

Pediatric Tracheostomy and Use of the Passy-Muir® Valve

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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

- o 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
 - o 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

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