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Comparative study of 4 weeks of task specific training versus conventional physiotherapy on sitting balance in patients with spinal cord injury: A randomised controlled trial

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Abstract
Background & objectives: Spinal Cord injury (SCI) can cause temporary or permanent changes in normal motor or autonomic function of the spinal cord. These changes can negatively affect a person's functioning and quality of life, also leading to postural instability in sitting balance. Physical rehabilitation after spinal cord injury (SCI) aims to optimize motor function, mobility and to improve stability and postural control especially in sitting, as it is the most adapted position. Objective was to study the difference between the effect of Task specific training and Conventional Physiotherapy on sitting balance in patients with Spinal Cord Injury.
Methods: 24 participants were involved. Group A were given Conventional Physiotherapy and Group B were given Task-specific Training for 4 weeks duration and the sitting balance was assessed by the t-shirt test, modified functional reach test, and the BOBO Pro Pre and Post intervention.
Results and Interpretation: Then data analysis was done using paired and unpaired 't' test. Results showed statistically significant improvement in Group B than Group A.
Conclusion: The Task- Specific Rehabilitation was more effective than Conventional Physiotherapy and has better long term effect on Sitting balance and Trunk control in patients with Spinal cord injury.

Keywords: sitting balance, spinal cord injury, conventional physiotherapy, task-specific rehabilitation, trunk stability.

Introduction

Spinal Cord injury (SCI) can cause temporary or permanent changes in normal motor or autonomic function of the spinal cord. These changes can negatively affect a person's functioning and quality of life [1]. The types of disability associated with spinal cord injury (SCI) vary depending on the extent of the injury, the segment of the spinal cord, and the nerve fibers affected. Disability is associated with the loss of sensory functions such as tactile, pressure, and thermal sensation due to motor dysfunction and damage to motor nerve fibers in the brain stem and limbs, resulting in impaired balance in walking, standing, and sitting [2]. Individuals with spinal cord injury (SCI) show significant motor and sensory impairment below the injury site, leading to postural instability in sitting balance without trunk support [3]. These changes can negatively affect a person's functional status and quality of life [1] Most functional activities such as eating, dressing, and moving are performed by people with paraplegia in a chair. Any limitation in the ability to safely shift the body's center of gravity to stability can limit wheelchair mobility and activities of daily living (ADL). Therefore, for people who cannot stand, sitting balance is very important for functional independence [1]. This disability can limit the scope of daily life of SCI patients. In patients with SCI, the higher the level of injury, the greater the loss of muscle strength and sensation. Although partial nerve innervation remains in the muscles, patients experience impaired balance, which impairs their ability to maintain postural stability in order to place their center of gravity on the support surface. Most SCI patients are involved in activities that require prolonged sitting [2].

The National Spinal Cord Injury Statistics Center estimates that the prevalence of SCI is approximately 291,000 people. In contrast, a systematic analysis using GBD data estimated the prevalence of SCI to be 2.6 million individuals in the US. Another CDC study estimates that there are 1.5 million individuals with SCI. Jain *et al* estimated the incidence rate to be between 52 and 54 cases per 1,000,000 based on NIS data from 1993 to 2012 [4].

One of the most important neurological outcomes is the conversion of a neurologically complete to an incomplete injury and vice versa. In the previous article conversion specifically refers to a change from an initial neurologic complete to an incomplete status (AIS A to AIS B -E) or from initial incomplete to neurologically complete injury (AIS B-D to AIS A). The conversion rate from neurologically complete to incomplete injury in tetraplegia is higher than in paraplegia—nearly double that of paraplegia in some studies. the likelihood of conversion is greatest for lumbar SCI, followed by cervical and lower thoracic levels, with the lowest likelihood of conversion for upper thoracic lesions [5].

Sitting balance is impaired in individuals with complete spinal cord injury (SCI) due to impaired functionality of muscles primarily responsible for postural control. Other mechanisms, such as normal postural synergy and sensory-motor integration of the lower limbs and trunk, are also disrupted. However, it has been proposed that after SCI, the gradual development of specific motor synergies for controlling balance while sitting, involving non-postural muscles, would lead to reorganizing the individual's balance control system [6].

Conventional physical therapy also includes strategies for group exercise of ankle and hip strategies, including postural adaptations from simple stretch reflex responses to activation of specific movement strategies (synergistic patterns). Muscles close to the BOS are especially important for maintaining balance. When LOS is reached due to COM disruption, the rate of postural response increases [7, 8]. About balance, task-specific rehabilitation similarly focuses on achieving three main functional goals, including balance. First, maintaining antigravity postures such as sitting or standing, second, anticipatory postural control during spontaneous locomotion, and finally, reactive postural control during unexpected perturbations [11].

BOBO Pro includes the BOBO BALANCE BOARD (BBB) and balance tests, balance games, and training programs to help patients balance using the BOBO Tab with BOBO's built-in software that provides wireless connectivity to the BBB, includes training and evaluation. mFRT is used in the non-ambulatory SCI population, as the majority of ambulatory and non-ambulatory motor SCI patients remain sedentary. The mFRT has good or excellent reliability in assessing sitting balance performance in SCI patients. The T-shirt test is a reliable and valid tool for assessing sitting balance in people with SCI.The T-shirt test has good ICC values (0.79 to 0.91). Measure how long it takes participants to put on and take off the t-shirt [1].

Rehabilitation after a spinal cord injury becomes imperative to start because it helps to focus on solving and working on the disability and leads to the recovery of the patient and improves his quality of life. Conventional physical therapy rehabilitation has its place in the training and treatment of spinal cord injury patients and demonstrates many aspects of recovery. On the other hand, task-specific rehabilitation is a recognized treatment protocol in patients with SCI, as it helps to improve stability and postural control in performing activities of daily living, especially in sitting, as it is the most adapted position. these patients. Both approaches are useful to their extent, but which one may prove to be more effective in achieving good sitting balance needs to be studied.

As various functional activities require most of the daily living tasks to be performed by challenging the balance in SCI patients in sitting position, therefore this study would focus on the extent to which task specific training versus conventional physiotherapy, which one could be more helpful in improving the sitting balance in these patients thereby studying the effectiveness of the interventions in individuals with Spinal Cord Injur

Materials and Methods

24 participants using purposive sampling were randomly allocated into the two groups. After obtaining the approval from the Institutional Ethical Committee participants were explained about the proposed benefits, risks and procedures involved in the study, in a language best understood by them. Participant willing to participate in the study were screened for inclusion and exclusion criteria. Participants meeting the study criteria were included in the study. During the initial clinical evaluation, to assess the sitting balance modified Functional Reach Test, BOBO balance board and T-shirt test were used at the time of admission and then patients sitting balance was assessed at Baseline, after 2 weeks and after 4 weeks of intervention, then patients divided on basis of random allocation in two groups i.e. Group A and Group B. The patients in Group A were given Conventional Physiotherapy which included 5 exercises for 2 minutes each with 14 minutes per session and for 7 days and 4 weeks. For Group B Task-specific training were given including 6 task specific exercises for 2 minutes each with 17 minutes per session for 7 days and 4 weeks.

Table 1: Conventional Physiotherapy Protocol

Coventional exercises				
Exercises	**1ST**	**2ND**	**3RD**	**4TH**
Forward sway	10	50%	50%	50%
With patient in sitting position	repetitions	repetitions	repetitions	repetitions
patient was asked to move over		per week	per week	per week
the feet in contact towards the		was added	was be	was be
forward direction.			added	added
Backward sway	10	50%	50%	50%
With patient in sitting position	repetitions	repetitions	repetitions	repetitions
patient was asked to move over		per week	per week	per week
the feet in contact towards the		was added	was added	was be
backward direction				added
Raising Both Arms	10	50%	50%	50%
Ovrhead	repetitions	repetitions	repetitions	repetitions
With no back support in the		per week	per week	per week
sitting position patient was		was added	was added	was added
asked to raise both arms above				
the shouder level.				
Catch a weighted ball	10	50%	50%	50%
The patient was given a	repetitions	repetitions	repetitions	repetitions
weighted ball in hand and asked		per week	per week	per week
to hold it firmly.		was added	was added	was added
Perturbations	10	50%	50%	50%
The patient had to maintain a	repetitions	repetitions	repetitions	repetitions
stable position while the		per week	per week	per week
therapist gave nudges from all		was added	was added	was added
directions.				

Table 2: Task Specific Exercises

Task - Specific Rehabilitation				
TASK	**1st Week**	**2nd Week**	**3rd Week**	**4th Week**
1.Tying Untying Knots	10 repetitions	50% repetitions per week will be added	50% repetitions per week will be added	50% repetitions per week will be added
2. Catch throw balls	10 repetitions	50% repetitions per week will be added	50% repetitions per week will be added	50% repetitions per week will be added
3.Pick objects off the floor	10 repetitions	50% repetitions per week will be added	50% repetitions per week will be added	50% repetitions per week will be added
4.Passing objects around body	10 repetitions	50% repetitions per week will be added	50% repetitions per week will be added	50% repetitions per week will be added
5.Taking clothes on and off	10 repetitions	50% repetitions per week will be added	50% repetitions per week will be added	50% repetitions per week will be added
6.Buttoning a shirt	10 repetitions	50% repetitions per week will be added	50% repetitions per week will be added	50% repetitions per week will be added

Outcome measures

1. Modified functional reach test

Functional reach in the sitting position was assessed using the modified functional rreach test which measured distance in centimeters with 3 trials and 3 conditions: i. Sitting with the unaffected side near the wall and leaning forward. ii.Sitting with the back to the wall and leaning right. iii.Sitting with the back to the wall leaning left. In patients with Spinal Cord Injury, reliability of modified functional reach test for the assessment of sitting balance function in people with spinal cord injury was reported as good to excellent with interclass coefficient values ranging from 0.78 to 0.99. [10, 12]

2. T-shirt Test

The t-shirt test is a reliable and valid tool for assessing sitting balance in spinal cord- injured persons. The t-shirt test has a good ICC value (0.79-0.91). It measured the time taken by participants to put on and take off a t-shirt. For the test, one standard size pullover type t-shirt and one t-shirt that was one size larger than what the participant would normally wear. The t-shirts were placed on a table of standard height in front of the participant. The participant was required to put on and take off the t-shirt, resting between each maneuver. The time taken for the whole activity was recorded. The test was repeated twice for each size of the t-shirt provided, and the average was taken for the final analysis [1, 12].

3. BOBO Pro

The sitting balance will be measured on The Bobo Pro with help of the Bobo board and the Bobo tab wherein the participant will be sitting on the Board which will be kept on a low platform for assessing the change in balance. This will be performed on a chair without handles so as to assess balance in different directions as the participant will be required to move in all directions. This will be recorded on the tab which will be kept in front of the participant which will instruct to perform the movement as per the already customised task.

Statistical Method

The Data analysis was done using GraphPad Instat 3. Descriptive statistics was used to analyse the demographic data of all participants.

Results

Paired t-test was used to compare pre and post interventions mean obtained from Sitting balance within the groups. Unpaired t-test was used to compare the post interventions mean difference obtained from Sitting balance between the groups. P value < 0.05 was considered Statistically significant for entire test.

Table no. 3 shows Basic Characteristics of all participants.24 patients were recruited in the study which were then divided into two groups Group A & Group B with 10 males and 2 females and 10 males and 2 females respectively. Patients with cervical injury were 25% in Group A and 17% in Group B, patients with thoracic injury were 58% in Group A and 50 % in Group B, patients with lumbar injury were 17% and 33 % in Group A and B respectively. Patients in Group A had 67% participants with ASIA Grade A, 17 % with Grade B, 17% with Grade C. Patients in Group B had 25% with Grade A, 42% with Grade B, 25% with Grade C and 8% with Grade D.

Table no. 4 shows within group analysis of Group A - Conventional Exercises pre and post intervention. Time to perform t-shirt test decreased post intervention and shows statistically significant with ($t= 9.286$) ($p<0.05$). Functional reach distance increased post intervention for centre ($t=8.638$) ($p<0.05$), for right ($t=9.507$) ($p<0.05$), for left ($t=11.22$) ($p<0.05$). There was Statistically significant improvement in BOBO Pro sitting percentage ($t= 10.04$) ($p<0.05$).

Table no. 5 shows within group analysis of Group B - Task specific Training pre and post intervention. Time to perform t-shirt test decreased post intervention and shows statistically significant with ($t= 7.60$) ($p<0.05$). Functional reach distance increased post intervention for centre ($t=7.07$) ($p<0.05$), for right ($t=10.01$) ($p<0.05$), for left ($t=11.19$) ($p<0.05$). There was Statistically significant improvement in BOBO Pro sitting percentage ($t= 14.44$) ($p<0.05$).

Table no. 6 shows between group analysis of Group A and Group B post intervention. Time to perform T-shirt test decreased post intervention but Group B shows more effective with as compared to Group A and is statistically significant with($t=2.27$) ($p<0.01$). Functional reach distance increased in both the groups but more difference is seen in post intervention of Group B for forward ($t= 2.25$) ($p<0.001$), right ($t=2.54$), for left ($t=2.46$). There was significant improvement in sitting percentage by BOBO($t=2.34$) ($p<0.01$).

Table 3: Basic chararcteristics of all participants

		Group A n(%)	Group B n(%)
Gender	Male	10 (83%)	10 (83%)
	Female	2 (17%)	2 (17%)
Neurological level of injury	C1-C8	3(25%)	2(17)
	T1-T12	7(58)	6(50%)
	L1-L5	2(17)	4(33)
ASIA Grade	A	8(67%)	3(25%)
	B	2(17%)	5(42%)
	C	2(17%)	3(25%)
	D	0	1(8%)
	E	0	0

Table 4: Comparison of within group analysis of sitting balance on conventional physiotherapy -group a

Outcome measures			Mean ± SD	t value	Significa nce
Sitting balance	T shirt test	PRE (baseline)	19.91±4.05	9.286	Extremely Significant
		POST (week 4)	15.41±3.8		
	Mfrt - Centre	PRE (baseline)	17.25±9.45	8.638	Extremely Significant
		POST (week 4)	25±9.6		
	Mfrt - Right	PRE (baseline)	10.5±6.417	9.507	Extremely Significant
		POST (week 4)	15.7±6.196		
	Mfrt - Left	PRE (baseline)	9.916±6.417	11.22	Extremely Significant
		POST (week 4)	15.75±6.137		
	BOBO Pro	PRE (baseline)	19.83±10.96	10.04	Extremely Significant
		POS (week 4)	45.58±13.19		

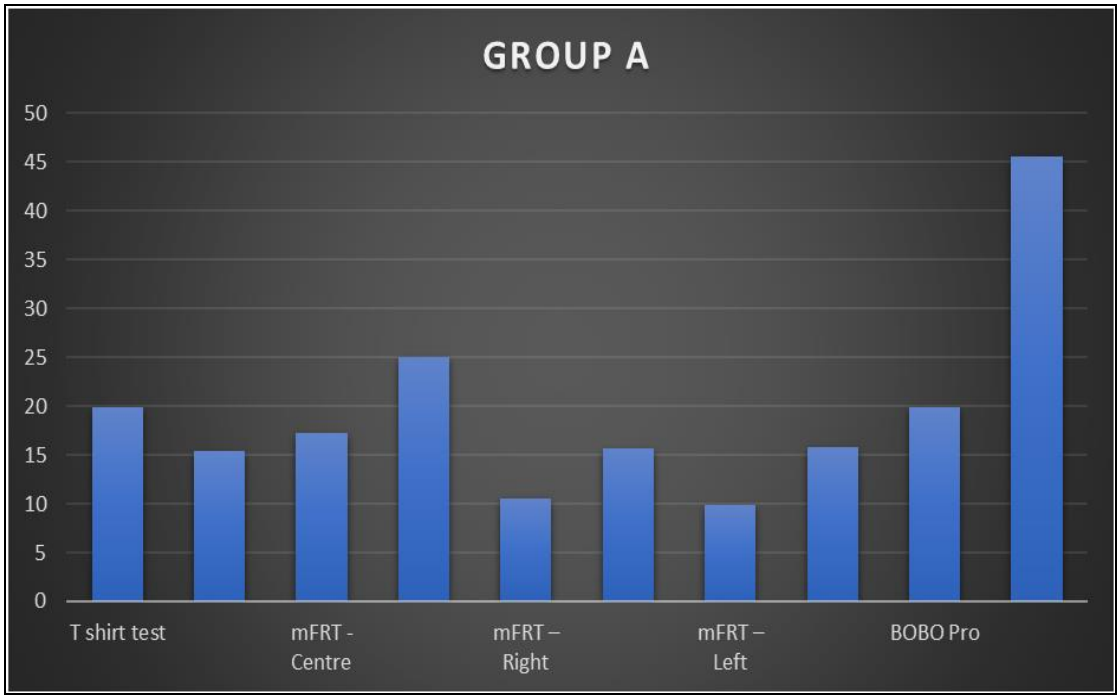


Table 5: Comparison of within group analysis of sitting balance on task specific training - group B

			Mean ± SD	t value	Significanc e
Sitting Balance	T shirt test	PRE (baseline)	16.83±5.09	6.82	Extremely Significant
		POST (week 4)	9.6±2.60		
	Mfrt - Centre	PRE (baseline)	20.83±11.58	7.45	Extremely Significant
		POST (week 4)	35.83±5.93		
	Mfrt - Right	P R E (baseline)	10.45±5.33	8.69	Extremely Significant
		POST (week 4)	23.25±3.27		
	Mfrt - Left	PRE (baseline)	10.58±5.82	9.44	Extremely Significant
		POST (week 4)	22.33±2.64		
	BOBO	PRE (baseline)	20.91±10.89	14.14	Extremely Significant
		POST (week 4)	63.3±17.35		

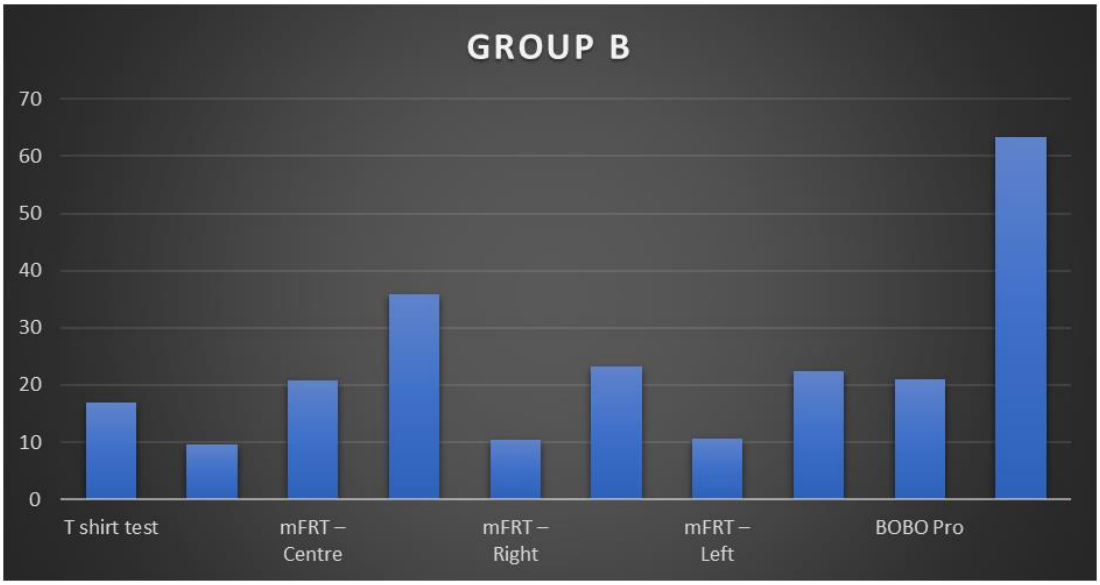
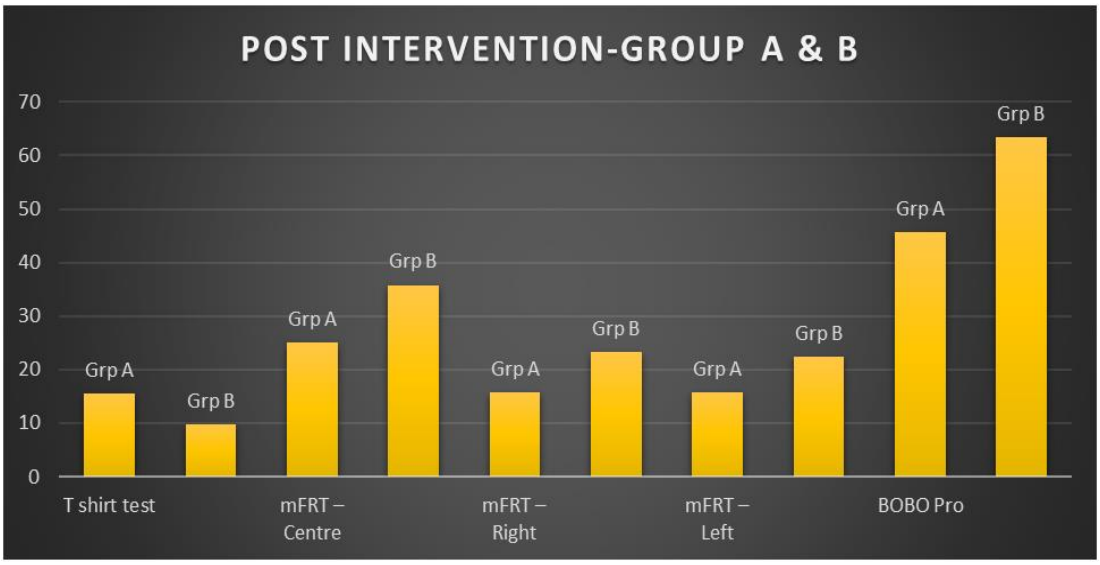


Table 6: Comparison of between group analysis of sitting balance on conventional physiotherapy and task specific training-post intervention

Outcome measures	Mean ± SD		t value	p value	Result
	Post conv. Pt	Post task specific training			
T shirt test	15.41±3.8	9.66±2.60	3.31	0.003	Very Significant
Bobo percentage	45.58±13.19	63.33±17.35	2.82	0.01	Very Significant
MFRT Centre	25.0±9.6	35.8±5.93	2.25	0.003	Very Significant
MFRT Right	15.75±6.19	23.2±3.27	3.70	0.001	Very Significant
MFRT Left	15.75±6.13	22.33.±2.64	3.41	0.002	Very Significant



Discussion

This Experimental Study focused on the comparison of Conventional Exercises and Task Specific Training on Sitting balance in patients with Spinal Cord Injury. The study demonstrated that there is significant difference between Conventional Exercises and Task Specific Training on Sitting balance in patients with Spinal Cord Injury in favour of Task Specific Rehabilitation. Sitting balance training is a form of exercise programme involving the aspects of attaining postural stability and trunk control to perform various activities of daily living in the sitting position as it is one of the most adapted positions by the spinal cord injury population. Both the techniques have been proved to be effective in clinical settings for improving the sitting balance in patients with spinal cord injury. So the study aimed to compare both techniques i.e. effect of conventional physiotherapy and task-specific training on Sitting balance in patients with Spinal Cord Injury.

There has been a significant improvement in terms of the T-shirt test, i.e. the time required to put on and take off the shirt, as well as for the modified functional test for the forward, right and left directions based on the ability of multidirectional reach after 4 weeks of intervention. In addition, there was a significant increase in the Bobo Pro percentile, that is, the level at which they maintained their sitting balance during the sitting challenge. Standard physiotherapy shows improvement in sitting balance leading to improved trunk control measured by T-shirt test, modified functional test and BOBO Pro. The time needed to complete the t-shirt test before the treatment was compared to after the treatment, which was significantly reduced by 4 seconds, indicating improved sitting balance.

The mean interference of the modified forward guidance function was 17 cm before and 8 cm after the standard treatment. The growth function of the right direction changed averaged 10 cm and increased to 15 cm after 4 weeks of intervention. Modified left-sided functional maturity showed similar results to right-sided functional maturity after treatment. The average percentage of BOBO Pro was 19% and after 4 weeks of treatment the percentage increased to 45% and showed a significant improvement in sitting balance.

A similar study by the authors of Khurana et.al (2017) revealed significant changes in T-shirt scores and functional range after 4 weeks of training based on a Virtual Reality Game. The results suggest that the improvements in the participants may be due to their performance in games played through the exercises of VR, which require the participants to be less anxious. The degree of difficulty participants experiences in controlling their center of gravity during dynamic activities can account for significant variations in balance performance.

There is a significant improvement in terms of the T-shirt test, i.e. the time to put on and take off the shirt in the seat and the modified functional test for the forward, right and left directions depending on the availability of the seat. Status after 4 weeks of work. In addition, there was a significant increase in the Bobo Pro percentile, that is, the level at which they maintained their sitting balance during the sitting challenge.

Exercise performed in the sitting position showed improvement in the T-shirt test, modified functional test, and sitting balance as measured by BOBO Pro. Before the treatment, the time needed to fill the t-shirt was better than sitting and compared to after the treatment, which was reduced by 7 seconds. The modified forward-directed functional mean intervention was 21 cm before and increased by 15 cm after conventional treatment. The growth function of the right direction changed averaged 10 cm and increased to 23 cm after 4 weeks of intervention. Left side function changed increased by 12 cm after treatment. Functional maturity has improved significantly in 3 areas. The average percentage of BOBO Pro is 21% and after 4 weeks of treatment the percentage increases to 63% and shows an improvement of 42%. Another study by Misbah *et al* 2018 showed that the functional independence of spinal cord injury patients improved after work-specific training. According to Cynthia *et al* 2017, the addition of task-specific balance training shows moderate evidence that this training may be beneficial for patients in the chronic phase, as was the case in this study. They agreed with the study of Fouad 2012, which supports the idea that many learning problems can be improved in everyday situations. Finally, the work prepared must be determined by the daily tasks and deficits that each person faces.

Camila Quel de Oliveira (2019) explores the underlying mechanisms that explain participants' progress in balance, mobility, and independence. One possibility is that the ABT program might have improved motor learning and motor control due to its repetitive and intensive pattern. The participants can learn new compensatory strategies to move their bodies by using their spare muscles more effectively. In addition, ABT activities involve high repetitions and low-load exercises, which can increase intrinsic or partial intrinsic muscle strength and endurance, increase the physical capacity of participants, and contribute to mobility, independence, and balance. The next hypothesis is that the neuroplastic changes caused in the spinal cord or brain may have been due to ABT.

However, the current study showed that individuals with both motor (AIS class A and B) and incomplete motor (AIS C and D) lesions showed improved balance in locomotion and sitting. The exception is independence, where great changes occur in individuals with complete motor injuries. Recovery in patients with complete spinal cord injury is delayed compared to patients with complete spinal cord injury.

Marcus *et al* found that when sitting in a person with complete motor paraplegia, the point of contact with the supporting surface determines the BOS and thus includes the legs, pelvis, and hands. Characteristic in the case of impaired lower limbs is the inability of the legs and feet to actively participate in maintaining balance. That is, if the center of mass moves forward, the foot increases the pressure of the foot on the ground and does not resist the increasing moment of the upper body around the kidney. Even if the center of mass is also located in the BOS, the balance becomes unstable. It is expressed as the limit of soil stability at which equilibrium can be maintained. The stability threshold in patients with complete motor paraplegia is significantly lesser compared to their BOS. When leaning back, the legs offer no resistance to compensate for the mass moving to the rear limit of the stability limit. This means that people with complete motor paraplegia need their hands to maintain balance when sitting unsupported (without a back). Often, at least three points of contact with the ground are required to determine the stability limit. Optimal balance is achieved when the rotational moment of the upper body is distributed evenly across the three points of contact. This in turn means that the arm is involved in the balance of the upper body and trunk. Contact points or other areas must be created to free one arm from supporting work, for example the wrist (wrist and elbow) of one arm. This principle, the limit of stability and the location of the center of mass, is an important factor in everyday life in patients with complete motor paraplegia, for example, reaching a cup, lifting a leg, driving a wheelchair. Gauthier *et al*. According to the study, the implementation of this measure in 2013 had an impact on the balance of unsupported seats. Compared with patients with complete motor paraplegia, people with iSCI who have partial or complete voluntary control of abdominal and lower trunk muscles generally have more stable sitting balance. In these patients, there are less impairments sitting balance which in turn gives scope for doing ADL, but challenging them for tasks requiring more demanding stability balance becomes more difficult during the transition to these tasks, such as standing and walking.

The current study showed that the intervention given to both groups was effective in terms of improving balance and postural control, despite conventional physiotherapy and task-specific exercises. However, task-specific training showed a more significant improvement in all results. A similar study by Harvey *et al* 2016 described neural plasticity and neural recovery after SCI, leading to the

emergence of the new term 'activity-based therapy'. Activity-based therapy has been heralded by some as a new approach to physiotherapy for people with SCI, but it is difficult to understand exactly what this term means. A key aspect of activity-based therapy is context-intensive and task-oriented practice that involves several hours of practice a day, unlike those advocated by Carr and Shepherd in the 1980s. However, "progress sequence" includes exercise, strength training, treadmill, or non-electric or robotic walking. Proponents say it is innovative because it combines function and nerve recovery below the injury level. This form of therapy is argued to be quite different from traditional or "conventional" therapy, which some argue only teaches compensatory strategies without focusing therapy below the level of injury.

Anecdotal evidence suggests that this is not a definite contrast, and that the therapeutic focus of physiotherapists predated the advent of activity-based therapy, particularly for those with motor symptoms. Now there is evidence from this trial that intensive physiotherapy improves sitting balance for both complete and incomplete injuries. Some argue that this supports a new type of treatment, so the trial provides long-term evidence to demonstrate the therapeutic benefits of intensive and comprehensive physiotherapy programs.

Another study by Cynthi a *et al* (2017) shows that task-oriented training interventions can be useful for sitting and standing balance, but available randomized controlled trials do not suggest that task-oriented training improves the effect of standard physical therapy. while sitting or standing. In general, even after incorporating the task-specific training for balance it does not seem to significantly improve the sitting ability achieved through conventional rehabilitation. However, there is moderate evidence that this exercise can be beneficial in the long term.

Another author, Padula *et al* (2015) [42] observed a significant improvement in the motor function of chronic SCI patients after a 6-month multimodal intensive treatment program (activity-based therapy, ABT), but found no improvement in quality of life and participation. Jones 2012 [44] noted in their work that although the effect of ABT on functional recovery and especially on walking appears to be low, this result is relevant for chronic SCI. This is comparable to the improvement reported by the control group participants in their study and significantly less than the improvement noted for the ABT participants.

Based on what Nair *et al* 2022 [45] studies suggested, the combination of VRT and conventional therapy showed a significant increase in MFRT intervals in all domains compared to conventional therapy alone. However, the combination of VRT and conventional therapy was as effective as conventional therapy alone in increasing the time required to do the T-shirt test, as there was no significant difference between the two groups.

This study by Jones (2014) [43] infers that intensive therapy based on certain activities has the opportunities to better the chances at performance neurologically and also giving way to walking ability improvement in chronic individuals with non-motor SCI. Significant changes in response to therapy were also noted. Therefore, additional analyzes were conducted to determine in whom ABT could lead to clinical improvement.

Conclusion

The conclusion of the present study is that Task- Specific Rehabilitation is more effective than Conventional Physiotherapy and has better long-term effect on Sitting balance and Trunk control in patients with Spinal cord injury.

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