



HOME-BASED OCCUPATIONAL THERAPY INTERVENTION TO IMPROVE FUNCTIONAL INDEPENDENCE IN SPINAL CORD INJURY – A SINGLE CASE STUDY.

Occupational Therapy

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ABSTRACT

Objective: To improve the functional independence in spinal cord injury patient by using home based conventional occupational therapy intervention

Methods: The study used a single case study design and used a diagnosed L2 lesion case that had undergone the following assessments: neurological assessment, American spinal cord Association scale, functional independence measure, and sensory examination. For the next three months, he received conventional occupational therapy intervention twice a week.

Results: There was a change of score on functional independence measure, muscle strength and sensory examination which shows there was improvement in muscle strength and functional outcome of the client after home based conventional occupational therapy.

Conclusion: This study suggest that using conventional occupational therapy home based interventions are beneficial in achieving functional independence in L2 spinal cord injury.

KEYWORDS

Occupational therapy intervention, spinal cord injury, functional independence

INTRODUCTION

Traumatic spinal cord injury (SCI) is a life-altering neurological illness with significant socioeconomic consequences for sufferers and their caregivers. SCI patients' diagnosis, stability, survival rate, and well-being have all improved as a result of recent breakthroughs in medical therapy. SCI is a devastating neurological illness that has a significant socioeconomic impact on afflicted people and the healthcare system.

According to the National Spinal Cord Injury Statistical Centre, there are 12,500 new cases of SCI each year in North America¹. The incidence of spinal injury in India is estimated to be 15 new cases per million per year, according to a report by the International Conference (Spinal Injuries Management, New Delhi, 1995). This amounts to 15,000 new cases per year, and the prevalence approaches 0.15 million due to a ten-year backlog². More than 90% of SCI instances are traumatic and result from events such as traffic accidents, violence, sports, or falls, according to the aetiology³. Impact plus persistent compression is the most common type of primary injury, which usually happens as a result of burst fractures causing bone fragments to compress the spinal cord or fracture-dislocation injuries^{4,5,6}. In clinical management of SCI, neurological outcomes are generally determined at 72 h after injury using ASIA scoring system^{7,8}.

Occupational therapy, as part of complex rehabilitation, is used to help patients with their occupation (self-care, work, and leisure). Occupational therapy's important role in boosting functional performance to an ideal level of independence is the use of functional activities as an activity medium⁹. Self-care training, according to S. Guidetti and K. Tham, is one of the most essential aims of occupational therapy¹⁰. It is stressed that beginning occupational treatment as soon as the patient's functional Medicinal status has been stabilised is critical¹¹. The main objective of this study was to assess the effectiveness of Home based occupational therapy intervention to improve functional outcome in patient with spinal cord injury.

METHODS:

It is a single case study design. The study was conducted in Goa and it was a home based intervention study. Conventional occupational therapy home based intervention was used to treat the patients with SCI as follows:

1. Activity based intervention to improve muscle strength in lower extremity – preparatory activities & Therapeutic activities (isometrics, isotonic movements in eliminating and against gravity, progressive resistive training by using of weighted cuff with purposeful activities), functional resistive training.
2. Sensory re-training to improve sensation – used different graded textures, task specific training, active sensory training.

3. Activities to improve activities of daily living such as dressing, eating, grooming, bathing, toileting transfer. Activities to improve bed mobility and transfer. Functional locomotion training by using walker.

Case Description

Mr. R is a 44-year old male who sustained traumatic spinal cord injury, Lumbar (L2) burst fracture after falling from the coconut tree. He was brought to the tertiary government medical centre, in Goa immediately on 20/08/2021. After 3 days of post injury, he had undergone surgery that is Decompression and stabilization of L2 vertebrae and then he was referred to occupational Therapy there on. He was undergone acute rehabilitation under occupational therapist posted in the hospital and got discharged after 20 days. On follow up after a month patient started home based conventional occupational therapy intervention.

On examination, Muscle strength, light touch, pinprick sensation were impaired below L vertebrae except for proprioception and kinaesthesia which was intact. According to American spinal cord association (ASIA) 5 the patient had an ASIA impairment scale grade -B, which indicates that he had sensory but not motor function perceived below the neurological level (ASIA 2003). His initial score on FIM was 76/126 which is described in Table 1. Lower extremity key muscles considered as per ASIA scale and grading is done by Florence P. Kendall grading (0-10), 1993, summarized in table 2 and sensory evaluation is summarized in table 3. Tone and bladder and bowel was intact.

Prior to his injury, Mr. R was living in nuclear family with his wife and two daughter. He had been a coconut pucker and a farmer for the past 25 years, and his interest is in gardening, watching TV, and socialising with friends. He was very motivated towards independence, stating goals such as being able to do his own self-care and others while using mobility aids. The problem list is based on occupational therapy evaluation. Based on the patient's stated problem, conventional occupational therapy home-based interventions were given for a total of 1 hour twice a week for 3 months.

Table 1: FIM Pre and Post occupational therapy intervention change in score

FIM	Pre- test	Post-test
Self-Care		
A. Eating	6	7
B. Grooming	6	7
C. Bathing	7	6
D. Dressing - Upper Body	2	7
E. Dressing - Lower Body	2	7
F. Toileting	1	6

Total score	24	40
Sphincter Control		
G. Bladder Management	6	7
H. Bowel Management	6	7
Total score	12	14
Transfers		
I. Bed, Chair, Wheelchair	1	6
J. Toilet	1	6
K. Tub, Shower	1	6
Total score	3	18
Locomotion		
L. Walk/Wheelchair	1	6
M. Stairs	1	6
Total score	2	12
Motor Subtotal Score	41/91	72/91
Communication		
N. Comprehension	7	7
O. Expression	7	7
Total score	14	14
Social Cognition		
P. Social Interaction	7	7
Q. Problem Solving	7	7
R. Memory	7	7
Total score	21	21
Cognitive Subtotal Score	35/35	35/35
TOTAL FIM Score	76/126	107/126

Table 2: According to ASIA evaluated key muscles by using Florence P. kendall muscle testing gradings.(Pre and Post- test score after Occupational Therapy Intervention)

Key muscles(ASIA)	Right (Pre-test)	Right (Post-test)	Left (Pre-test)	Left (Post-test)
L2 (Hip flexors)	T	8	0	4
L3 (Knee extensors)	T	8	0	1
L4(ankle dorsi flexors)	T	8	0	1
L5(Toe extensors)	T	8	0	1
S1 (Ankle plantar flexors)	T	8	0	6

Table 3: Sensory examination Pre and Post Occupational therapy Intervention:

Senses	Right	Left (Pre-test)	Left (Post-test)
Light Touch	Intact	Impaired (L3,L4,L5,S1) 80% loss	Impaired (L3,L4,L5,S1) 20% loss
Pin Prick	Intact	Impaired (L3,L4,L5,S1) 80% loss	Impaired (L3,L4,L5,S1) 20% loss

RESULTS

Periodical assessment were made with gap of 1 month duration .the muscle strength of key muscles which was taken after 3 months which has been summarized in table 4, found change in score in right and left lower limb.

His score on FIM has improved to 107/126 (overall score), his individual score was also evaluated and there were change in score in each individual component such as self care , sphincter control, transfers locomotion, mainly considered Motor components as cognitive components was not affected on FIM, and it's summarised in above table 1. Also key muscle strength after 3 month of intervention were improved in both the lower extremity, describe in table 2. Whereassensation such as light touch and pin prick were also improved to 80% and there is 20% loss on the left leg below L2 which was affected summarized in table 3.

DISCUSSION

The most devastating injury is spinal cord injury, which is connected with enormous human suffering and financial expenditures. Occupational therapy (OT) is a significant pillar of rehabilitation that focuses on increasing performance in activities of daily living (ADLs) and motor skills. and there was improving of the functional outcome in this case. Table 1 described the FIM score of the patient ,which is improved after the intervention on both overall and individual score of each motor components, of which client was able to do most of the self-care independently , able to transfer independently on chair , bed , toilet by using walker and was able to walk more than 10 meter using assistive device i.e, walker. In a related study Aatik Arsh et al.,2020,

found Occupational therapy significantly improves daily living performance in patients with complete cervical tetraplegic spinal cord injury.¹²

Table 2 and 3 reveal the baseline and post intervention score of both lower extremity key muscle strength and sensory impairment of left lower limb (L3-S1). It was improved post occupational therapy intervention , there were more improvement in the right lower extremity strength then the left and also there was 80 % of improvement of sensation that is light touch and pin prick on the affected left lower extremity . As describe by Annemie I. F. Spooren et al., 2009 In cervical spinal cord injury patients, motor training programmes may enhance arm and hand function and/or activity levels¹³. The client achieved the goals that he stated earlier, prior to his occupational therapy intervention, of being independent in self-care, locomotion, and transfer by using at least one assistive aid.

CONCLUSION

This case study indicates that using conventional occupational therapy home-based intervention is beneficial in achieving functional independence in spinal cord injury patients at the L2 level.This will allow for functional independence in people with lower level spinal cord injuries.

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