

collar 30. This will alert the operator to the fact that the ET tube is in the esophagus and will allow the operator to immediately reattempt proper ET tube placement without an undue time delay.

It will be appreciated by those of ordinary skill in the art that the device of this invention provides many features which facilitate proper placement of ET tubes. As ET tubes are manufactured in a gentle curve to allow easier placement, so to is the shaft of the stylette curved in an anterior/posterior plane. The distal V-shaped end is composed of a bifurcated V-shaped member having two prongs, with each prong of the V being rounded at its most distal end and being biased to flex outwardly, laterally and in a horizontal plain. By including enlarged nodes thereon which are substantially as large as possible, surfaces of the throat, trachea, and esophagus are protected from injury.

In a preferred embodiment, the right and left prongs are approximately 2.5 centimeters (1 inch) in length and are constructed of a material having a durometer such that the prongs are spring-like and biased toward lateral expansion. However, lateral tension of such bias pressure should not exceed 20 centimeters of water pressure. By limiting outward bias tension, a possibility of damaging a mucosal lining of a trachea or esophagus is minimized during tube placement.

In one embodiment the enlarged nodes are convex in three dimensions on their outer surfaces however inwardly they are substantially flat to allow them to nest together when compressed together. In one embodiment the nodes are six millimeters in their widest dimension and nest together to form a six millimeter by six millimeter ovoid shape. This shape precludes puncturing, penetrating, or otherwise damaging fine tracheal or esophageal structures.

It will be appreciated that with the endotracheal tube stylette apparatus of this invention an operator can accurately implant an ET tube with one hand.

The retainer mouthpiece of FIGS. 11-13 enables an operator to quickly and securely affix the position of an ET tube in a patient's mouth by locking it thereto with clip retainers. The retainer mouthpiece 104 also protects from patients' teeth not only the endotracheal tube 10 but also the inflation tube 23 which can extend on the inside of the retainer mouthpiece 104 through one of the locking notches 148. A separate notch could also be provided therefor.

Normally, medical personnel employ tape for holding ET tubes in position on a person's mouth. Such tape is uncomfortable for a patient and is not particularly effective in holding an ET tube stationary while taping the tube into place. The retainer mouthpiece 104 is much more comfortable for a patient, can be quickly activated by an operator and is much more effective for holding an ET tube in a stationary position on a patient, especially during initial placement.

It will be appreciated by those of ordinary skill in the art that the tube adaptor collar 30' of FIG. 6, with its large female mounting stub 36' which receives the ET tube 10 therein provides many benefits over a male adaptor collar 30 as is shown in FIG. 2. Since the mounting stub 36' does not restrict flow through the ET tube, patient's who are being weaned from a respirator need not be forced to create greater pressure for exhaling. Also, flow of air and insertion of tools through the ET tube is enhanced. Also, the nodes 64' and 66' can be larger.

It should be appreciated that the belt-engagement extensions 125 and 126 of the retainer mouthpiece 104 of FIG. 11 are extremely effective for keeping a mouth of a patient covered while yet providing mouth-care orifices for providing selective access to a patient's mouth.

While the invention has been particularly shown and described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention. For example, the stylette could include a foam pad at the apex, or base, so as to protect the carina. Also, the V-shaped distal end of the stylette could include three prongs, thereby forming three V's, in which case the stylette would be less orientation sensitive. Also, the compression spring could be a separate member, or it could be attached to the thumb button and/or directly to the stylette shaft.

The retainer housing 108 of the retainer mouthpiece 104 can be made sufficiently large to fit various sizes of ET tubes while the inner surfaces 150 and 152 of the clip retainers 110 and 112 can be of various sizes to fit the various sizes of ET tubes.

The embodiments of the invention in which an exclusive property or privilege are claimed or defined are as follows:

I claim:

1. A stylette apparatus used to aid insertion of an endotracheal tube past an epiglottis of a patient and to further position the endotracheal tube at a predetermined position relative to the carina of the patient, said tube comprising a proximal end and a distal end, said apparatus comprising:

stylette means comprising exterior peripheral dimensions which fit for slidable movement within a bore of the endotracheal tube; a length which is longer by a predetermined distance than the endotracheal tube, a proximally disposed shaft end, and a distally disposed bifurcated end comprising a pair of prongs which are self-biased to spread apart at a sensible bifurcation site when not otherwise contained;

adapter means interposed between the proximal ends of the stylette and the endotracheal tube, said adapter means comprising an endotracheal tube connector whereby the proximal end of the endotracheal tube is firmly attached at a predetermined location relative to the adapter means, a digitally operated stylette actuator comprising memory means by which the actuator is proximally biased away from the proximal end of the endotracheal tube at a first position, a stylette connector for connecting the proximal end of the stylette to the actuator such that the stylette and endotracheal tube are initially inserted past the epiglottis of a patient while the actuator is biased by said memory means in the first position and, after such insertion, the stylette is moved distally against the bias of the memory means through the endotracheal tube by action of a single digit of a hand moving the actuator and therefore the stylette to a second position relative to the endotracheal tube whereat said prongs separate and said sensible bifurcation site is a predetermined distance from the distal end of said endotracheal tube.

2. The stylette apparatus according to claim 1 wherein each of said prongs comprise large vessel fol-