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Effect Of Occupational Therapy Task Oriented Approach On Restoring Independence In Activities Of Daily Living In Patients With Neurological Disorders: A Case Series

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Abstract:
Background*: Neurological disorders. The authors reports 3 case series of neurological disorders affecting individual of different ages, wide variety of clinical manifestations thus affecting their activities of daily living. The cases included in this case series are on stroke, pineal gland tumor & on Guillian-Barré. Each patient in this case series showed functional affectations limiting their role performance. Occupational therapy's task-oriented approach has showed improvement in functional participation thus improving the engagement in role performance. The task-oriented approach is highly individualized, client-centered rehabilitation approach.*
Materials and Methods*: 3 patients diagnosed with neurological disorders undergoing rehabilitation therapy participated in the task-oriented training. These patients were evaluated using occupational therapy's uniform terminologies. Standardized scales for each neurological disorder were used for assessment of these patients. WEEFim scale, Clinical grading scale for Guillain-Barré syndrome, Motor Assessment scale, Barthel index, Pediatric Balance Scale, Functional independence scale were the assessment measures used. Their performance on these assessment measures were graded before & after the intervention using task-oriented approach. The duration of intervention was varied for each patient depending on their individualized.*
Results*: The results have shown that task-oriented approach had a significant impact in terms of improving the function. Patients were able to independently participate in their activities of daily living, work & play. They were now able to resume back to their role performance in life.*
Conclusion: *Functional activities, play, simulated activities used for intervention purpose in the form of task-oriented approach have found to be effective in restoring the independence in activities of daily living.*
Key Word*: Stroke, task-oriented approach*, functional independence, mobility.

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Neurological disease such as Stroke, Parkinson's disease, Guillian-Barre syndrome, Brain tumors, affect the ability to independently function, & perform the activities of daily living in these patients.
These conditions impose a wide variety of functional impairments affecting mobility, work, leisure, education, social participation, and play.
Occupational Therapy can help enhance their independence and overall quality of life.
Trombly (1993) advised occupational therapists to use top-down assessments that focus on the ability to engage in activities of daily living, education, work, play, leisure, and social participation.
Task oriented approach uses a top-down client centered & occupation focused intervention.
This approach was proposed by Mathiowetz and Bass-Haugen in 1994 based on the motor control, motor development, and motor learning theories and research of that time.
Mathiowetz has outlined a series of intervention principles based on use of the Occupational Therapy Task Oriented Approach.
These principles include the following:
• Help clients adjust to role and task performance limitations by exploring new roles and tasks.
• Create an environment that includes the common challenges of everyday life.
• Practice functional tasks or close simulations that have been identified as important by participants to find effective and efficient strategies for performance.
• Provide opportunities for practice outside therapy time.
• Minimize ineffective and inefficient movement patterns.

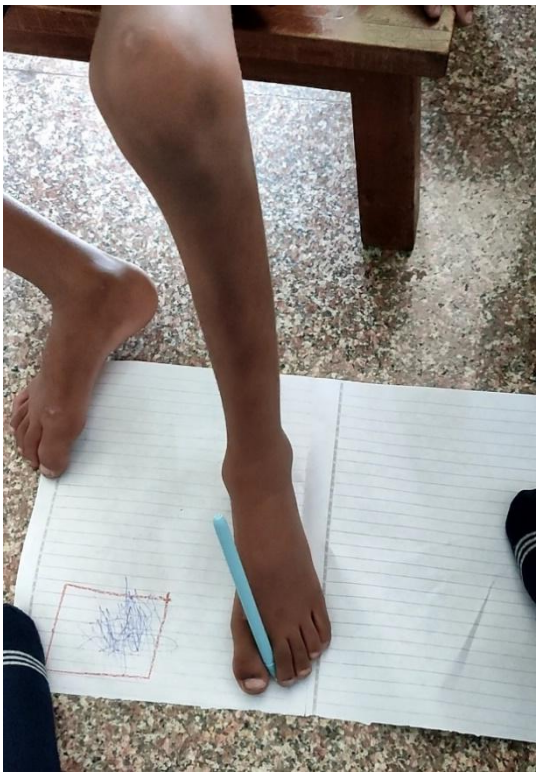
II.Material and Methods

Case 1

Patient information

- It was a case of 7-year-old male child, he was apparently alright, in April 2019 he had fever for 10 days, he was taken to a local hospital, investigations showed pancytopenia & splenomegaly, on investigations child was diagnosed with precursor B- cell lymphoblastic leukemia.
- He was started with chemotherapy from April 2019.
- During the same year on 15th June 2019, he was diagnosed as a case of Pulmonary Tuberculosis.
- He was on anti-Kochs treatment from July 2019.
- From march 2021, he developed a sudden onset of weakness in both the legs, he was unable to stand & walk on his own, as no improvement was seen in child's health, child was referred to LTMMC & GH Sion.
- His brain & spine MRI dated 24th march 2021 showed subtle enhancement along the anterior aspect of conus representing Guillain barre syndrome.
- He was conservatively managed with intravenous immunoglobulins & medications & was referred to occupational therapy OPD for rehabilitation.
- Patient was assessed using uniform terminology.
- On 1st evaluation for performance areas using WeeFIM Patient had difficulty in selfcare & mobility domains scoring 95/126, Clinical grading scale for Guillain-Barré syndrome showed grade 6 indicating, neuromusculoskeletal examination showed exaggerated knee jerks, Moderate adductor tightness, tendo-achilles tightness & ilio-tibial band tightness was present in bilateral lower limbs, hip flexion contracture was seen, bilateral foot drop observed.
- He had poor to fair voluntary motor control in his legs.
- Muscle testing for lower extremities showed poor to fair grade.
- Linking assessment to treatment:
- Task oriented approach was used for training transfers, & for balance rehabilitation.
- Task oriented approach for sit to stand focuses on having patients practice this functional task in a variety of contexts.
- By using a force-control strategy, patient was taught to bring the buttocks forward toward the edge of the stool.
- With supported standing patient was given table top play activities.
- He was prescribed for bilateral ankle foot orthosis for bilateral foot drop.
- Using sensory, motor & cognitive strategies tasks were analyzed& selected.
- Play as the major focus for task completion was used for active participation of the child.
- Peg transfers using legs, ball kicking, stationary cycling, paper crumbling activity, writing using legs was given.

(Fig 1) Ball kicking activity



(Fig 2) Writing with toes
Writing using feet for strengthening of feet intrinsic muscles & activating of dorsiflexors

(Fig 3) Ring stacking activity

(Fig 4) Walking with walker with wheels

(Fig 5) Sideward walking in parallel bars

- Gait training was done using supported walking in parallel bars, supported side-walking in parallel bars with mirror feedback for cueing.
- He was further made to walk using walker for walking independently.
- He was given activities like stationary cycling for strengthening.

(Fig 6) Stationary cycling

(Fig 7) Walking with walker

(Fig 8) Walking in parallel bars & using mirror as visual feedback

WEEFim Scale:

Domain	**1st Evaluation 10/12/2021**	**2nd Evaluation 18/02/2022**
1. Selfcare	51/56	**52/56**
2. Mobility	14/35	**25/35**
3. Cognition	30/35	30/35
Total Score	95/126	**107/126**

Voluntary control	**1st evaluation (10/12/2021)**	**2nd Evaluation 18/02/2022**
Upper Limb (Shoulder, Elbow, Wrist)	Good	Good
Lower Limb (Hip, Knee, Ankle)	Poor to fair	Fair

Grade	Status
0	Healthy
1	Minimal signs or symptoms without motor involvement
2	Involvement of cranial nerves only
3	Minor signs or symptoms at the extremities
4	Able to walk without support
5	Able to walk with support
6	Unable to walk but no complete tetraparesis and/or need for ventilation
7	Requiring ventilation but no complete tetraparesis
8	Complete tetraparesis without need for ventilation
9	Complete tetraparesis and need for ventilation
10	Dead

	1st Evaluation 10/12/2021	**2nd Evaluation 18/02/2022**
Clinical grading scale for Guillain-Barré syndrome	6	**5**

Postural control:	**1st evaluation 10/12/2021**	**2nd evaluation 18/02/2022**
Static postural control	Sitting- Good Standing- CBT	Sitting- Good Standing- Poor to fair
Dynamic postural control	Sitting- Good Standing- CBT	Sitting- Good Standing- Poor

Thus, it is concluded that task-oriented approach has helped the patient in regaining his community mobility function & resume back to his occupation of play.
Here the approach has helped in remediation by providing an adaptive equipment (walker) & adaptive positioning (supported sitting & standing) for playing thus modifying the task of play & helping patient resume back to it.

Case 2
Patient information

- 10 yr. old child, was apparently alright till December 2020, then he started having headache & multiple episodes of vomiting for almost one month (January), patient was taken to a private hospital, managed conservatively & further investigations were done.
- CT Scan of Brain (28/01/2021): A well-defined nodular thick-walled lesion in the region of pineal gland causing mass effect in the form of moderate supratentorial obstructive hydrocephalus with periventricular ooze.
- Patient was then further referred to Sion hospital for further treatment.
- He was operated for Pineal gland tumor excision on 5th February 2021.
- He was then further referred to Occupational therapy for rehabilitation services.
- Patient was assessed using uniform terminology.
- The patient's neurological evaluation showed hypotonia on 10/02/21, grade 1 of Modified Ashworth scale in right elbow extensors on 16/02/21 & normal muscle tone on 18/02/21.

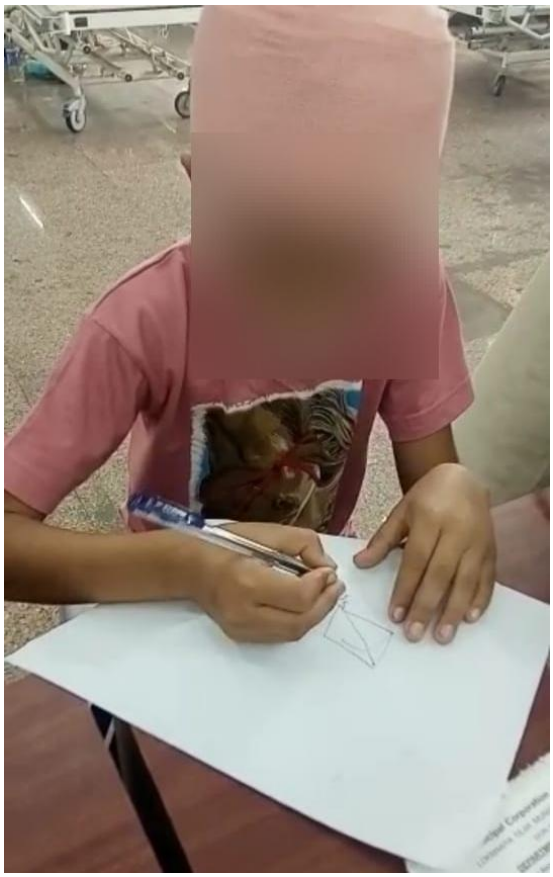
- His co-ordination was affected in time, space & rhythm which was assessed using finger-nose test & heel-knee test.
- The patient had horizontal nystagmus present in both eyes, he had Intentional tremors present on right side of body prominently in hand, he had titubation in neck & trunk & his fine motor co-ordination was also affected.
- On examination the patient could not do tandem walking & Romberg' s Sign was positive when assessed with eyes closed.
- These findings indicated that the patient had difficulty in his proprioceptive & vestibular system.
- Linking assessment to treatment:
- The goals of a task-oriented approach were:
- (a) resolve, reduce, or prevent impairments in systems that are important to balance;
- (b) develop effective task-specific sensory, motor, and cognitive strategies, and
- (c) retrain functional tasks with varying postural control demands under changing environmental contexts.
- Tasks were given to the patient in the form of play like throwing ball in prone for strengthening of back extensors & of upper extremities.
- Initially child was made to sit with support & gradually the support was weaned off.
- Intervention included supine to sit transfer technique, sitting with support on edge of the bed with supports of hand & gradually weaning of the support.
- Bed side puzzle activities, table top games were given to the patient in independent support were given to the patient simultaneously patient was cued using manual & verbal cues for maintaining sitting balance.
- Sitting balance was further improved by giving reaching out activities in various directions.
- Standing balance was improved by giving activities like ball kicking in standing, obstacle pathways & step-up & step-down activities.
- Post discharge patient was given a home program which included one leg standing exercises gradually progressing to playing hopscotch & then increasing the hopscotch play timing.
- PNF Diagonal patterns were given while playing ball catch & throw.
- Playing on Thera-ball in prone on ball, with target hitting.
- Walking on straight lines
- Various animal walks, wheelbarrow walking, playing on swings with target hitting,
- Increasing the complexity of obstacle course & making it time bound.

Barthel index (higher the score more is the independence)

1st evaluation (10/02/2021)	**2nd evaluation (16/02/2021)**
14/100	95/100

Pediatric Balance Scale

1st evaluation (10/02/2021)	**2nd evaluation (16/02/2021)**
38/56	54/56



(Fig 9) Drawing as an activity

(Fig 10) Two-piece puzzle matching activity.

Thus, we can conclude that task-oriented approach has helped the patient to go back to his occupation of play & also back resume back to his role as a student.

Posture	1st evaluation (10/06/2021)	2nd evaluation (18/06/2021)
Supine	Patient in supine position has her legs externally rotated.	Patient in supine position has her legs externally rotated.
Sitting	Required support (back rest) while sitting, due to impaired sitting balance	Patient can sit without support, sits with slouched posture with drooping shoulders & her hands resting on bed for support.
Standing	Patient could not be made to stand due to poor voluntary control, & weakness in her legs.	Patient can stand with the help of walker, stands with wide base of support with cues for erect standing.

Case 3

Patient information

- Mrs., 39-year-old Hindu female, house help by occupation, known case of hypertension &menorrhagia was apparently alright until she had an episode of seizure (GTCS) for the first time on 2nd June 2021 following which she developed weakness in left side of her body.
- Patient was then brought to LTMMC & SION GH. On investigations Her brain imaging reports showed complete thrombosis of the superior sagittal sinus & bilateral fronto-parietal cortical veins.
- Venous hemorrhagic infarct in right high frontal precentral para-falcine region & left frontal region.
- Patient was thus diagnosed as a case of cerebral venous sinus thrombosis with left hemiparesis.
- Patient was bedridden, unable to move her left arm & leg, unable to sit without support, generalized weakness all over the body so she was referred to occupational therapy department for rehabilitation.
- Patient was assessed using uniform terminology.
- On 1st evaluation for performance areas using Functional independence measure showed scoring of 46 indicating dependence in Self-Care, sphincter control, transfers, locomotion domains.
- Neuromusculoskeletal evaluation showed decreased tone in left upper & lower limb, showing poor voluntary motor control.
- She had poor endurance & poor static sitting balance.
- Muscle testing for left upper & lower limb showed poor grade in all muscle groups.
- Motor assessment scale scored 8 indicating poor functioning on left side of body.

Motor Assessment scale

Sr. No.	Component	1st evaluation Score (10/06/2021)	2nd evaluation Score (18/06/2021)
1.	Supine to Side-lying onto intact side (starting position: supine with knees straight)	1	3
2.	Supine to Sitting over side of bed	2	3
3.	Balance Sitting	1	4
4.	Sitting to Standing	1	2
5.	Walking	0	3
6.	Upper Arm Function	1	5
7.	Hand Movements	0	5
8.	Advanced Hand Activities	0	6
9.	General Tonus	2	6
	Total Scoring	**8**	**37**

Functional independence scale

	10/06/2021	**18/06/2021**
Self-Care		
Eating	1	**7**
Grooming	2	**5**
Bathing	1	**4**
Dressing - Upper Body	2	**5**
Dressing - Lower Body	2	**5**
Toileting	1	**5**
Sphincter Control		
Bladder Management	1	**5**
Bowel Management	1	**5**
Transfers		
Bed, Chair	2	**4**
Toilet	1	**5**
Shower	1	**5**
	10/06/2021	**18/06/2021**
Locomotion		
Walk/Wheelchair	1	**3**
Stairs	1	**1**
Motor Subtotal Score	17	**59**
Communication		
Comprehension	7	**7**
Expression	7	**7**
Social Cognition		
Social Interaction	7	**7**
Problem Solving	4	**6**
Memory	4	**6**
Cognitive Subtotal Score	29	**33**

- Linking assessment to treatment:

Treatment Principles of a Task-Oriented Approach used:

❖ Client-Centered Focus

❖ Occupation-Based Focus

❖ The personal and environmental factors
❖ Practice and Feedback.

Task specific training:

Client's attention is focused on completing the task instead of performing a particular movement. Initially the activity was performed in graded manner,

(Fig 11) Combing hair

(Fig 12) Tying hair

Client-Centered Focus:

Combing:

1. Partitioning the hair into two halves using only left hand (Constraint induced movement therapy)
2. Holding the hair in left hand when combing with right hand
3. As grasp developed, combing was initiated with left hand
4. Plating using right hand in assistance with left hand.

Dressing:

Hand manipulation activities were given to the patient like beading, picking up small blocks, tearing papers for developing hand functions for independent saree draping & independent eating.

(Fig 13 & 14) Making plates of saree while donning saree independently.

(Fig 15) Eating independently

Occupation-Based Focus

In ward patient was given mud cutting activity using spatula, making fruits of mud using shaping box, cutting it, transfer of learning for chopping vegetables for meal preparation.

(Fig 16) Using simulated activity for improving hand functions

(Fig 17) Stationary cycling

(Fig 18) Transfer of learning to daily activities of rinsing utensils

Tasks were given to the patient involved in her daily life, so that she can go back to her occupation of house help which requires her to do activities like chopping vegetables, washing clothes, sweeping & dusting the floor.

(Fig 19) Rinsing clothes

(Fig 20) Chopping vegetables

(Fig 21) Cleaning vegetables

(Fig 22) Sweeping with broom

(Fig 23) Wiping floor

❖ Using the principles of task-oriented approach, the patient was helped to adjust to her role as a house help.

❖ The approach has helped to create an environment within the clinical settings that provide typical challenges of her everyday life by simulating the activities.

❖ These activities like picking up the plastic cups & stacking them, clay modelling using play knife & scissor has helped her for developing the transfer of learning to use knife while chopping vegetables & washing utensils, clothes etc.

❖ Random practice method was given to the patient using such functional tasks to help patient find effective and efficient strategies for performance.

❖ Thus, task-oriented approach has helped the patient to resume back to her role of house-help.

Discussion:

The purpose of the present study was to evaluate the effectiveness of task-oriented approach on functional activities.

The evidence for evaluating the efficacy of task-oriented approach on resuming back to occupations such as vocation, play, functional mobility in varied neurological conditions is limited hence this study was conducted as an attempt to study the effect of occupational therapy task-oriented approach on restoring independence in activities of daily living in patients with neurological disorders.

The results of the present study show improvement in the scores of the scales used. After training improvements in the scores of WeeFim, Barthel index, Paediatric balance scale, Clinical grading scale for Guillain-Barré syndrome, Motor assessment scale,Functional Independence measure, Montreal cognitive assessment.

In a case study conducted by Alison Newell BS, titled "Use of the Task-Oriented Approach for Chronic Inflammatory Demyelinating Polyneuropathy: A Case Report," states that using task-oriented approach as a framework has helped patient achieve his functional mobility & walk independently.[1]

Also, a review paper titled, "Task-oriented training in rehabilitation after stroke: systematic review" conducted by Marijke Rensink et, al published in the journal of advanced nursing on 20 November 2008 states that active use of task-oriented training with stroke survivors has led to improvements in functional outcomes and overall health related quality of life. [3]

In a study conducted by Tanavi S. Patel and Suraj Kanase titled, Effect of Task Oriented Training on Spasticity in Post Stroke Individuals, published in Journal of Ecophysiology and Occupational Health on September 2021 states that task-oriented training alone is effective in acute stroke survivors.[2]

These studies. supports all the three mentioned case studies as the interventions formulated by task-oriented approach which includes force-control strategy for sit-to-stand transfer, balance training within the parallel bars, activities such as ball kicking, cycling, stair climbing, walking using the assistive aids like walker has helped the patients achieve their functional mobility & walk independently.

A study done by Chiang-Soon Song, PhD, OT, published in Journal of Physical therapy science in July 3, 2013 titled "Effects of Task-oriented Approach on Affected Arm Function in Children with Spastic Hemiplegia Due to Cerebral Palsy" says that Task-oriented approach generally include daily activities and play activities, and these activities have been beneficial in motivating children.[4]

The intervention activities used in the present studies also included repetitive practice of functional activities used in daily activities or play activities.

Thus, Task oriented approach has shown to be effective in improving the active participation of all patients having varied neurological disorders.

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