is contraindicated in patients with metal prothesis in the leg neuropathy, infections/ thrombophlelitis.

Total hip replacement is one of the most successful surgeries done to remove the damaged bone and cartilage replaced with prosthetic components. It is a safe, effective procedure that can relive pain, increase range of movement that improves quality of life. Post surgery the patient had pain and had difficulty to perform ADL'S. A well-planned

physiotherapy intervention protocol was formulated including simpler exercises initially followed by strengthening exercises. the protocol starts with hip ROM exercises progressing to balance training and resistance training. Pre prosthetic training should the given.

Table 2 Outcome measures

Scale	1ST MONTH	2ND MONTH	3RD MONTH	4TH MONTH
Numerical pain rating scale	9/10	9/10	7/10	5/10
Harris hip score	50/100	60/100	70/100	80/100
Functional Independence Score (FIM)	52/126	72/126	96/126	106/126

4. Conclusion

There was successfully improvement of physical function and general wellbeing post hip replacement. This case report suggests that well organized physical therapy with proper medication is immensely effective in reducing the pain and improving the functional independence, quality of life.

Physiotherapy arises as a possible and safe complementary treatment that might improve the results of traditional treatment. It has demonstrated to improve tissue healing with different grades / evidences. The main limitations of the physiotherapy are lack of clinical trials, the availability, the variability of parameters used in different conditions and also lack of comparable results. Probably electrical stimulation and ultrasound therapy are most studied.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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