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The Impact of physiotherapy intervention Onan Individual with traumatic paraplegia: A comprehensive Case Study

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ABSTRACT

Traumatic spinal cord injury (TSCI), which results in paraplegia, poses substantial physical and psychological obstacles to patients. This report examines the case of a 28-year-old male welder who developed acute paraplegia as a result of a T11-T12 spinal fracture. The study emphasizes the significance of physiotherapy interventions in improving limb function, sensation, and overall quality of life. Significant gains in functional independence and management of bowel and bladder problems were reported following a comprehensive rehabilitation strategy that included passive range of motion exercises, strengthening routines, gait training, and sensory re-education. The findings highlight the critical impact of individualized physiotherapy programs in improving the recovery and well-being of people with traumatic paraplegia, highlighting the need for early intervention and holistic care to achieve the best results.

KEYWORDS: Traumatic Spinal Cord Injury (TSCI), Traumatic Paraplegia, Spinal Fracture, Physiotherapy Intervention, Quality of Life

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INTRODUCTION

Traumatic spinal cord injury (TSCI) is a severe neurological issue with a global annual incidence of approximately 10 cases per 80 million people, profoundly affecting life quality and expectancy. This injury often results from external forces such as car accidents, falls, sports-related incidents, or acts of violence, causing immediate harm to the spinal cord[1-5].

Traumatic paraplegia, characterized by paralysis in the limbs below the spinal cord injury, poses significant medical challenges, becoming an unforeseen crisis in individuals' lives[6]. It is accompanied by substantial economic and social burdens, affecting both patients and their families[7]. The urgent need for research dedicated to improving patient well-being and easing social and familial strains is evident[8].

Spinal fractures, particularly at the thoracolumbar junction (T11 to L2), are predominantly influenced by accidental high falls and road traffic accidents[9]. Approximately 22% of patients experience deficits, including bowel and bladder dysfunction, paraplegia, or a combination of both. The diverse system impacts lead to a spectrum of impairments, with higher injury levels correlating with increased complications and diminished survival prospects in severe cases[10].

Beyond spine fixation, healthcare extends to implementing a structured rehabilitation and preventive management strategy that engages various personnel and includes family members in the process. Commencing early physical therapy interventions for paraplegic patients is crucial, emphasizing targeted practice and repetition[11]. Early physiotherapy management minimizes the likelihood of extended bed rest, enhancing the prospects for prompt mobility and autonomous functional activity[12].

In a specific case, following a significant fall resulting in a wedge compression fracture and subsequent paraparesis, the patient underwent surgery. The integral role of

physiotherapy in wedge compression fractures is vital for restoring the patient to their regular activities of daily living. Treatment aims to prevent complications and foster functional independence, with the goal of restoring patients to their pre-injury state.

This research paper delves into the profound impact of traumatic paraplegia, emphasizing the crucial role of physiotherapy in improving patient well-being and facilitating a return to regular activities of daily living. A comprehensive approach to healthcare, including early physical therapy interventions and a structured rehabilitation strategy, becomes pivotal in minimizing complications and enhancing the overall quality of life for individuals with traumatic paraplegia.

PATIENT'S INFORMATION

On October 6, 2023, a 28-year-old man, brought to Subharti Hospital in a wheelchair by relatives, had a history of a fall resulting in a severe back injury and an inability to move his lower limbs. During the physical examination, his blood pressure was 117/76 mmHg, his pulse rate was 82 beats per minute, and respiration rate was 18 breaths per minute. The CNS examination revealed discomfort at the thoracolumbar junction, complete paraplegia with bowel and bladder involvement, and a history of a previous fall causing a T11-T12 vertebrae fracture, which was surgically managed with pedicle screw fixation and laminectomy. Despite normal sleep and appetite, there is bladder and bowel dysfunction, requiring intermittent catheterization, and the patient relies on a wheelchair.

DEMOGRAPHICDETAILS

Characteristics	Values
Age	28 years
Gender	Male
Height	5’2
Weight	55kg
BMI	22.2kg/m^2
Occupation	Welder
Onset of injury	1 year ago
Chief complaint	Unable to walk independently and loss of sensation in both lower limbs

CLINICAL FINDINGS

The patient exhibited a mesomorphic build, presenting a limb attitude characterized by slight plantar flexion at the ankle and external rotation of the hip. A neurological examination revealed a T12 neurological level of A on the ASIA scale. Absence of sensations below the T12 level, spasticity (MAS grade 1), and complete muscle weakness (graded 0 on manual muscle testing) in the lower limbs were noted. Deep tendon reflexes were absent, while the upper limbs demonstrated normal neurological function. The modified Barthel Index score was 7, reflecting functional limitations. The patient was on intermittent catheterization due to bowel and bladder involvement.

PHYSIOTHERAPY INTERVENTION

A thorough rehabilitation approach was used to improve limb function, sensation, and functional independence for a patient with traumatic paraplegia. The treatment plan included passive range of motion and stretching exercises to improve lower limb flexibility and spasticity, bed mobility techniques to encourage independence in bed

movements, and targeted strengthening exercises such as back extension, pelvic bridging, and core muscle strengthening to support functional activities. Gait and balance training were also added to retrain standing and walking abilities, while Kegel exercises were designed to improve bowel and bladder control. Sensory re-education exercises were used to improve sensory integration, and various exercises for pelvic and core strengthening, together with static and dynamic balancing activities, were essential in improving posture, balance, and overall mobility, greatly contributing to the patient's quality of life.

RESULTS

This case study demonstrates the substantial positive impact of physiotherapy management on a patient with traumatic paraplegia. Improved limb function, enhanced sensations, increased functional independence, and specific management of bowel and bladder complications were achieved through carefully designed exercises. This shows the importance of early and comprehensive physiotherapy interventions in facilitating a meaningful recovery and improving the overall well-being of individuals with traumatic paraplegia.

DISCUSSION

This case study demonstrates the effectiveness of providing impactful physical therapy intervention to a patient with a significant traumatic spinal cord injury involving a T11-T12 fracture. In the chronic phase, the primary goal for individuals experiencing complete paraplegia is to achieve independent mobility, requiring an extended and intensive rehabilitation program.

The rehabilitation plan includes various components such as bed mobility exercises, mat activities, home exercise programs, gait and balance training, and the use of orthoses, with each exercise performed two to three times daily. After completing the rehabilitation program, the patient was successfully able to initiate the movement. The

initial coordinated effort focuses on identifying crucial markers for high-quality rehabilitation in routine clinical care for individuals with spinal cord injuries (SCI). SCI, being a low-incidence condition, encounters challenges in establishing specialist services in remote locations.

However, there is a need to improve designs and functionalities to better assist users in achieving their goals. At the start of physiotherapy, the patient exhibited an inability to move both lower limbs on the first day. When the patient returned for physiotherapy one year later, early recovery presented challenges, but a strategic emphasis on bed mobility, transferring activities, and performing Activities of Daily Living (ADLs) became the primary approach. After four weeks of treatment, the patient could initiate movement and achieve unsupported sitting. So, early implementation of physiotherapy is beneficial, as insufficient early intervention may potentially prolong the recovery time.

CONCLUSION

This case study exploring the impact of physiotherapy treatment on a traumatic paraplegia patient highlights the significant benefits and improvements that can be achieved through targeted rehabilitation.

This study underscores the importance of individualized physiotherapy programs in enhancing the quality of life, functional independence, and overall well-being of traumatic paraplegia patients.

So, this case study emphasizes the profound impact of physiotherapy on a traumatic paraplegia patient with a T12 neurological level of injury, with notable improvements through designed physiotherapy interventions, addressing deficits, and enhancing overall well-being.

The positive outcomes observed in this case study further emphasize the vital role of physiotherapists in the holistic care and recovery of individuals with paraplegia and their potential to make a meaningful difference in the lives of those facing this challenging condition.

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