

# The Thomas Tube Holder in pre-hospital care

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## Abstract

The paper describes a single-use device suitable for securing the endotracheal tube (ETT) or laryngeal mask airway (LMA) in pre-hospital care.

## Key words

Thomas tube holder; endotracheal tube; ETT; laryngeal mask airway; LMA; pre-hospital care; unplanned extubation.

## Background

Accidental displacement of an endotracheal tube (ETT) is a well-recognised danger with intubated patients. Relatively small movements of the head and neck or inadvertent traction on an ETT can result in dislodgment with potentially disastrous consequences if the situation goes unrecognised.

The traditional solution for stabilising the ETT has been to tie it in place with ribbon gauze, or to secure it to the patient's face with adhesive tape. However, both of these methods have their drawbacks. Ribbon gauze can slip or come loose and adhesive tape performs badly on bearded, wet or bloodied faces. In one prospective study of 426 ventilated patients on an adult intensive care unit over a two-month period, fixation with 1cm adhesive tape was identified as a significant risk factor for unplanned extubation, regardless of whether or not the tape encircled the neck, and the author recommended strong fixation of the ETT with particular attention paid to orally intubated patients.

Tube biting is an additional hazard when a neuromuscular blocking agent is not being used, and this involuntary act can result in self-asphyxia. A bite block may be fashioned from a roll of gauze swabs, or a Guedel airway can be used for this purpose. Although these time-honoured methods of stabilising and protecting the ETT are still in everyday use during routine anaesthesia, they are less suitable for the more hostile pre-hospital environment.

## Thomas tube holder

The Thomas tube holder (TTH) was designed to address the twin problems of accidental

dislodgment of a tracheal tube and tube biting. This single-use device first appeared on the market in 1995 and was originally manufactured in the USA. Manufacture was subsequently switched to China and the device underwent a re-design before the rights to the product were obtained by Laerdal.

The device consists of a plastic mouthpiece with a central tube-clamping hole and is available in adult and paediatric sizes. An open gateway provides access to the tube-clamping hole and there is a quick-thread plastic screw which, when tightened with thumb and finger, holds the tube firmly in place. The TTH has an integral pliable bite block, and the underside of the mouthpiece has a soft foam backing to cushion the device against the face.

The TTH is secured around the back of the patient's neck by means of a soft but strong fabric strap. A plastic slide-stick allows the strap to be passed easily behind the neck even if the patient has long hair, and the clever 'T'-shaped profile of the slide-stick ensures that the Velcro fastener remains in the correct orientation for trouble-free application.

Finally, the mouthpiece possesses a separate access hole of ample size to allow suctioning of secretions from the oropharynx whilst the TTH is in place. Having used the device in pre-hospital care on numerous occasions over a five-year period, this author has found the TTH to be both simple to apply and highly effective.

## Use with laryngeal mask airway

Although designed for use with an ETT, the original TTH could be used equally successfully with the laryngeal mask airway (LMA)<sup>ii</sup>. However, the last re-design resulted in a narrowing of the tube-clamping hole making it really only suitable for use with an ETT. Now that Laerdal has obtained the rights to the product, plans have already been drawn up to enlarge the tube-clamping hole to make the device equally suitable for use with the full range of standard LMAs, and the new version of the TTH should become commercially available during 2005.

The ability of the TTH to clamp the LMA with its curved airway tube pressed firmly up into the palato-pharyngeal arch produces the ideal conditions for optimal LMA mask position in the hypopharynx, so enhancing the cuff seal against the posterior aspect of the larynx. When an LMA is secured using a TTH, it becomes possible to lift a full-sized manikin off the ground holding just the airway tube – a very useful feature with an airway device that is recognised to require secure fixation<sup>iii,iv</sup>.

The LMA is gaining rapid acceptance as a valuable alternative device for pre-hospital emergency airway management, and it is now the first choice rescue ventilation device in the latest iteration of the American Society of Anesthesiologists Difficult Airway Algorithm (ASADAA)<sup>v</sup>. Other than the esophageal tracheal Combitube<sup>vi</sup>, the LMA is the only alternative airway device with a current European Resuscitation Council (ERC) Class IIa designation - Class IIa status being reserved for therapeutic options where the weight of evidence is in favour of its usefulness and efficacy. In a postal survey reported in 2003<sup>vii</sup>, the availability of the LMA on UK frontline ambulances had increased from 10 to 26% since the previous survey in 1997, so there would appear to be an increasing need for an effective device both to stabilise the LMA and prevent tube biting in the pre-hospital environment. When the revised version becomes available in the near future, the TTH should fulfil this need for both the ETT and the LMA.

## Conclusions

The single-use TTH conveniently solves the twin problems of accidental dislodgment of an airway tube and tube biting. Its impending re-design will make it suitable for use both with the endotracheal tube and the laryngeal mask airway. The device is particularly appropriate for use in the pre-hospital environment, but could be equally useful in any location where security of an airway tube is a high priority.

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## References

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- vii Roberts K, Allison KP, Porter KM. A review of emergency equipment carried and procedures performed by UK front line paramedics. *Resuscitation* 2003;58(2):153-158.

## Thomas tube holder – useful tips

- When used with wide-bore tubes, hold the TTH in two hands and flex the mouthpiece to open up the gateway of the tube-clamping hole
- Make sure that the patient's lips are not caught between teeth and bite block
- Secure the device to the patient using the retaining strap before clamping the tube in position
- Always check that an ETT remains in its correct position after application or re-adjustment of the TTH, ideally using a 'near-failsafe' device (CO2 detector or oesophageal detector device)
- When using the TTH in combination with an LMA, push the airway tube well up into the palato-pharyngeal curve, and then clamp it in this position using the 'quick-set' screw
- Always have a pair of scissors handy to cut the straps of the TTH in case rapid extubation is necessary (e.g. if a casualty begins to regain consciousness). This is particularly important in casualties who are immobilised between head blocks and wearing a cervical collar, since access to the Velcro fastener may be obstructed
- After undoing the retaining strap, the TTH and clamped airway tube can be removed as one.



Figure B - The Thomas Tube Holder in use with an LMA in a Laerdal manikin immobilised using the Laerdal Spinal System Solution (BaXstrap, SpeedBlocks and Stifneck Select Extrication collar).