Applying Developmental Coordination Disorder Treatment Theories To Physical Therapy Practice: A Case Report

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ABSTRACT

This case report describes the application of two treatment intervention theories for Developmental Coordination Disorder (DCD) to physical therapy practice. The patient was an 8-year-old girl with hypotonia, generalized weakness, balance, coordination deficits, and poor cardiovascular endurance. Parent concerns related to frequent episodes of tripping and falling. DCD treatment intervention theories of the bottom up (process or deficit oriented) and top down (functional skill approach) methods were used to guide and direct the physical therapy treatment. The goals of treatment for this child included improving balance, coordination, cardiovascular endurance, and self-esteem. The case report demonstrates a method to apply the current knowledge of DCD treatment theory in a way that can be integrated into clinical practice. Applying a strategic combination of each theory in this case has led to the development of clinical questions for future research.

INTRODUCTION

Background Information

Developmental Coordination Disorder (DCD) affects nearly 6% of children in the United States, aged 5 to 11 (Kaufman & Schilling, 2007), with 5% of full-term birth compared to 16% of preterm birth (Roberts, Anderson, & Davis, 2011). According to the Diagnostic and Statistical Manual of Mental Disorders, DCD presents with coordination impairment, which significantly restricts activities of daily living and academics of a child. The impairments cannot be related to any other medical condition or another developmental disorder in order to be diagnosed as DCD (Kaufman & Schilling, 2007). Physical therapy has been found to be the most effective treatment for this diagnosis. Within physical therapy, there are many types of treatment approaches that have been researched although no consensus has been reached on which type of approach is the most effective. This case report describes the application of two treatment intervention theories of the bottom up (process or deficit oriented) and top down (functional skill approach).

Case Description

The case patient is an 8-year-old girl who was referred to physical therapy by her pediatrician. She was born prematurely at 24 weeks gestation with a birth weight of 1 lb 7 oz. She has a medical diagnosis of hypotonia (781.3) and treatment diagnosis of lack of coordination (781.3). She was trained in a normalized gait pattern and cardiovascular endurance in treadmill walking. With practice the patient was able to progress in gait training running with improved gait pattern and reduced anxiety. With every new activity the patient displayed anxiety and expressed that she was unable to complete the activity. After attempting the activity and practicing the patient was able to gain confidence in her motor skills and understandings that she was able to complete the activities. Other bottom up activities included jumping on the mini trampoline focusing on symmetrical jumping, tilt board, swing progressing to quadruped position, scooter board supine and prone, stretching, modified push ups and sit ups. By beginning with a bottom up activity the patient was able to become more aware of her body and increase confidence in her motor skill abilities to prepare for top down activities. The patient found increased difficulty in completing top down activities if the bottom up activities were not performed first. Top down activities require motor planning integration along with gross motor skills, coordination, balance, and strength. The patient was able to progress in galloping and backward walking with increased speed and proficiency in starting with either foot. Bear walking with decreased knee extension and increased endurance to the activity. Improved balance beam with ability to complete 3 feet of tandem walking without falling. In the beginning of treatment the patient was unable to complete the rock-climbing wall. She required verbal and tactile cues for foot and hand placement. By the end she was able to self-talk herself through the activity for hand and foot placement to be able to reach the top of the wall using the cognitive theory of this top down activity as well as her gains in motor skills.

METHODS and RESULTS

Over the course of 8 months with 60-minute sessions once a week the patient was treated using a strategic combination of the Developmental Coordination Disorder treatment theories of bottom up and top down methods. The bottom up approach (process oriented) involves treating an underlying dysfunction or motor control disorder (Kaufman & Polatajko, 2010) and top down involves gaining new skills and cognitive problem solving (Branhart et al., 2003). Each session began with a bottom up theory activity then progressed to a top down activity. In early sessions the patient was trained in a normalized gait pattern and cardiovascular endurance in treadmill walking. With practice the patient was able to progress in treadmill running with improved gait pattern and reduced anxiety. With every new activity the patient displayed anxiety and expressed that she was unable to complete the activity. After attempting the activity and practicing the patient was able to gain confidence in her motor skills and understandings that she was able to complete the activities. Other bottom up activities included jumping on the mini trampoline focusing on symmetrical jumping, tilt board, swing progressing to quadruped position, scooter board supine and prone, stretching, modified push ups and sit ups. By beginning with a bottom up activity the patient was able to become more aware of her body and increase confidence in her motor skill abilities to prepare for top down activities. The patient found increased difficulty in completing top down activities if the bottom up activities were not performed first. Top down activities require motor planning integration along with gross motor skills, coordination, balance, and strength. The patient was able to progress in galloping and backward walking with increased speed and proficiency in starting with either foot. Bear walking with decreased knee extension and increased endurance to the activity. Improved balance beam with ability to complete 3 feet of tandem walking without falling. In the beginning of treatment the patient was unable to complete the rock-climbing wall. She required verbal and tactile cues for foot and hand placement. By the end she was able to self-talk herself through the activity for hand and foot placement to be able to reach the top of the wall using the cognitive theory of this top down activity as well as her gains in motor skills.

REFERENCES


Kaufman, L. L., & Polatajko, H. J. (2007). Applying this strategic combination of theories has led to more efficacy this patient will see improvements in I.

Through the use of both treatment theories the patient demonstrated gains in strength, balance, coordination, gross motor development, cardiovascular endurance, and self-esteem. One of the most significant gains was in self-efficacy and the belief that she was able to complete all of the activities her peers are completing. She was able to decrease the amount of self-doubt throughout the sessions and became more open to trying new activities. She learned how to complete more difficult tasks by integrating the steps of the less difficult tasks such as prone swinging to reach for objects. By the end of the session she was able to think through the steps to be able to swing far enough to reach for the objects at her level.

Characteristics

- No increase or decrease of tendon reflexes
- Low tone
- Abnormal posture
- Forward head
- Winging of scapula
- Increased kyphotic curve
- Hypertension of elbows
- Genu recurvatum
- Problems not associated with physical strength, vision, hearing, or deformity