Background

• Cancer in the cerebellum in a pediatric population is rare.
• The cerebellum is responsible for:
  • Coordination of ongoing movements
  • Postural control
  • Visual gaze
  • Performing smooth purposeful movements.1
• There is limited evidence investigating the physical therapy management of pediatric survivors of cancer, more specifically, in cerebellum brain tumors.

Purpose

The purpose of this case report was to investigate the PT management of a pediatric survivor of cancer who had a cerebellar tumor resection.

Case Description

• Five-year old boy, post cerebellum tumor resection.
• Patient presented with cerebellar pathology including impairments:
  • Balance, gait, coordination, vision, strength, range of motion
  • Impairments resulted in overall functional limitations and disabilities (unable to attend school).

Examination

The majority of tests and measures were collected through clinical observation.

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<tr>
<th>Tests and Measures</th>
<th>Initial Evaluation (Start of Care – 5/29/09)</th>
<th>End of 12 Weeks Clinical (22 weeks post-op)</th>
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<td>Gross Motor</td>
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Interventions

• Physical therapy interventions, while wearing the DMO, which has been shown to improve core stability2 included:
  • Functional Training
  • Balance Training
  • Gait Training
  • Stair Management

Graph: Interventions Timeline Throughout the Plan of Care

Dynamic Movement Orthosis

Orthosis worn for all therapeutic exercises

Interventions

• Interventions were provided using a Neurodevelopmental Technique (NDT).
  • Examples of interventions performed during treatment sessions:
    • Tall Kneel → Half Kneel
    • Sit → stand
    • Side stepping
    • Squatting
    • Treadmill and stair training
    • Balance activities such as reaching outside base of support in various positions.
    • Obstacle course designed to improve balance, coordination, core activation, and gait while stepping over objects and accommodating various surfaces.
  • Coordination, Communication and Documentation included an interdisciplinary team of speech therapy, occupational therapy, pediatrician, orthotist, caregiver, and family.

Outcomes

• The patient demonstrated improvements in:
  • Balance
    • Pediatric Balance Scale: 5/56 → 26/56
  • Coordination
  • Strength
  • Range of Motion (ROM)
  • Gait
  • Particularly noticeable improvements when DMO was first used in week 15.
  • Functional gains were observed throughout the plan of care. These gains increased with DMO use however, overall, gains occurred at a slow rate.

Discussion

The PT management of this pediatric patient after tumor resection included therapeutic exercise, functional training, and balance training with the use of a DMO. Gains were made in all areas, however, no conclusions can be made about the effectiveness of any one treatment. However, it should be noted that the patient demonstrated greater improvements in all areas when using a DMO.

Future research should investigate best interventions for pediatric survivor of cancer including the specific uses of a DMO.

References