

Comprehensive Physical Therapy Management of a Patient with Motor Control Deficits and Idiopathic

Toe-Walking: A Case Report

Chelsey Hoglund, SPT and Kirsten Buchanan, PhD, PT, ATC

Department of Physical Therapy, University of New England, Portland, Maine



Background & Purpose

- Idiopathic toe-walking (ITW) describes patients who walk bearing most weight through their forefoot, in the absence of any known cause.^{1,2}
- Developmental coordination disorder (DCD) is a chronic condition involving impairments in gross motor, postural, and/or fine motor performance and affects the performance of movements necessary for daily living and academic tasks.⁴
- Physical therapy intervention have been shown to result in improvements for patients with ITW with DCD.¹⁻⁴ However, there are no known studies that investigate the physical therapy intervention for patients with a diagnosis of both ITW and DCD.
- The purpose of this case report was to described the comprehensive physical therapy management of a patient with a clinical diagnosis of DCD and ITW.

Case Description

- Eight-year-old boy referred to outpatient physical therapy for concerns of toe-walking
- Presented with a family history of toe-walking
- Walked and ran 100% of the time on his forefoot since the age of two
- Unable to walk up and down the stairs without scooting or hopping
- First time he had received physical therapy for this diagnosis
- Was also seeing an occupational therapist for fine motor coordination deficits and a speech language pathologist for a speech impediment

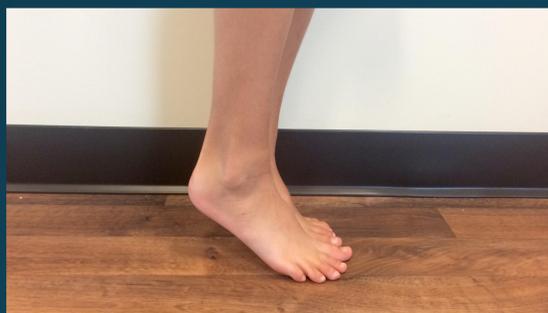


Figure 1. Patient's standing ankle posture.

Case Description

Test and Measures	Results
Dorsiflexion ROM with knee extended	Right: -10° Left: -15°
Hamstring straight leg raise	Right: 70° Left: 79°
Squat Observation	Performed with excessive trunk flexion, minimal knee extension, and weight through the forefoot
Sagittal Gait Analysis	Without cue for heel strike: No heel contact was present through entirety of stance phase With cue for heel strike: Able to step with a heel strike twice in a distance of 50 ft
Stairs	Ascent: Hopped up with weight bearing through railings and upper extremities Descent: Preferred to sit and scoot down
Dynamic Balance	2 tandem steps on line before loss of balance
Static Balance	Right: 1 second, weight through forefoot Left: 1 second, weight through forefoot
Transition from floor to stand	Rolled to the side and pushed up to sitting with two upper extremities, rose to standing through a plantigrade position
BOT-2	Balance: Well Below Average Body Coordination: Below Average Strength: Below Average Strength and Agility: Well Below Average

Interventions

Stretching

- Gastrocnemius stretching home program performed everyday
- Hamstring stretching home program performed everyday
- Parent educated on importance of stretching and methods to motivate patient

Strengthening

- BOSU squats to throw weighted balls (Figure 2)
- Jumping down from elevated surfaces
- Trunk strengthening through perturbations

Task Specific Training

- Stair negotiation ascent and descent (Figure 4)
- Dynamic and static balance on various surfaces
- Trunk stability with perturbations (Figure 3)
- Squat mechanics



Figure 2. BOSU squat.



Figure 3. Trunk stability.

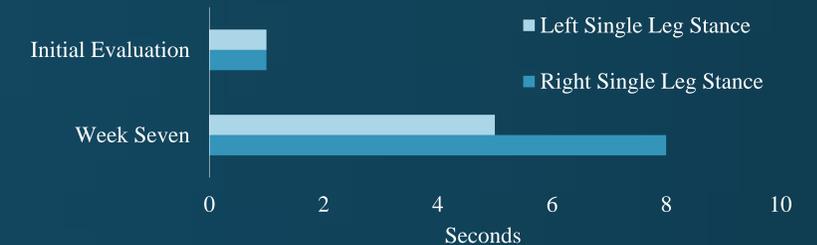


Figure 4. Reciprocal stair ascent.

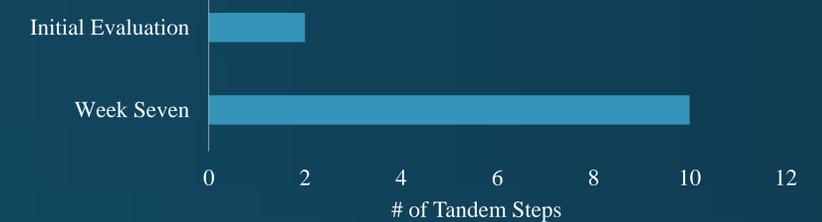
- All exercises were practiced with a block practice schedule
- Progressions were made through faded feedback, an open environment, and decreased support
- Visual and verbal cues established for task specific training
- Patient seen once a week for nine weeks
- Home exercise program of stretching and functional practice provided in written form to the patient's mother
- Goals focused on functional mobility and improve participation in sports

Outcomes

Static Balance



Dynamic Balance



Reciprocal Stair Negotiation



Conclusions

- Functional mobility improved with task specific training based on clinical performance and the mother's reports.
- A stretching program may have helped to improve hamstring and gastrocnemius/soleus complex flexibility.
- Beginning with a task-specific training and stretching program may have helped to establish patient and parent rapport for serial casting.
- Task specific training and a conservative stretching program may be beneficial when treating a patient with a clinical diagnosis of DCD and ITW.
- Future studies may consider investigating task specific interventions for a larger population of patients with a concurrent diagnosis of DCD and ITW.

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