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Background & Purpose
- Idiopathic toe-walking (ITW) describes patients who walk bearing most weight through their forefoot, in the absence of any known cause.1
- 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.2
- Physical therapy intervention has been shown to result in improvements for patients with ITW with DCD.3 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 describe 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

Case Description
- Test and Measures
  - 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 standing
    - 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

Outcomes
- Static Balance
  - Initial Evaluation
    - Week Seven:
      - Left Single Leg Stance
      - Right Single Leg Stance

- Dynamic Balance
  - Initial Evaluation
    - Week Seven:
      - # of Tandem Steps

- Reciprocal Stair Negotiation
  - Initial Evaluation
    - Week Seven:
      - # of Stairs

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 care.
- 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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References