

Effect of Task Oriented Training on Functional Independence In Stroke Survivors- A Case Series

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ABSTRACT

Background

World Health Organization defines Stroke as a condition with rapidly developing clinical signs of focal loss of cerebral function, with symptoms lasting longer than 24 hours or leading to death with no apparent cause other than of vascular origin.[1] It is the third most common cause of mortality in developed countries following heart diseases and cancer. Stroke causes a variety of deficits including motor impairments. Following this impairment stroke survivors suffer from decrease ability to perform Activities of Daily Living. Thus our purpose of this case study to find out the efficacy of Task oriented training program with a clinical evidence for stroke patients for improving their functional abilities.[2]

Methods

Study design-A total of 5 patients in this series have clinical evidence of hand function limitations and each underwent a similar treatment program consisting of 3 phases: upper limb muscle activation, reaching and grasping, and in hand manipulation. **Outcome measure**-Functional Independent Measure all the patients have shown improved hand functions. Increase independency and self-care, improved activities of daily living.

Results

The pre and post FIM score mean were 93.8 and 113.8 and 20 was the mean difference. The pre and post BBS score mean were 32.2 and 40.2 and 08 was the mean difference. It has been proved this study is clinically significant.

Conclusion

All stroke survivors responded well to this program. This case series suggested that patients with clinical evidence of stroke can show a remarkable improvement with Task Oriented training.

KeyWords: Stroke, Activities of daily living, task oriented training, functional independent measure.

Introduction

The commonest problem in growing countries is health care and disease control. The leading causes of physical impairment were neurological, musculoskeletal diseases etc. Among the neurological disorders cerebro-vascular accident is known as Stroke. The prevalence of stroke subsequently increased as the age which is a risk factor. Other factors might influence the incidence of stroke are gender and race. The worldwide incidence was reported as 2/1000 population per annum(p.a); in population aged 45-84 years around 4/1000.[1] The incidence of cerebrovascular disease in India was found to be 13/100,000 population p.a in a study in Vellore, Tamilnadu and 33/100,000/year in a study in Rhotak, Punjab.[3]

Cerebrovascular diseases can be defined as an interruption of blood flow to the brain resulting in a number of focal neurological deficits that last longer than 24 hours[1]. The World Health Organization defines stroke as “a condition with rapidly developing clinical signs of focal loss of cerebral function, with symptoms lasting longer than 24 hours or leading to death with no apparent cause other than of vascular origin”. [3]

Stroke disorders are the most common ischemic stroke that affects 80% of the population; it happens when a thrombus blocks blood flow and deprives the brain of essential oxygen and nutrients; Hemorrhagic stroke occurs when the blood vessels break and blood leaks in or around the brain.[1] A variation of shortfalls occurs following stroke such as altered consciousness, sensory and motor impairments, cognitive, perceptual, language dysfunction, hemiplegia or

paresis. Impairments decrease as tissue of brain boosts within 3 weeks. Residual signs are those that occur for more than 3 weeks and lead to disability or injury.[4]

In a course of neurological recovery by spontaneously happens within the initial few weeks when penumbral area recovers their function and it is fast within the first 3-6 months. Regular functional recovery occurred in the presence or absence of normal neurological recovery through adaptation and learning. This lags the neurological recovery by 2 weeks and it is mostly assisted by rehabilitation. It helps to improve independency level in areas of self-care and mobility; and it depends on quality and intensity of therapy, on patient's motivation and; is modifiable by interventions.[2]

Post ischemic stroke with spontaneous recovery referred to the mechanisms of neural recovery, occurring innately within brain. An acute ischemic stroke is a dynamic process with damage to brain tissue evolving over a short period of time, initial reduction of blood supply results in two identifiable areas of damage "core" and "penumbra". Reperfusion stage shows elevated blood pressure to facilitate in perfusion of salvageable penumbra, Recanalization of brains vasculature through thrombolysis therapy promotes reperfusion.[4]

Stroke is often associated with a decreased in activity of daily living (ADLs) such as self-care e.g. dressing, bathing, grooming, feeding, toiling, and transfers. The early rehabilitation process is aimed at improving the quality of life and minimizing disability. Authors aimed to treat the stroke survivor to be independent in their ADL at earliest. Task-oriented training approach was used to accomplish this. To find the impact of task-oriented training role in stroke survivors in the upper / lower extremities.[5]

Methodology

Task-oriented training is a therapeutic technique used in neurologically impaired patients, it is client and not the therapist's own task. It is patient and task specific not physiotherapist. This included training to improve the capacity of the patient to achieve goals for completing the task and to develop problem solving skills and successful compensatory techniques by improving the adaptability of the patient in various circumstances. Study design: Case series with experimental study. Outcome measures: Functional Independence Measure (FIM) is an 18-point physical,

psychological and social function measure that is part of the uniform medical rehabilitation data system. The FIM uses the extent of assistance and individual needs to assess the functional status from total independence to total support.[6] The Berg balance scale is an objective measure of the ability to balance static and dynamic. This consists of 14 commonly performed functional activities in everyday life.[7] All the following cases have given informed consent to undergo for case study.

Case Description-I

A 62 year old female had a history of stroke 2 years back. She is suffering from left side upper and lower limb weakness with difficulty in ADL, problem in doing household work independently, stiffness in left hand along with difficulty in grasping, holding and carrying any object with left hand. At present she had a stroke 2 years before without any relevant history. In April 2016 at early morning when she was getting up from bed she fell down and became unconscious. She was immediately admitted to a nearby hospital in Phagwara, found on examination the ischemic stroke on right cerebral hemisphere with left side body paralysis. Past Medical History: no history of hypertension, diabetes, dyslipidemia with a family history of stroke.

On Observation the patient was ectomorph, with slight kyphotic posture, attitude of left upper limb with shoulder slightly adducted, internally rotated; elbow extended; wrist flexed; fingers flexed; left lower limb; hip extended; knee extended; ankle slightly plantar flexed; toes flexed. Deformation included flexor contracture of fingers and toes of left side. Circumduction gait and muscle tone was firm with bony end feel.

On Examination patient was conscious, well oriented with difficulty in completing complex sentences, divided attention. She had difficulty in opening the left hand along with grasping, holding, carrying objects, poor hand coordination, flexor contracture of fingers and reduced muscle strength of upper limb with reduced range of motion as well as limitations of ADL.

Case Description-II

A 56-year-old female stroke patient with weakness on left side of the body with impaired speech, breathe and household activities. She was hypertensive since 10 years. A sudden onset of symptoms on April 4th, 2017 at early in the morning she had fallen down while making breakfast in the kitchen. Her dependents spotted this and immediately admitted to a hospital where she got emergency care given. Later after 20 days she got a second episode of attack which left her with slurred speech, facial deviation towards her left side, weakness in left side of body, inability to maintain an erect posture and impaired coordination. As mentioned she had a long history of hypertension and diabetes. She felt a dull aching pain in the anterior aspect of left shoulder as a gradual onset from past month, which got aggravated by elevation movements and relieved by rest. In her family, one of her elder sister had a similar history. Her vitals were normal.

Case Description-III

A 54 year old female was presented with a right side hemiplegia since 4 months. It was a sudden onset while she was washing clothes, with complaints of weakness in the right extremity, pain on passive movements of shoulder and hip which disrupted her ability to work and ADL. Symptoms of pain were aggravated by any active movements in the shoulder and hip in all planes. Her past medical history includes hypertension for the past 8 years and she took hypertensive drugs for the same. On examination of dermatomes, myotomes and reflexes were intact. Motor examination revealed a decrease in muscle power of right side biceps, triceps (grade 2+), quadriceps, hamstring (grade 3+). A Berg balance scale was measured less than 45 which were at the great risk of falling. On observation the patient was found to have difficulty in walking as she was limping while walking with pain on NPRS scale 6 out of 10.

Case Description -IV

A 65 year old male admitted with diagnosis of left hemiplegia who complained of ipsilateral weakness and pain. He was under medication for anti-hypertensive since 5 years and hypoglycemic drugs about 2 years. He was a smoker with a past medical history of coronary angioplasty and diabetes management. On evaluation he had difficulty in fine motor skills

included hold, grasp and transfers. Functional independence measure was rated as (104/126) and for balance scale was measured as (44/56) in BBS. Manual Muscle Test of upper and lower extremity graded to be as 3 and ROM was restricted due to pain. On observation, he had a stooped posture with a rounded and protracted shoulder. The right hip has been extended, adducted and rotated internally; the right knee has been extended and the right ankle has been flexed, the right shoulder has been rotated and adducted internally and the right elbow has been completely flexion of wrist and fingers. Both sitting and standing balance were diminished, declined ability to carry out self-care tasks.

Case Description-V

An 84-year-old patient with left hemiplegia came with complete difficulty in ADL due to weakness of right upper and lower extremity. Stroke impairments were difficulty in grasp, hold, reach, walk or balance due to the tight muscles of right upper hand unable to open the hand. Patient had a history of hypertension since 10 years. FIM measurements were noted which is 97 out of 126, balance scale BBS was showing 36 out of 56. On past medical history he slipped down in bathroom where he lost his consciousness and treatment later he developed weakness of one side of body and was on wheelchair since 6 months.

Therapeutic Interventions

The patient was treated in OPD for a period of 3 to 4 days in a week. Task oriented training was applied to patient's hand to improve hand function. Initially the patient was trained for forward and sideways reach with assistance. Weight bearing on hands while sitting so as to improve the proprioception of joints. Once the patient able to perform previous one, then task for hand functions activities includes grasping different shape and textures using objects such as bottle, glass, ball, pen, plastic bag, etc. Holding and placing objects from one place to another. She was taught buttoning and unbuttoning of shirt, folding and unfolding the clothes, placing rubber band on finger tips and trying to open the hands, opening and closing bottle, pouring water in glass. To improve fine motor skills by picking and placing key in lock, holding pen, picking and placing marbles in bottle, placing nails in holes, cutting paper with scissor, making shapes with clay, building blocks and solving game puzzles.

Protocol for Task Oriented Training (TOT)

Upper extremity hand rehabilitation task were given to patient. For example: Grasp and squeeze the smile ball, grasp bottle from middle or bottom, with this movement grasping and holding power of the hand was gained. Hold the bottle and keep from one place to another. Turning the book pages with affected hand it will increase the fine movement of hand or fingers. Hold the pen or write something on white paper for example. Put a ring over the pen, Catch the ball with both hands and movement done frequently with coordination. Lower extremity task were walking on flat surface with the support of cane, over the circle of eight, on a straight line or on a square. Walking with close feet on ground walking with closed feet on ground on straight line or on boxes, standing straight at least for two to three minutes, walking on ground without support or with supervision.[8]

Results

Table 1.1 shows the pre and post values of Functional Independence Measure and berg balance scale

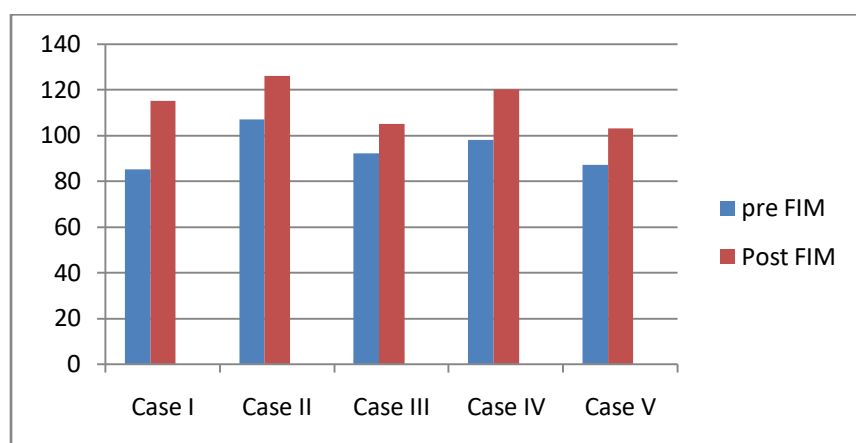
S.No	Cases	Pre FIM	Post FIM	Mean difference	Pre BBS	Post BBS	Mean difference
1	Case I	85	115	30	31	37	06
2	Case II	107	126	19	33	39	06
3	Case III	92	105	13	35	45	10
4	Case IV	98	120	22	32	44	12
5	Case V	87	103	16	30	36	6

There are 18 items of FIM -13 motor and 5 cognitive. Each item is scored on an ordinal scale from 1(dependent) to 7(independent). Scores are summed for the motor(13 items) and cognitive (5 items) sub scores as well as the total (18 items) FIM.[9]Berg et al 1992 reported the cut-off

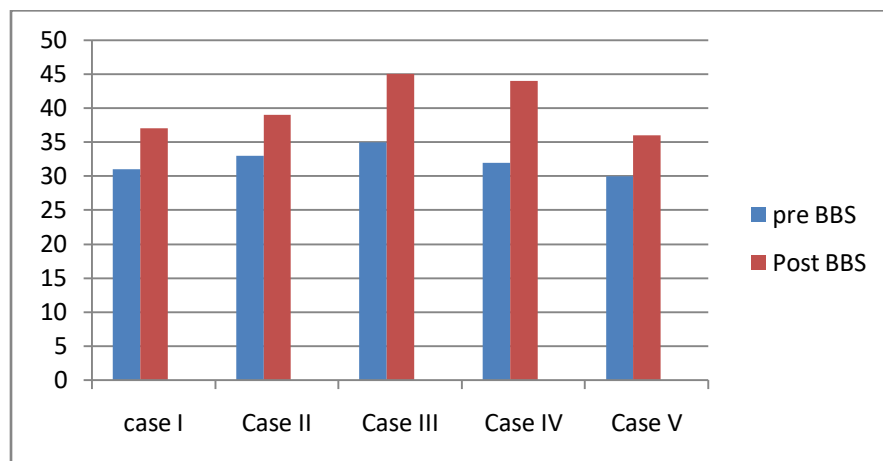
scores for the elderly as follows: a score of 56 had shown a functional balance. A score of < 45 shown in such individuals may be at higher risk of falling.[10]

All 5 cases that underwent TOT had got improvement in both outcome measures of BBS and FIM score. Pre and post FIM score mean were 93.8 and 113.8 and 20 was the mean difference. Pre and post BBS score mean were 32.2 and 40.2 and 08 was the mean difference. It has been proved that this study result revealed it is clinically significant.

Graph 1.1 shows pre and post values of Functional independent measure



Graph 1.2 shows pre and post values of Berg balance score



Discussion

These case reports proved a positive functional recovery of both proximal and distal motor skills of upper extremity after stroke. According to Sharon Israely et al, task-oriented training expending these values were reported to be greater than the conventional neurodevelopmental approaches in stroke management.[11] All cases were facing problems holding objects, grasping and manipulating them before intervention. The upper extremity motor section FIM measurements were significantly improved by following our task oriented training.

According to Aye Aye Thant et al, Task-oriented training made statistically significant and clinically important progresses of paretic upper extremity functional activities in patients with sub-acute stroke.[2] These beneficial effects were observed after 2 weeks (10 hours) of training. This TOT has revealed that chronic stroke patients who are not able to do functional activities as compared to sub-acute stroke. The patient was able to hold and pick the objects, place to objects from one place to another and can wear her clothes with minimal assistance, can comb her hair, and able to prepare food independently. These cases finding difficulty in lower body function in comparison with upper body.[10]

This study focused on the foundation on upper and lower extremities of the possible therapeutic effect of task-oriented training. The results of this study disclosed that stroke survivors in the task oriented training group showed restored functional recovery than those who were in the traditional therapy in terms of balance functions. The patients showed progress in the performance of the ADLs in the upper extremities and an improvement in the performance of ambulatory function with Task Oriented Training. This study's clinical value lies in verifying the therapeutic effect of task-oriented learning in hemiplegic patients.

Conclusion

The case report outlines the implementation of TOT (task-oriented training for patients with acute stroke). The results suggest that early initiation of task-oriented training is difficult and can relieve issues with gait and ambulation and enhance functional quality in the lower limb. The rapid gains reported in Quadriceps and hamstring power appear to exceed results with traditional

rehabilitation or delayed initiation of TOT. To assess the use of task-oriented training in stroke patients, a guided clinical examination is required.

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