Does early intervention with proprioceptive and vestibular play increase motivation for active exploration of mobility in children with Down Syndrome?

Milli Crowder, Student PT, Bellarmine University  Madison Osbourne, Student PT, Bellarmine University

Background
Pathology
-Duplication of the 21st chromosome

Prevalence
-1 per 700-800 births

Physical characteristics
- Almond shaped, usually wide set eyes
- Short neck
- Flattened facial profile and nose
- Small stature
- Deep center palm crease

Clinical presentation
- Increased joint laxity
- Decreased muscle tone
- Increased difficulties in visual organization strategies
- Increased response time in response to sensory information
- Slowness of voluntary movement
- May have cognitive deficits
- May have speech deficits

Hippotherapy⁴
- Case Report
- 11 week Hippotherapy program
- Three different positions: face forward, side-sitting, face backward
- Improve balance, posture and overall function
  - Child 1 (28 months with DS)
  - Child 2 (37 months with DS)
- Results
  - GMFM: running, walking and jumping had the largest improvements
  - Accelerometer: decreases in head and trunk frequency in the mediolateral plane
- Outcome Measures: Gross Motor Function Measure (GMFM), Accelerometer

Sensorimotor Groups²
- 10 children with Down Syndrome
- 13 to 29 months of age
- 2 groups
  - Intervention group: Individual intervention with 10 weekly sensorimotor groups
  - Control group: Individual intervention alone
- Results
  - Intervention group had significant improvements in GMFM scores (lying and rolling, crawling and kneeling, and total score) and Goal Attainment Scaling.
  - Outcome measures: Gross Motor Function Measure (GMFM), Goal Attainment Scaling

Multisensory Massage⁴
- 20 infants with DS, recruited between 1 and 3 months of age, placed in two groups
  - With Infant Massage
    - 15 min of tactile stimulation, 5 min of kinesthetic stimulation (child placed in supine and parents passively moved limbs in flexion and extension)
  - Standard care
    - Clinically significant improvements in rate of stereopsis acquisition in experimental group
  - Outcome measures: Teller Acuity Cards, Frisby Stereopsis Screening Test

Experience and Practice³
- 10 infants with DS diagnosis
- 2 groups
  - Novice sitters
  - Experienced sitters
- Oscillating movement room utilized to tax visual- sensory system
- Experience and practice in the movement room were important when coupling sensory and motor action in both groups of DS sitters
- Objective Measures: Presence of Nystagmus, Trunk Sway Distance

Clinical Significance
Early Intervention
- Research shows that children and infants with DS are sensitive to practice and can couple sensory information with motor action if they have enough experience in a motor task
- Children and infants with DS may benefit greatly from early intervention in order to acquire planning strategies to better explore their environment

Participation
- Integration of sensory and balance components, such as Infant Massage and Hippotherapy and participation in sensorimotor groups may help develop improvements in balance and sensory integration strategies
- Fun, interactive activities that may be used at home and in the clinic help encourage children to engage further with their environment and with others

Approach
- Each study emphasized a holistic approach to treatment of children with DS
- Proprioceptive and vestibular treatments are beneficial, however they should completed in conjunction with other functional therapy approaches

References