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CLINICAL PRACTICAL UPDATE

Securing paediatric endotracheal tubes: Tape it like you mean it!

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> Duct tape is like the Force . . . it has a light side, a dark side, and it holds the universe together . . .[1]

Whether for respiratory failure, head trauma, or surgical interventions, oral intubation of children is commonly performed. For the most part, unless one does anaesthesia or transport retrieval, nursing's primary role in the Emergency Department (ED) is not to ''put the tube in.'', our primary role is to ''keep the darn thing in!'' With that in mind, practitioners should ''tape it like you mean it!''[2]

> It is better to be prepared a thousand times, than to die once!

Taping a child's endotracheal tube (ETT) really starts with assembling the correct equipment before attempting the procedure. This involves at least two or three people (most important) with one to hold the tube in place and the others to place the tape and ventilate (unless the patient is already on a ventilator). Trying to tape and hold an ETT with only one person is insane at best, and will most likely result in the tube falling out.[2,3]

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> Airway security seems to bring out the home handyman, and the obsessive-compulsive in physicians and nurses.[4]

Types of tape

Suggested tapes are those that 'stay sticky' in a tsunami (i.e. saliva/goobers/snot). Durapore (silk tape) and Transpore (clear tape) are not recommended due to the fact that they seemingly stick for only a few seconds when confronted with saliva. The easiest way to remember this is to look at the name of the tape. Durapore (3 M, St. Paul, MN USA) and Transpore (3 M, St. Paul, MN USA) tapes are acceptable for taping intravenous cannulas in place, but 'PORE' choices for taping ETT's. Some tapes that work very well for securing ETT's include Leukoplast™ (Beiersdorf Inc., Wilton, CT, USA) or Elastoplast™ (Beiersdorf Inc., Wilton, CT, USA) or WetPruf™ (cloth tape) (Kendall Healthcare Products, Mansfield, MA, USA) as they seemingly have the ability to stay sticky in a hurricane. Whichever tape is chosen, research shows that 'pre-taping' the ETT with a transparent Tegaderm™, Duoderm™ or OpSite™ type dressing results in significantly greater tape adhesion.[4–6]

> We have found commercial tube holder devices . . . to be more consistent than taping in preventing movement of the tube . . .[7]

Tube holders

Simply, these devices are great, especially for most practitioners in the ED who do not encounter truly sick (i.e. intubated) children very often. In addition, once the child arrives in the paediatric ICU, they will be 're-taping the tube they way they like it.' These holders are made for babies to big people and are ideal for short term use in the ED, both with medical emergencies, but especially with facial injuries or burns in which 'tape just doesn't cut it.' As with taping, they have a very short 'orientation' period during which one learns how to use them, but once proficient, they allow for quick and consistent securing. In addition, once the ETT is placed and the radiograph reveals that the ETT needs to get repositioned, the tube can be moved up or down, but the tape does not have to be ripped off the child's face with each repositioning[3,4,8,9] (Figs. 1–3).

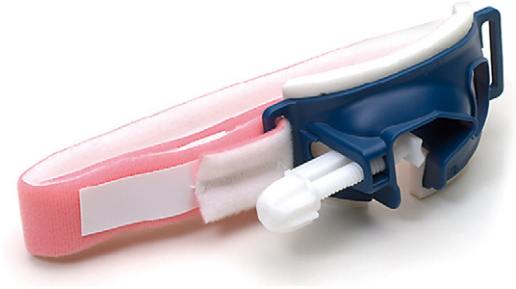

Figure 1 Thomas endotracheal tube holder (Laerdal Medical, Wappingers Falls, NY, USA, http://www.laerdal.com).

Figure 2 Neo-bar endotracheal tube holder (Neotech Products, Chatsworth, CA, USA, http://www.neotechproducts.com).

Tape technique

Simply, gauze and suction are your friends. Suction the saliva and dry the face with gauze before taping the tube. To allow for a dry skin surface before placing tapes, several products have been used in clinical practice; not all of which are beneficial to the child. The routine use of benzoin compounds under the tape should be avoided in infants as epidermal damage can result on removal of the tape.[10] Products such as No-Sting Barrier Film™ (3 M, Australia) are recommended as they assist with adherence of the tape, but do not damage the infant's delicate skin.[11] Again, 'pre-taping' with Tegaderm™, Duoderm™, or OpSite™ is recommended if conventional tapes are used.[6]

Then think about what part of a child's face do they move perpetually since birth?—their mouth (mandible). It is always moving, therefore, do not tape it there. Unlike

Figure 3 Ambu endotracheal tube holder (Ambu Inc., Linthicum, MD, USA, http://www.ambuusa.com).

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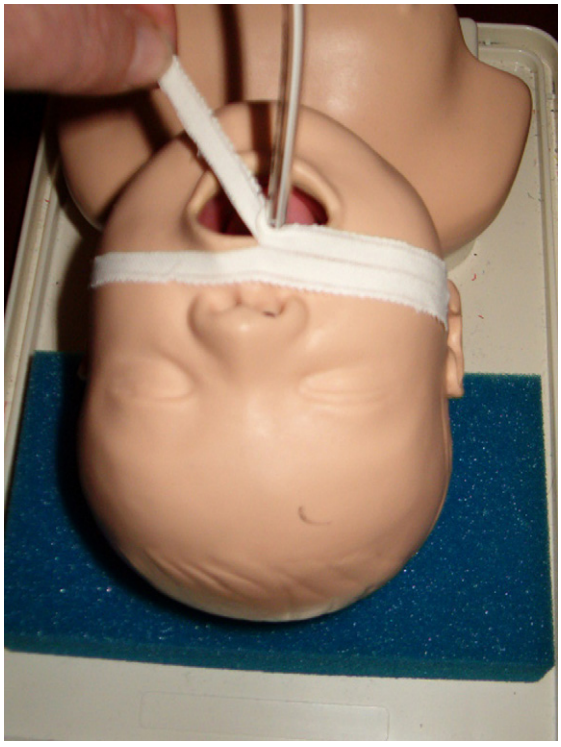

Figure 4 'H' endotracheal tube taping technique (Photos courtesy of Packmule Education and Consulting Service, http://www.packmuleedu-consult.com).

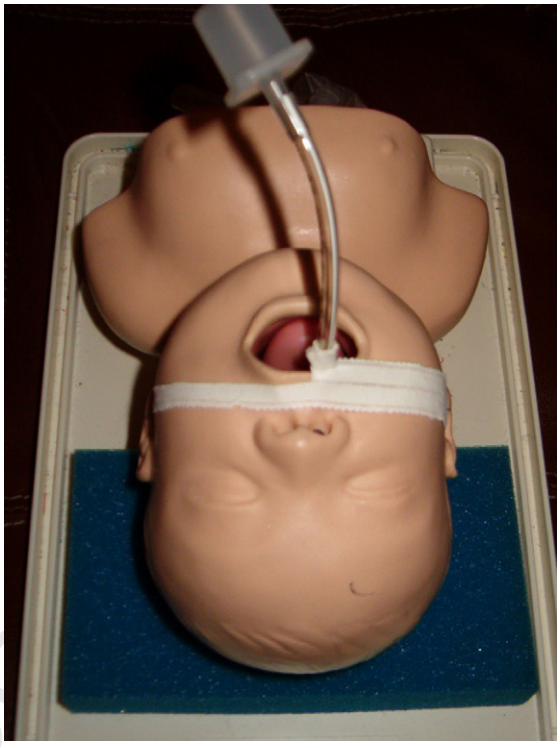

Figure 5 'H' endotracheal tube taping technique (Photos courtesy of Packmule Education and Consulting Service, http://www.packmuleedu-consult.com).

adults where practitioners seemingly tape around the neck, head, chin, face, abdomen, and big toe, you want to tape it to a 'non-moving target.' The maxilla (where a gentleman's mustache would be) never moves (unless there is a Leforte fracture), therefore, tape it there. When cut into an 'H' shape, the top part of the tape is put on the maxilla and the bottom part of the tape is wrapped around the tube.[6,12] Alternatively, cut the tape into a 'trouser leg' shape. The wide part is secured onto the child's cheek. Then one 'leg' is placed on the maxilla and the other 'leg' is wrapped around the tubex[13] (Figs. 4–6).

Finally, do not ever trust an intubated infant or child! They may be heavily sedated, but the moment your back is turned, inadvertently become extubated. Always apply simple splints to ensure they cannot bend their elbows to reach the ETT. Use prepared arm splints or a hardbound magazine from the parent's lounge which is wrapped in a cylindrical shape around the child's elbow and secured with tape. By not wrapping their little hands, they are kept free to hold a favourite toy or a parent's hand.

As airway management remains our first priority in paediatric emergencies, keeping the ETT secure is a prime objective. If the 'KISS' approach, i.e. keep it simple stupid, and the steps outlined above are followed, securing the ETT for paediatric patients will be less stressful for all concerned. Whether using the right tape or a holder, ''tape it like you mean it!''[2]

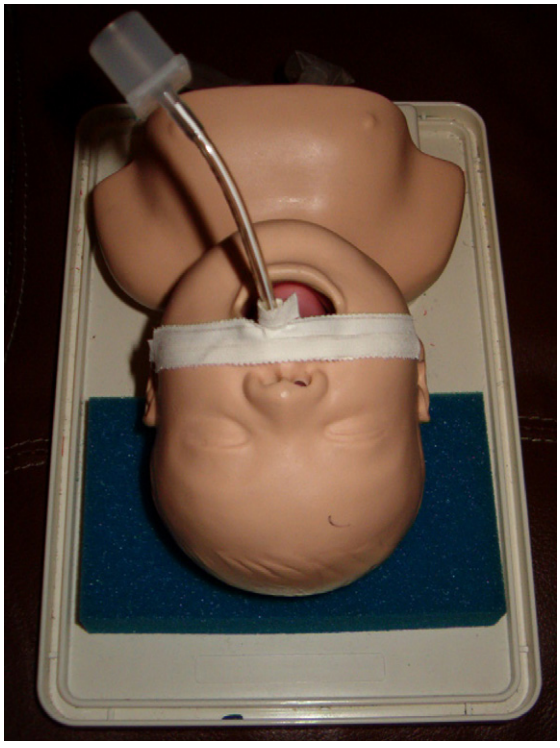

Figure 6 'H' endotracheal tube taping technique (Photos courtesy of Packmule Education and Consulting Service, http://www.packmuleedu-consult.com).

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References

1. Zwanzig C. (cited December 4, 2006); Available from: http://www.enw.org/words(thoughts.htm.
2. Richmond AL, Jarog DL, Hanson VM. Unplanned extubation in adult critical care: quality improvement and education payoff. *Crit Care Nurse* 2004;**24**(1):32–7.
3. Foster J. Photo guide: help your patient's ET tube stay put. *Nursing* 2005;**35**(10):409–17.
4. Lovett P, Flaxman A, Sturmann K, Biju P. The insecure airway: a comparison of knots and common devices for securing endotracheal tubes. BMC Emergency Medicine 2006; 6(7). Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1483826.
5. Fenje N, Stewart DJ. A study of tape adhesive strength on endotracheal tubes. *Can J Anaesth* 1988;**35**(2):198–201.
6. McLean S, Kirchhoff KT, Kriynovich J, Ahe LV. Three methods of securing endotracheal tubes in neonates: a comparison. *Neonat Netw* 1992;**11**(3):17–20.
7. Luten R. Accurate endotracheal tube placement in children: depth of insertion is part of a process. *Pediatr Crit Care Med* 2005;**6**(5):606–8.
8. Cracchiolo L, Prentice D, Lane N, Bess K, Clayton D, Kollef M. Clinical evaluation of the Hollister E-TAD endotracheal tube holder device versus tape. *Resp Care* 2006;**51**(11):1131. Abstract OF-1106-1102.
9. Tasota FJ, Hoffman LA, Zullo TG, Jamison G. Evaluation of two methods used to stabilize oral endotracheal tubes. *Heart Lung: J Acute Crit Care* 1987;**16**(2):140–6.
10. Darmstadt G. Neonatal skin care. *Pediatr Clin North Am* 2000;**47**(4):757–82.
11. Andrews D. Airway and breathing management during resuscitation of infants. *Neonat Paediatr Child Health J* 2005;**8**(2):24–7.
12. French J, editor. *Pediatric Emergency Skills*. St. Louis: Mosby; 1995. p. 118.
13. NETS. *Securing oral ETT, NSW newborn and paediatric emergency transport service policy and procedure manual*. Sydney: NETS; 2006.

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