Pediatric Tracheostomy and Use of the Passy-Muir® Valve
Julie A. Kobak
Director of Clinical Education-Speech
jkobak@passy-muir.com
(949) 833-8255

Course Outline
- Pediatric Tracheostomy
- Clinical Complications of Tracheostomy
- Clinical Benefits
- Assessment Guidelines
- Treatment Principles
- Therapy Techniques
  - With video examples

Pediatric Tracheostomy
- Timing of Pediatric Tracheostomy
  - Majority are trached under 1 year of age
  - Average age 2-3 years old
  - Critical time for development
  - Practice and hear their own vocalizations
- Indications for Pediatric Tracheostomy
  - Long term ventilation
    - Neuromuscular
    - Ventilator dependency
  - Upper airway obstruction
    - Stenosis
    - Laryngo/tracheo/broncho malacia
    - Craniofacial malformations/syndromes
    - Vocal cord paralysis
- Pediatric Airway Anatomy
  - Softer, larger palate
  - Lumen size is smaller
  - Larynx is higher
  - Close approximation of larynx and tongue
  - Less cartilage (softer)
- Normal Trachea
- Grade 3 Subglottic Stenosis
- Grade 4 Complete Obstruction
- Laryngomalacia
- Vocal Cord Paralysis

Clinical Complications of Tracheostomy
• **Effects of Tracheostomy on Communication Development**
  - Caregiver interaction
  - Voice quality
  - Speech
    - 61% have articulation error
    - Consonant and vowel errors
    - Excessive use of phonological processes (stridency and liquid deviation, cluster reduction, fronting)
  - Language

• **Impact on Swallow**
  - Laryngeal Tethering
  - Decreased Sensation in the Oropharynx
  - Reduced Airway Closure
  - Reduced Subglottic Air Pressure

• **Pediatric Studies**
  - Swallow Physiology
    - 91% of 36 trach infants had swallowing disorders; 1/2 attributed to underlying neuro or anatomic deficits.
    - Higher incidence of enteral feeding
  - “Trach effect” – Abraham (2000)
    - Toddlers with trach
    - Reduced laryngeal elevation
    - Delayed swallow response-penetration

• **Decreased Secretion Control and PEEP**
  - Removal of filtration & humidification
  - Decreased cough
  - Abraham (2009)
    - All 50 children in study had secretion management issues
      - 98% level of trachea
      - 40% level of larynx
      - 56% oral

• **Restore Airflow to Upper Airway**

• **Clinical Benefits**

• **Improved Secretion Management**
  - Abraham (2009)
  - 24/49 children wearing Passy-Muir® valve full time
  - Secretion management within normal limits in average of 2 weeks.

• **Cotreatment**

• **Expedites Decannulation and Weaning**
  - Restoration of normal physiology
  - Utilization of expiratory muscles
  - Accustomed to more normal breathing pattern
  - Increased PEEP and oxygenation
  - Able to communicate
Less WOB, easier to tolerate
• Improved Quality of Life

Types of Passy-Muir® Valves
• PMV® 2000 (clear) & PMV® 2001 (Purple Color™)
• PMV® Secure It®
• PMA® 2000 Oxygen Adapter
• PMV® 007 (Aqua Color™)
• Patient Care Kit
• Team Approach
  o Multi-disciplinary
  o Patient centered
  o Policies and procedures
• General Differences
  o Psychological aspects
  o Habilitation
  o Behavioral considerations
• Patient Selection
  o Cognitive status-Awake, responsive, attempting to communicate
  o Medically stable
  o Able to tolerate cuff deflation
  o Able to manage secretions
• Factors Affecting Upper Airway Patency
  o Size of tracheostomy tube
  o Presence and degree of obstruction
  o Edema
  o Secretions
• To Assess for Upper Airway Patency
  o Deflate cuff
  o Finger occlude and voice or cough on exhalation
  o Use mirrors, cotton, feathers, whistles or bubbles to assist with the oral exhalation process.
• Placement Guidelines
  o Patient education
  o Patient position
  o Suctioning
  o Achieve complete cuff deflation
  o Use the warning label provided with packaging
• Baseline Measurements
  o Oxygenation
  o Vital Signs
  o Breath Sounds
  o Color
  o WOB
**Patient Responsiveness**

- **Distress...Signs and Symptoms**
  - Increased RR, HR
  - Anxiety and fear
  - Restlessness
  - Increased irritability
  - Stridor
  - Grunting (infants)
  - Retractions
  - Nasal flaring
  - Head bobbing
  - Sniffing position
  - Decreased BS during auscultation
  - Decreased chest movement
  - Decreased LOC
  - Decreased PaO2 (SaO2)
  - Increased PaCO2
  - Paleness or cyanosis
  - Decreased perfusion/mottling
  - Bradycardia/hypotension
    (this is a late sign)

- **Guidelines**
  - Approach to Education
  - Higher incidence of airway obstruction
  - Normal baselines
  - Reaction time
  - Transitions may be gradual

- **Children 0-6 months old**
  - Evaluation:
    - Infant communication developmental scale
    - Oral-motor function and feeding skills
  - Treatment:
    - Parent education
    - Early developmental milestones
    - Non-nutritive oral stimulation/sucking
    - Bottle feeding

- **Children 6-24 months old**
  - Evaluation:
    - Receptive and expressive language
    - Play and cognition
    - Oral feeding Skills
  - Treatment:
    - Parent education
    - Facilitate oral exhalation
- Facilitate vocalization
- Augment with alternative communication systems as necessary
- Oral feeding

- Play, Play, Play!

- Goal #1 Increase Oral Exhalation
  - Techniques
    - Imitation
    - Blowing
    - Bubbles
    - Whistles
    - Horns, Kazoos
    - Pinwheels
    - Straws
    - Cotton balls

- Toby Tracheasaurus™

- Goal #2 Increase Voicing
  - Activities
    - Planes, trains, and automobiles
    - Play dough
    - Rice and beans
    - Animals
    - Books
    - Songs

- Children 3 years old—School Age
  - Evaluation:
    - Receptive and expressive language
    - Oral feeding Skills
  - Treatment:
    - Parent education
    - Coordinate services with school, IEP
    - Elimination of negative behaviors
    - Intensive voice and speech therapy

- Additional Voice and Speech Goals
  - Improve voice quality
    - Weak
    - Harsh, hyperfunctional
    - Pitch
  - Improve coordination of respiration and speech
  - Improve articulation and phonology

- Swallowing and Feeding Goals
  - Passy-Muir® valve for assessment (clinical & instrumental)
  - Passy-Muir valve for oral feeding
    - Decrease sensitivity (facial/oral stimulation)
    - Tastes
- Textures
- Feeding Equipment
- Positioning
- Care, Cleaning and Lifetime of the Passy-Muir® Speaking Valves
  - Average lifetime of 2 months

**Educational Opportunities**

**WEBINARS or SELF STUDY COURSES**

Application of Passy-Muir® Swallowing and Speaking Valves
Interdisciplinary Tracheostomy Team: Where Do I Start?
Ventilator Basics for the Non-RT
Ventilator Application of the Passy-Muir Valve
Pediatric Tracheostomy and Use of the Passy-Muir Valve
Pediatric Ventilator Application of Passy-Muir Valve
Swallow Function: Passy-Muir Valve Use for Evaluation & Rehabilitation

www.passy-muir.com
Passy-Muir Inc. is an approved provider of continuing education through ASHA, AARC and California Board of Nursing Credit