Impact of the Balance-Based Torso-Weighting System on Balance, Gait, Vestibular-ocular Function and Symptom Self-Report in an Individual with Vestibular Dysfunction

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Purpose

To investigate the effect of Balanced-Based Torso-Weighting (BBTW) on balance, gait, vestibular-ocular function and symptom self-report in an individual with vestibular dysfunction.

Introduction

BBTW, a treatment approach in which small amounts of weight are strategically placed on the trunk in order to address a person's balance deficits, has shown clinical improvements in balance, gait mechanics, cadence and visual function in individuals with diagnoses such as multiple sclerosis, Parkinson disease and stroke. Limited evidence exists for use in people with vestibular dysfunction.

Case Description

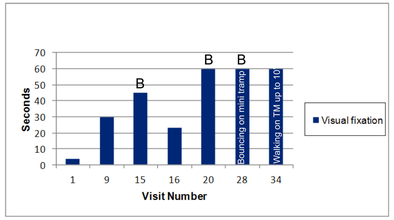
- 29 year-old female
- Diagnosis: General vestibular dysfunction occurring after robotic laparoscopy performed in the extreme trendelenberg position
- Symptoms included:
  - Dizziness
  - Vertigo
  - Diplopia/blurry vision
  - Lightheadedness
  - Phonophobia
  - Photophobia
  - Nausea
  - Multi-stimulus intolerance
- Interventions included, but not limited to:
  - Visual fixation
  - Saccades
  - Vestibular Occular Reflex (VOR)
  - Rhomberg/Sharpened Rhomberg (eyes open/closed)

Outcome Measures

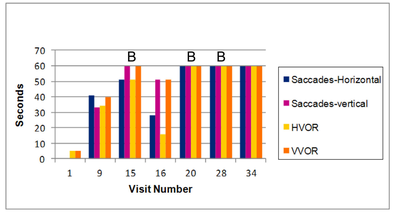
- Dynamic Visual Acuity (DVA)
- Gaze Stabilization Test (GST)
- Functional Gait Assessment (FGA)
- Sensory Organization Test (SOT)
- Motion Sensitivity Quotient (MSQ)
- Symptom Self Report-Dizziness Handicap Inventory, dizziness (VAS 0-5) and headache (VAS 0-5)

Interventions

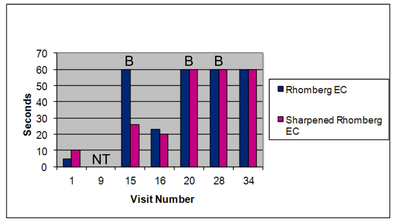
Vestibular-Ocular Exercises



Vestibular-Ocular Exercises

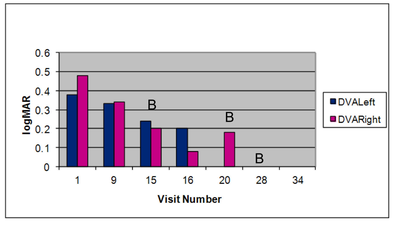


Static Balance

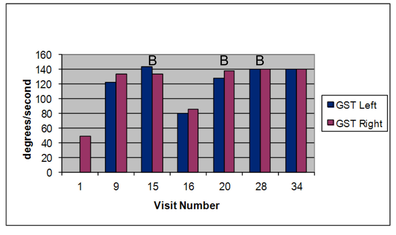


Outcomes

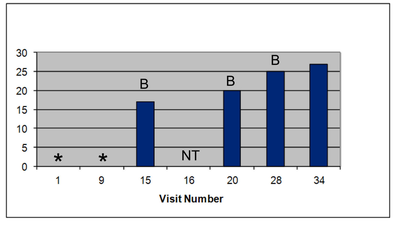
Dynamic Visual Acuity



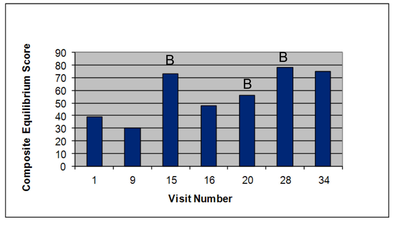
Gaze Stabilization Test



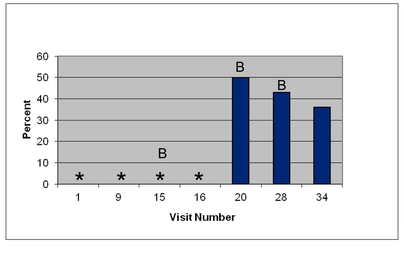
Functional Gait Assessment



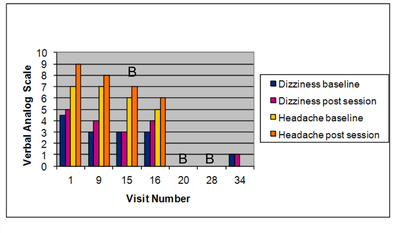
Sensory Organization Test



Motion Sensitivity Quotient



Symptom Self Report

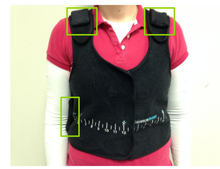


Notes

*Unable to tolerate testing secondary to symptom exacerbation
B = BBTW utilized during visit/reassessment

Findings

- 15 sessions of standard vestibular PT, with poor prognosis
- Initiation of BBTW at visit 15
- Patient weighted with:
  - 0.5 pounds along the lateral right trunk
  - 0.25 pounds to the left of the 1st lumbar vertebrae
  - 0.25 pounds at bilateral shoulders



- Improvements immediately noted in all outcome measures
- With use of BBTW, patient was able to fully participate in PT interventions, and over 19 sessions was able to demonstrate excellent progress

Discussion

- The individual in this case study was initially unable to demonstrate progress during PT and was unable to tolerate the most appropriate interventions due to the onset of severe dizziness/vertigo.
- An improvement in vestibular-ocular function, aided by the use of BBTW, allowed this individual to better tolerate treatment sessions enabling successful completion of interventions and resulting in more optimal outcomes.
- The use of BBTW also demonstrated improvements in gait kinematics and balance, which may allow for decreased risk of falls and faster return to prior level of function.
- Limitations include patient fatigue, as this individual was unable to tolerate multiple trials of each assessment in a session due to symptom exacerbation.

Future Considerations

- These findings suggest that utilization of BBTW may be beneficial in the treatment of vestibular dysfunction.
- Further research is needed to continue to explore the effects of BBTW in those with vestibular dysfunction.