

Child Welfare: **When EMS Confronts Complex Pediatric Problems**



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EMS and Children

■ Statistics:

- 13% of EMS transports but mostly BLS
- 62% are for injury or poisoning
- ~12 million special needs kids in US

■ Pedi concerns for EMS

- ↑ risk for errors due to limited:
 - history and exam
 - experience (EMS and local EDs)
 - clinical research evidence
- Special anatomy, VS, equipment, protocols
- Emotional impact

Some Pedi Pearls for EMS

- **Obstructed airway**
- **Pediatric Hearts**
- **Patient Safety**
- **Toxicology**
- **Children with special healthcare needs**

Upper Airway Obstruction

- **Recognition!!**
- **Take suction, oxygen, airway box in with you**
- **Half:**
 - of all obstructed airways for EMS are in kids < 5 yrs
 - of these children are < 1 yr old
 - resolve before EMS arrives (and only 3 of 182 needed ALS from San Diego study)
- **Most common foreign bodies:**
 - Age < 4 months: Liquids
 - Solid foods: Candy, chips, cookies; grapes, hot dogs
 - Objects: Coins, paper, toys, marbles
- **Partial obstruction: Position of comfort & txp**

Complete Obstruction: Foreign Bodies—Try the Usual

- **Responsive:**

- < 1 yr old: back slaps and chest thrusts
- ≥ 1 yr old: abdominal thrusts (Heimlich)

- **Unresponsive/not breathing:**

- Position: head tilt/chin lift; jaw thrust
- Tongue/jaw lift, look, remove/suction
- Try to ventilate
- Chest compressions/look again/
reattempt ventilation
- **PLUS more options before needle cric**

PLUS:

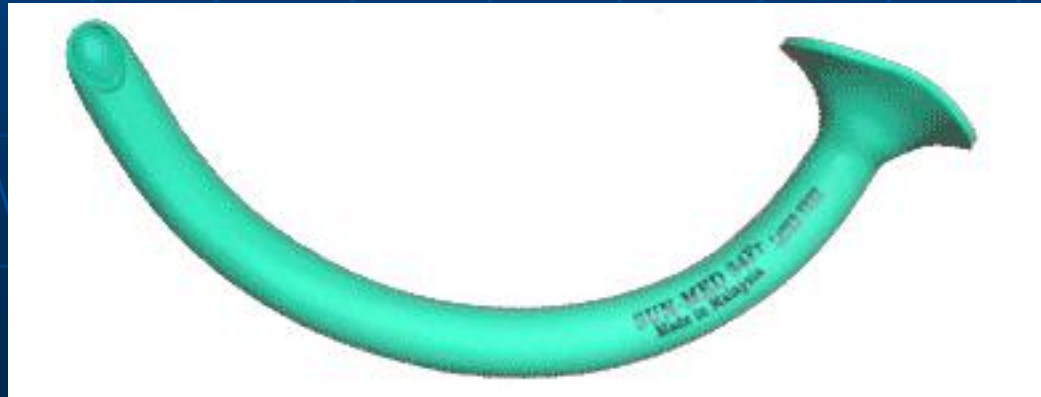
- Magill vs.



Ring (sponge
stick) forceps



- Large NPA by mouth, attach to suction



Video Laryngoscopy



PLUS:

- **Bag-mask ventilation:**
 - Two person, two handed, tight seal
 - High pressure (occlude pop-off valve)
 - If able to ventilate, then haul a__ to ED
- **Try small ETT — may bypass FB or:**
 - May push FB into one mainstem
 - May push goop into ETT (then remove)
 - May push ETT into mainstem below goop

(This is NOT a substitute for leaving the suction in the truck)

Hearts: Chest Pain in Children

- Unusual sx, seen in $\sim 0.3\%$ of ED visits
- **> 90% are NOT cardiac in origin:**
 - musculoskeletal
 - pulmonary (asthma, infection)
 - GI
 - sickle cell
 - idiopathic
 - psychogenic
- So 12 leads usually non-dx
- If cardiac, rarely ischemic:
 - No great markers from sx/sx
 - Arrhythmias (SVT)
 - Mitral valve prolapse
 - Myocarditis, pericarditis
 - So kids don't get NTG or aspirin

But kids can get acute MIs too!

- **Anomalous coronary arteries**
- **Myocardial bridging**
- **Arterial vasculitis**
- **Hypertrophic cardiomyopathy**
- **Obstructive heart lesions**
- **Sickle cell disease**
- **Marfan syndrome**
- **Hypercoagulable states**
- **Familial hyperlipidemia**
- **Chronic hypertension**
- **Diabetes**
- **Kawasaki disease**
- **Family hx of SCD or CAD at young age**
- **Cocaine/meth**

Congenital Heart Disease

Children with Tetralogy of Fallot exhibit bluish skin during episodes of crying or feeding.



"Tet spell"

© ADA



Pedi Safety

- **Transport restraint: Do it!**
- **Hospital Choices:**
 - **Nearest ED may not be best choice, even for “can’t get an airway”**
 - **EDs need neonate, infant, pedi equipment**
 - **EM physicians and nurses need to keep skills up too**

Child Safety: Math errors (EMS quiz)

- ETT size:
 - 27% knew correct formula for pedi ETTs
 - Of those, 29% calculated the wrong size
- Calculating drug doses: 35% error rate
 - Decimal points, mg → ml
 - Use the tape—plus chart with your concentrations

■ **COMPUTERS!!!**



Children with special healthcare needs

- “those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally”
- Parents know “If any problem, call 911”
- Wide spectrum of disorders, complications, devices—can’t learn them all

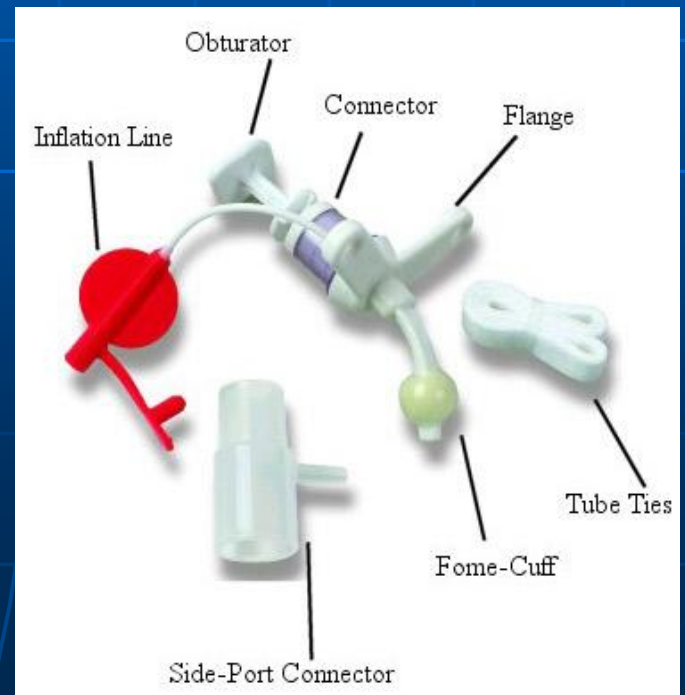
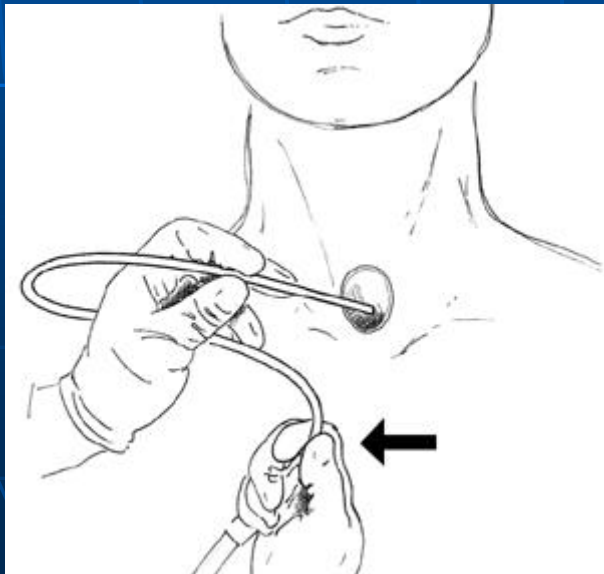


Approach to Emergencies

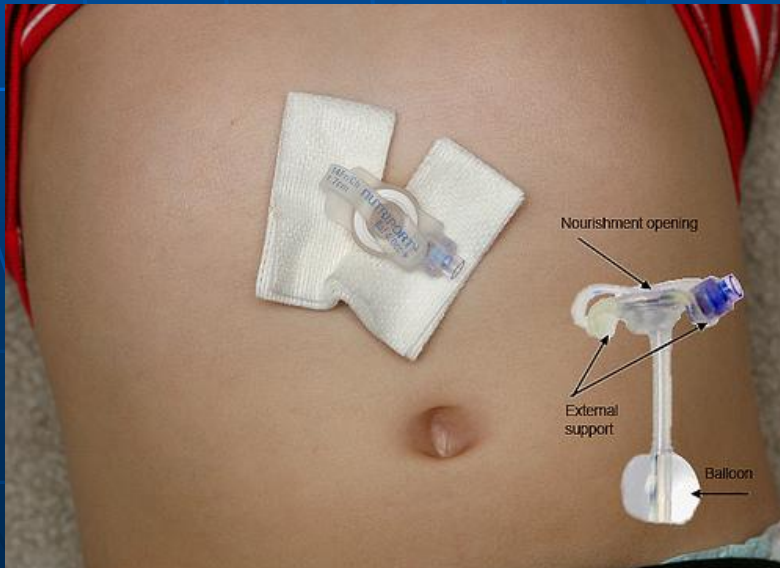
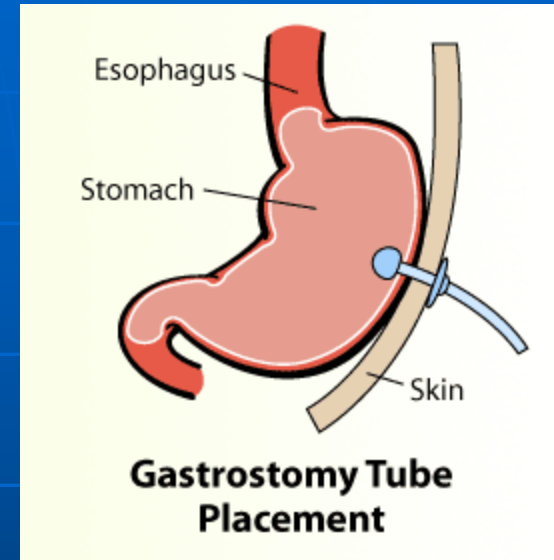
- **A, B, C s**
- **Start with usual protocols**
- **Listen to caregivers**
- **Involve caregivers and ask for help—
focus them, calm them**
- **Medical devices:**
 - **Treat the child, not the device**
 - **Look for supplies and info—"go bags"**
 - **Look for contact #, call for help**
 - **Bring all "stuff" to ED**

Trachs

- Obstruction
- Dislodgment
- Infection
- Bleeding



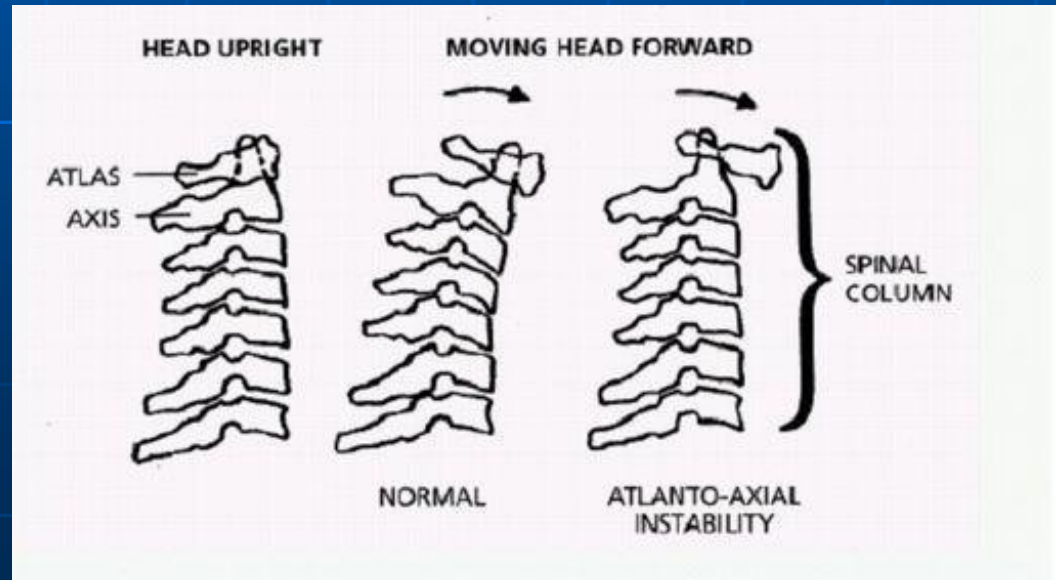
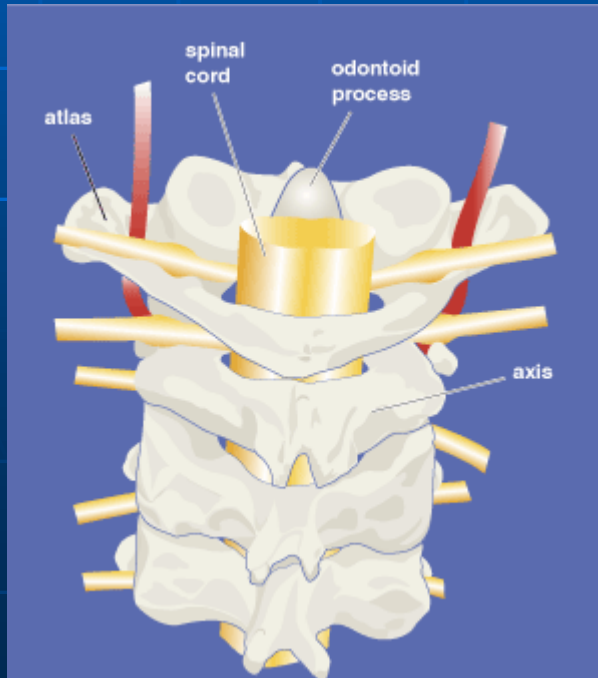
Feeding tubes



Down syndrome



- Multiple organ systems
- Atlantoaxial instability = spinal cord risk



Other Associations

- **Spina bifida** & **Latex allergies**
- **Hydrocephalus** & **CNS shunt blockage**
- **Marfan syndrome** & **spontaneous PTX, aortic dissection**
- **Muscular dystrophy** & **“quiet” respiratory failure**
- **Osteogenesis imperfecta** & **fractures**

Resources for EMS

- **Prehospital Protocols for Children with Special Health Care Needs (from CNMC):**
 - trachs, vents, central lines, CSF shunts, feeding tubes, apnea monitors, nerve stimulators, colostomy
- **Special Children's Outreach and Prehospital Education course with teaching package and videos**

Poisonings: When small doses can kill

(1-2 pills or tsp lethal for 10 kg toddler)

- Calcium channel blockers
- Chloroquine
- Chlorpromazine
- Clonidine
- Clozapine
- Diphenoxylate
- Hyoscyamine
- Imidazolines (Afrin)
- Imipramine/TCAs
- Methadone
- Quinine
- Sulfonylureas
- Theophylline
- Thioridazine
- Acetonitrile
- Ammonium fluoride
- Benzocaine
- Butyrolactone
- Camphor
- Hydrocarbons
- Lindane
- Methanol
- Methyl salicylate (oil of wintergreen)
- Pennyroyal oil
- Selenious acid
- Superwarfarins
- Toxic alcohols

Pedi poisonings:

- Don't be fooled when child looks fine
- Call Poison Information Center

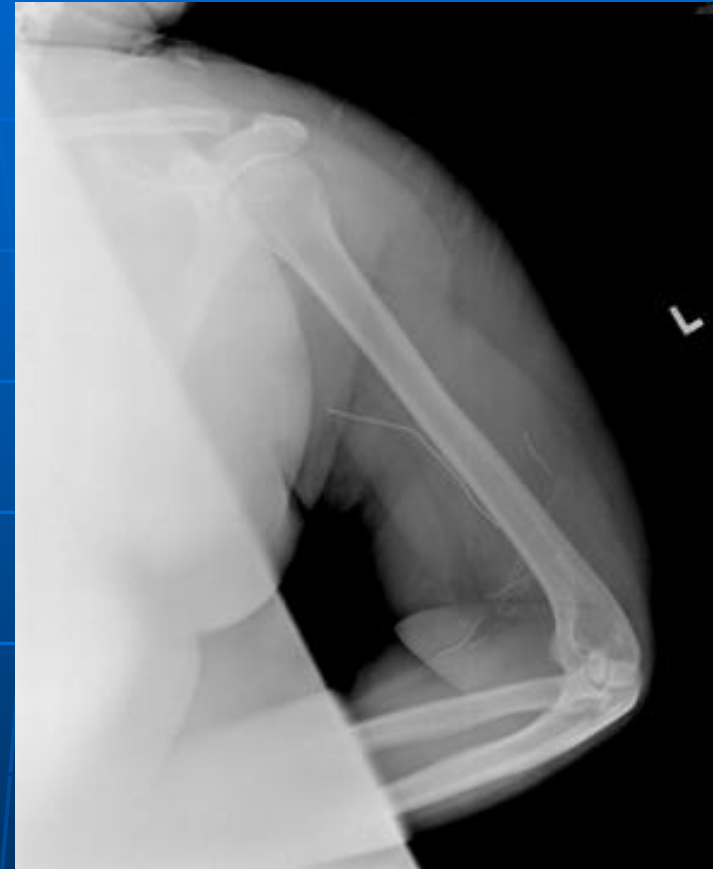


The other “special needs” kids: Teenagers and the things they do

- **Clubbing: Poly – overdose**



Teenagers—Self Embedding



Teens and Older—Head Bangers



**“Been dazed and
confused for so long....”
(Led Zeppelin)**

References and Resources

- EMS use by children: Shah et al, PEC 2008;12:269
- EMSC model pedi protocols: PEC 2004;8:343
- Airway obstruction–EMS data: Vilke et al, PEC 2004;8:196
- Foreign body extraction: Higgins, PEC 2003;7:316
- Calculation errors: Bernius et al, PEC 2008;12:486
- Tox: Henry, Harris; Pediatric Clin NA 2006;53:
- EMS C, SCOPE, protocols re special needs:
www.childrensnational.org/EMSC; jbpublish.com
- EMS C & clearinghouse: www.ems-c.org
- EMS C: <http://mchb.hrsa.gov/cshcn05>
- PEPP course: www.peppsite.com, Jones & Bartlett
- Center for Pedi EM: Paramedic Teaching Resource for Instructors in Prehospital Pediatrics
- Emerg Pedi Care course: naemt.org/education/epc_a.asp
- Prehospital Pediatric Care Curriculum (EMTs):
health.state.ny.us/nysdoh/ems/ppectoc.htm
- Disaster response: www.bdlis.com;
www.aap.org/advocacy/emergprep.htm
- Special needs protocol template: Singh et al, PEC 2003;7:336

