

A Commentary on Task-Oriented Interventions in the Functional Mobility and Postural Control of Children with Cerebral Palsy

Young-eun Choi^{1*} and Hyerim Jung²

¹Department of Physical Therapy, Kaya University, Republic of Korea

²Department of Occupational Therapy, Kaya University, Republic of Korea

Abstract

Disorders of movement and posture development in children with cerebral palsy can limit the participation in everyday activities, such as learning and play. In the modern concept of motor learning, the interaction among an individual, the task, and the individual's environment are crucial in improving the individual's motor ability, and task-orientation training is the representative approach for motor learning. This short commentary reviews task-orientation training as an intervention in the functional mobility and postural control of children with cerebral palsy.

Keywords: Cerebral palsy; Task-Oriented interventions; Postural control; Children

Introduction

Children with cerebral palsy (CP) have disorders of movement and posture development caused by damage to their immature brains; these disorders are often involve disturbances of sensation, perception, cognition, communication and behavior and occurrences of epilepsy and secondary musculoskeletal complications [1]. These limitations restrict the children's participation across a broad range of life domains, including self-care, education and recreation. In particular, motor difficulties which are the core deficits of children with CP influence the children's abilities to learn and perform everyday tasks [2,3].

While postural control and functional mobility are factors involved in performing and participating in everyday activities, for several decades, clinicians have used traditional approaches, such as neurodevelopment (NDT), with a focus on atypical musculoskeletal elements to treat children with CP. However, NDT is not a recommended intervention for such children [4]; rather, interventions that integrate the core concepts and specific principles of NDT and other approaches are recommended. Thus, after introducing motor and task-oriented training to children with CP, clinicians and researchers recently focused on dynamic activity and participation interventions.

Task-Oriented Interventions in CP

Task-oriented training, sometimes called task-specific training, goal-directed training, task-related training, functional task practice, and repetitive task practice, is a form of therapy with which patients 'practice context-specific motor tasks and receive some form of feedback' [5]. The concept involves interactions between an individual, a task and the individual's environment; these interactions are dynamic [6]. This training is a top-down approach focused on each client's goal.

A therapist may design a bottom-up intervention to reduce a client's impairment and help the client gain new skills. That is, a therapist may have a child repeat a skill or movement, such as a muscle strengthening activity. However, a top-down approach would allow the therapist to consider the child's performance in regards to his or her environment, routine, activity patterns, contextual support, and opportunities for participation [7]. With task-oriented training, which is top-down, the child would practice everyday tasks and a wide range of interventions that involve meaningful activities with the aim of acquiring a skill. It is task and client centred, not therapist centred.

The concept of motor learning recently posited that the specific training task leads to the intended outcome as well as meaningful to the person [8].

This can occur through the practice of task-specific activities that allow a client to gain optimal improvements to his or her functions [9]. Many studies found that neurobiological changes can occur in a client with CP due to such task-specific training. That is, the adaptive cortical reorganization of an injured brain can be produced not by generic tasks or activations but by task-specific training interventions [10]. Such tasks should be challenging and adapted progressively so a client actively participates in them [11].

Functional mobility tasks, such as running, standing up, walking straight, walking up and down stairs, and controlling one's posture are crucial for children with CP as they allow the children to address the demands of various tasks and environments. It is needed that interventions involve the task-oriented training using real tasks or activities in client's environment to address the difficulties of children with CP, since the complex ability of motor control emerge from interaction of child, task and environment [7].

Functional Mobility

Functional mobility is the ability to independently move in environmental situation and task situation. Task-oriented training emphasizes the role of environment and task in the performance of functional activities. The effect of task-oriented training on the motor ability in children with mild or moderate cerebral palsy during 3 months was investigated. As a result, the scores of mobility domain in Paediatric Evaluation of Disability Invention (PEDI) improved, which continued to gradually improve even 15 months after training [12]. A systematic review on the interventions in children with cerebral palsy was performed, and evidence state on the interventions was presented. They concluded that task-oriented training improves functional performance and motor ability to independently perform daily activities [4].

Postural Control

Children with CP have deficits in their anticipatory postural adjustments, reactive postural adjustments, and sensory and

*Corresponding author: Young-eun Choi, Assistant professor, Kaya University, 208 Samgye-ro, Gimhae-si, Gyeongsangnam-do, Republic of Korea, Tel: 82-55-330-1190; E-mail: choiye00@naver.com

Received April 19, 2018; Accepted April 24, 2018; Published April 30, 2018

Citation: Choi Y, Jung H (2018) A Commentary on Task-Oriented Interventions in the Functional Mobility and Postural Control of Children with Cerebral Palsy. Int J Neurorehabilitation 5: 314. doi: [10.4172/2376-0281.1000314](https://doi.org/10.4172/2376-0281.1000314)

Copyright: © 2018 Choi Y, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

musculoskeletal postural control components. Thus, postural control has a significant impact on the everyday activities and participation of these children. However, while many studies have been conducted on task-oriented training interventions that improve children's motor skills, few studies have been conducted on the effects such interventions have on children's postural control [13].

In a study on the effects of task-oriented training interventions on postural stability, a program consisting of stationary bicycling, elliptical machine walking, standing up, stepping up and down, walking, and running was conducted for 8 weeks. The study's goal was to improve the strength and endurance of children with CP who were able to ambulate independently. When the program was complete, the post test of functional reach showed the children's distance (i.e., endurance) increased, and in the 10 m walk test, children's performance time decreased [14].

Another study, published in 2017, investigated the effects of task-oriented training provided for five weeks. The aim of the study was to strengthen the lower extremity muscles, related to postural stability, of children with CP. The results presented that the children's centers of pressure (COP) shift and COP surface area decreased. This suggests that task-oriented training can improve the postural control of children with CP [15].

Conclusion

Task-oriented training provides to children with CP sufficient opportunities for practicing activities integrated with everyday environment. When an activity is successful, it is likely to try to more challenging activities continuously. Also, they learn by actively attempting to solve the problems inherent to a functional task. Task-oriented training is proper intervention to enhance the functional mobility and postural control of children with CP, at all disability severity levels.

References

1. Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M, et al. (2007) A report: The definition and classification of cerebral palsy April 2006. *Dev Med Child Neurol* 109: 8-14.
2. Imms C (2008) Children with cerebral palsy participate: A review of the literature. *Disabil Rehabil* 30: 1867-1884.
3. Himmelmann K, Beckung E, Hagberg G, Uvebrant P (2006) Gross and fine motor function and accompanying impairments in cerebral palsy. *Dev Med Child Neurol* 48: 417-423.
4. Novak I, McIntyre S, Morgan C, Campbell L, Dark L, et al. (2013) A systematic review of interventions for children with cerebral palsy: State of the evidence. *Dev Med Child Neurol* 55: 885-910.
5. Teasell R, Meyer MJ, McClure A, Pan C, Murie-Fernandez M, et al. (2009) Stroke rehabilitation: An international perspective. *Top Stroke Rehabil* 16: 33-56.
6. Pendleton H, Schultz-Krohn W (2013) *Pedretti's occupational therapy: Practice skills for physical dysfunction*. St. Louis, Missouri: Elsevier.
7. Case-Smith J, O'Brien JC (2015) *Occupational therapy for children and adolescents*. Seventh edition. St. Louis, Missouri: Elsevier.
8. Ma H, Trombly CA, Robinson-Podolski C (1999) The effect of context on skill acquisition and transfer. *Am J Occup Ther* 53: 138-144.
9. Bayona NA, Bitensky J, Salter K, Teasell R (2005) The role of task-specific training in rehabilitation therapies. *Top Stroke Rehabil* 12: 58-65.
10. Rossi F, Gianola S, Corvetto L (2007) Regulation of intrinsic neuronal properties for axon growth and regeneration. *Prog Neurobiol* 81: 1-28.
11. Wolf S L, Winstein CJ, Miller JP, Taub E, Uswatte G, et al. (2006) Effect of constraint-induced movement therapy on upper extremity function 3 to 9 months after stroke: The EXCITE randomized clinical trial. *JAMA* 296: 2095-2104.
12. Ketelaar M, Vermeer A, Hart H, van Petegem-van Beek E, Helders PJM (2001) Effects of a functional therapy programme on motor abilities of children with cerebral palsy. *Phys Ther* 81: 1534-1545.
13. Dewar R, Love S, Johnston LM (2015) Exercise interventions improve postural control in children with cerebral palsy: A systematic review. *Dev Med Child Neurol* 57: 504-520.
14. Peungsuwan P, Parasin P, Siritaratiwat W, Prasertnu J, Yamauchi J (2017) Effects of combined exercise training on functional performance in children with cerebral palsy: A randomized-controlled study. *Pediatr Phys Ther* 29: 39-46.
15. Kim JH, Choi YE (2017) The effect of task-oriented training on mobility function, postural stability in children with cerebral palsy. *J Korean Soc Phys Med* 12: 79-84.