The Effects of Facilitating Postural Reactions on Motor Development in Children with Down Syndrome

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Importance of Postural Reactions

• Prerequisite for the attainment of motor skills in course of early development
• Provide support and stability to the head, trunk, and extremities
• Keep head vertically aligned during movement, to help with balance during perturbations
• Helps to establish protective responses to prevent falls during rapid movements (2)

Development and Maintenance of Stability

• Stability requires maturation of two separate but interactive processes within postural control:
  • Those responsible for coordinating muscles and joints into appropriate response patterns and
  • Those responsible for ensuring that responses remain consistently context dependent
• Control of static balance must be acquired before a child learns to walk
• This involves organizing, integrating and acting upon repetitive visual, vestibular and surface-somatosensory inputs providing orientational information to the postural control system(3,5)

Sensorimotor Deficits in Children with Down Syndrome

• Timing
  • Decrease in both simple and choice reaction time
• Higher incidence of muscle co-activation
  • Instead of biphasic pattern of muscle activity, show simultaneous pattern
• Slowness becomes accentuated at longer distances
  • Decreased ability to generate muscle force to same extent for longer distance in comparison to neurologically normal individuals(1)

Evidence

• Studies have shown that maintaining postural stability requires sustained adjustments rather than maximal bursts of activity
  • This can be very difficult for children with neurological dysfunction because of low force output ability, poor endurance, and poor biomechanical alignment
• Results of combined tests—measures of functional skills with impairment dimension measures—shed light on the critical value of range of motion, motor coordination, force production, and sensory integration necessary for postural stability in normal activities(4)

Clinical Significance

• Therapeutic services should focus on assisting children with Down Syndrome in the refinement of postural synergies, specifically enhancing motor planning and coordination
• Including both postural reactions, along with focusing on increasing strength will help promote motor milestone progress

References