PHYSICAL THERAPY FOR MTBI

FOR THE CENTER ON BRAIN INJURY RESEARCH AND TRAINING

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GOOD OUTCOMES WITH PHYSICAL THERAPY FOR PATIENTS WITH MTBI


APPROPRIATE PATIENTS FOR PT

- Vertigo, visual motion sensitivity, nausea, imbalance
- Neck pain, cervicogenic & tension headaches
- Poor tolerance of exertion, de-conditioning, & anxiety

- Vestibular Rehabilitation Therapy
- Cervical Manual Therapy & Stabilization
- Exertional (Aerobic) Training
SENSORY INTEGRATION

- Obtaining and organizing sensations to form perception of environment

- "When the flow of sensation is disorganized life can be like a rush-hour traffic jam" A. Jean Ayres, OT, PhD
CENTRAL NERVOUS SYSTEM VERTIGO WITH MTBI

- Vestibular apparatus transduce head movement into neural impulses

- MTBI often effects brainstem, cerebellar, and cortical vestibular CNS pathways

- Impaired Sensory Integration/Vestibular-Visual sensory conflict -> Vertigo, Nausea, Imbalance

- Vertigo - abnormal sense of motion
VESTIBULAR OCULAR REFLEX

• Stabilizes gaze with head movement

• Trauma to vestibular pathways disrupts VOR
  Gain (ratio of head to eye movement) causing…

• Nystagmus &

• Oscillopsia
OCULOMOTOR CONTROL

- Coordination of eye movements to capture light on the fovea of the retina by mechanisms below...
- Smooth Pursuits - continuous tracking of slow target
- Saccades - rapid eye movements to catch up or move between targets
- Vergence - coordination of binocular movements in/out for depth perception
PT TESTS & MEASURES FOR MTBI

• Dizziness Handicap Inventory

• Vestibular Oculomotor Screening (VOMS)

• Infrared Video analysis of oculomotor control and nystagmus - high tech rule in/out central versus peripheral vertigo

• Balance Testing

  • High Tech - Computerized Posturography

  • Low Tech - Dynamic Gait Index, Functional Gait Assessment, High Level Mobility Assessment Tool
NYSTAGMUS

http://youtu.be/E5xUh4DMfUA
VISUAL MOTION SENSITIVITY

- Vertigo from Visual-Vestibular sensory conflict
- Occurs with optical illusions, complex, moving backgrounds
- More common with abnormal oculomotor & nystagmus seen with MTBI

OPTICOKINETIC NYSTAGMUS
VESTIBULAR REHABILITATION THERAPY

- Specialized form of physical therapy serving patients with vertigo, dizziness, visual motion sensitivity, imbalance, and nausea through applied sensory integration techniques below and canal repositioning therapies.

- SUBSTITUTION via up training Somatosesory & Visual perception

- GAZE STABILIZATION

- HABITUATION to provoking Vestibular & types of Visual stimuli
SOMATOSENSORY SUBSTITUTE

- Coaching of touch & pressure to control acute symptoms
- Sensitization - balance training with firm surfaces and eyes closed
VISUAL SUBSTITUTION

- Retrain coordination of oculomotor control
- Enhances visual perception ->
- Eliminates sensory conflict ->
- Controls vertigo, imbalance, nausea rest and with head movement
Oculomotor control moves eyes to map environment
Oculomotor training also controls Visual Motion Sensitivity

SPOT THE DOTS
GAZE STABILIZATION

- Viewing target with head movement
- Improves VOR gain
- Controls Oscillopsia
- Also Habituates to head movement
CERVICAL PT

- Manual therapy to restore cervical & thoracic facet and rib facet mobility
- Decompression of occipital nerves
- Stabilization training
EXERTIONAL TRAINING

• Known as Aerobic conditioning in USA
• Mode of training which minimizes acute head movement & visual stimulation
• Also benefits some as additional anxiety management
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