Children with Tracheostomy, Voice or Resonance Disorders in the Schools

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Objectives

- Basics of tracheostomy
  - Anatomy, Trach tubes, Reasons for trachs
- Complications with Tracheostomy
  - Communication Development
  - Feeding/Swallowing
- What to do
  - Communication
  - Feeding/Swallowing
Anatomy

- Upper airway
  - Nose
  - Mouth
  - Pharynx
- Larynx
- Lower airway
  - Trachea
  - Bronchi
  - Bronchioles
  - Alveoli
Tracheotomy

- Surgical procedure
- Incision into the trachea to form an opening or stoma
- Placement of a tracheostomy tube into the stoma
Tracheostomy Tubes Pediatric

• A curved tube through the tracheostoma
• Usually plastic or silicone
• Usually single-cannula for pediatrics
• Generally not cuffed for pediatrics
• Size and length determined by Dr
  – Depends on child’s age, size, medical need
  – Proper diameter, length and curve to minimize complications/damage to tracheal wall
Tracheostomy

Nasal cavity
Teeth
Lips
Tongue
Epiglottis
Vocal cords (inside the larynx (voice box))
Esophagus (food pipe)
Tracheostomy tube
Trachea (windpipe)
Reasons for Tracheostomy

• Airway anomalies
  – Subglottic stenosis
  – Vocal cord paralysis
  – Laryngo/tracheomalacia
  – Laryngeal or subglottic web
  – Glossoptosis—Pierre Robin Sequence
  – Tumors (e.g. cystic hygroma, teratoma)
  – Obstruction
Reasons for Tracheostomy

- Lung Conditions
  - Bronchopulmonary dysplasia
  - Chronic lung disease
  - Congenital diaphragmatic hernia
Reasons for Tracheostomy

• Airway injury
  – Burn/inhalation injury
  – Laryngeal trauma
  – Chest trauma
  – Obstruction from choking
  – Caustic ingestion

Neurologic Conditions
  – Congenital central hypoventilation syndrome
  – Spinal cord injury
  – Brain injury
Reasons for Tracheostomy

• Muscular conditions
  – Muscular dystrophies
  – Cerebral palsy
  – Diaphragmatic paralysis
  – Congenital myasthenia gravis
Risks Associated with Tracheostomies in Kids

• Developmental delay
  – Influences of chronic illness and frequent hospitalizations

• Communication Deficits
  – Also impacted by underlying diagnoses

• Feeding and swallowing problems
  – Also impacted by underlying diagnoses
Communication

• Lack of vocalization
  – Tracheostomy frequently reduces that ability to move air through larynx to upper airway
  – Lack of opportunity for vocal play and development
  – Age of trach placement and removal is a factor in communication difficulties
Communication

• Speech-Language deficits
  – Expressive language delays may persist after decannulation
  – Slow development of sound acquisition, vowel production
  – Excessive use of phonological processes (Kertoy et al. 1999)
Feeding & Swallowing

- Up to 80% of infants and children with tracheostomies have been identified with dysphagia (Norman et al. 2007)

- Difficulties with feeding & swallowing are also impacted by underlying diagnoses
Feeding & Swallowing

• Infants and children with trachestomies are at increased risk of:
  – Oral motor/oral phase difficulties
  – Aspiration
  – Oral aversion
Feeding & Swallowing

• Physiologic changes in Swallowing
  – Delayed swallow initiation
  – Slowing of laryngeal movement
  – Delayed laryngeal closure during swallowing

(Abraham & Wolf, 2000)
What do we do?

We work within a team including:

- Child
- Parents
- Trach home (the medical home where trach is managed)
- Pediatrician
- Speech-Language Pathologists
- Respiratory Therapists
- OT/PT
- Teachers
- Nurses
- Para-educators
What do we do?

• Hospital/Clinic
  – Evaluation and therapy
  – Communicate with local service providers

• Home
  – Evaluation and therapy
  – Listen to and Involve parents and home nurses

• School
  – Evaluation and therapy
  – Seek information & assistance from medical/trach home when needed
  – Utilize the social situations in schools
What do we do?

• Communication
  – Receptive language development
    • Evaluation and therapy
    • May need to start with basics for communication
  – Expressive language development
    • Evaluation and therapy
    • Multimodal communication methods
  – Speech sound development
    • Evaluation and therapy
    • Phonological errors, but may need placement cues and lots of practice
Receptive Language Development

• Speech-language stimulation and therapy
  – Parent education and involvement
  – Improving child’s use of signals (facial, gestures)
  – Turn taking
  – Following directions
  – Pointing

• Developmentally appropriate activities
  – Choice of toys and books
Expressive Language Development

- Early gestures
  - Target in therapy
  - Parents should be participating also
- Sign language
  - For early wants and needs then expand
- Augmentative communication
  - Devices
  - Electrolarynx
- Esophageal speech
Vocal & Speech Sound Development

• Oral movement imitation activities
  – May include smacking sounds, tongue clicking, “kissing” sounds
  – Making /p/ with air trapped in mouth
  – Lip rounding
  – Tongue movements (tongue tip up)
Vocal & Speech Sound Development

• Leak vocalization/speech
  – Vocalization with air that leaks around trach either from active exhalation or air pressure provided by ventilator
  – May involve finger occlusion of tracheostomy
  – Reinforce vocalizations, humming etc
  – Encourage imitation of vocalizations, speech sounds, words
Speaking Valves

- Child must be medically ready
- Have enough space around trach to pass air trach to upper airway and maintain saturations
- Allows air into trach for inspiration, then closes so exhalation goes around trach to upper airway
- Need to be evaluated for tolerance of valve with trained healthcare provider
Speaking Valves

Shikani Valves

Passy-Muir Valves
Speaking Valves
Speaking Valves
Speaking Valves

• Goals may include
  – Tolerate brief periods with valve in place then gradually increase duration
  – Vocalize with valve in place
  – Imitate vocalizations, vowels, consonants
  – Speak certain number of syllables per breath
  – Imitate respiratory pattern with vocalization on exhalation
Speaking Valves

• Activities with preschool children may include
  – Note type and contexts when child makes sounds with valve in place
  – Imitate the child’s sounds
  – Encourage blowing bubbles, raspberries
  – Make sounds associated with playing with a toy—take turns with the toy.
Speaking Valves

• Activities with older children may include
  – Vowel imitation
    • start with vowels child already produces and varying length
    • Introduce new vowels (only vowels because consonants can affect vowel) then add consonants VC, or CVC
    • In words/syllables track vowel errors and then work on vowel pairs for contrast
When Trach removed

• **Possible Goals**
  – Increasing rate and complexity of child’s vocalizations
  – Continuing to improve consonant productions
    • Select classes of sound child already produces

• **Activities**
  – Songs and rhymes
  – Activities with frequent target sounds
  – Work on increasing number of syllables
What do we do?

• Feeding & Swallowing
  – Aversion
  – Oral motor difficulties
  – Aspiration
Aversion

- Provide positive face and oral experiences
- Facial/oral stimulation to decrease any hypersensitivity
- Toothbrushing
- Start with empty utensils
- Tastes of food on child’s fingers
Oral Motor Deficits

• Work on aversion first because need to be able to get near and into child’s mouth

• Oral motor therapy for lip, tongue and jaw movement and control
  – Downward pressure on tongue with finger, spoon, brush, other utensil to promote tongue cupping

• For chewing, work on lateralization of tongue, place therapy aides or foods on molars when child ready
Aspiration

- Swallow study analysis to determine cause and timing of aspiration
- Swallow study to determine if any compensations reduce/eliminate aspiration
- Even is grossly aspirating, consider continued offering of tastes of food/liquid to prevent aversion
- Size of bolus is sometimes a factor
- Thickening of fluids sometimes helpful
Summary

- Infants and Children have trachs for multiple reasons
- Tracheostomy can affect speech-language development and feeding/swallowing
- Therapy is needed to help develop multiple modes of communication
- Therapy may be needed for feeding/swallowing difficulty
Summary

• Communication between local services providers and medical/trach home is necessary

• Be cautious and respectful when dealing with a child with a trach, but don’t panic because basic communication and feeding/swallowing evaluation and treatment apply

• Look at overall development as well as communication and feeding/swallowing
Questions & Answers

For a copy of the updated version of this presentation
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References