SUMMARY

A "Y" adapter has been devised that will simplify the amount of equipment for open system intubation anesthesia. A description is given for utilization of this method, and suggestions made for decreasing problems usually encountered. Using this unit, only one adapter is required, although various size tubes may be utilized by employing a standard series of connectors.

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A T-TUBE SLIP JOINT ADAPTER FOR TRACHEOTOMY TUBES

One of the problems which face anesthesiologists when administering an anesthetic agent to a patient undergoing an elective tracheotomy is the maintenance of anesthesia after the insertion of the tracheotomy tube. A frequently used technique is that of inserting an unshortened endotracheal tube into the outer cannula and attaching the distal end to the rebreathing bag or canister on the unsterile side of the anesthesia screen. Using this method we have noted difficulty in maintaining a pressure tight fit between the endotracheal tube and the cannula. Slippage frequently resulted in contamination of the operative field. We have thought that the thickness of the wall of the endotracheal tube restricted the airway space.

With the help of the engineering department of our hospital we constructed metal
T-tube slip joints to function as adapters* to the standard Jackson tracheotomy tubes. These slip joints were made in seven sizes (5.1, 6.64, 7.6, 8.6, 9, 9.72 and 11.1 mm.), and fit the corresponding outer cannula of the tracheotomy tubes number 3 to 9 (figs. 1 and 2). It was found that the slip joint adapter for a certain size outer cannula would also fit the inner cannula of the next larger size tube, for example, the adapter for number 9 outer cannula fits the inner cannula of a number 10 tracheotomy tube.

One end of the cross piece, which is of uniform size in all seven adapters, is sealed and the other fitted to a 12 inch length of wide bore rubber tubing (inner diameter is 11 mm.). After the surgeon inserts the slip joint into the outer cannula of the tracheotomy tube he passes the free end of the rubber tubing to the anesthesiologist (fig. 3). During surgical procedures, the inner tracheotomy tube is removed to obtain maximal airway.

Because of the availability of a complete set of these easily sterilized T-tube adapters
at the operating table we have found that a tight fit could be quickly established, no matter what size tracheotomy tube was used.

Patients who have had tracheotomies frequently require increased oxygen or an atmosphere of high humidity. In such cases we use the T-tube with both ends unsheathed. Oxygen or nebulized water reaches the patient through one side of the cross piece and the patient exhales through the other (fig. 1). With this technique there is no resistance to exhalation, reduction of the airway is minimal and there is no drying effect of a concentrated gas stream on mucous membrane, all of which frequently occur when an oxygen catheter is inserted into the opening of a tracheotomy tube.

Patients with tracheotomies who require maintenance in a respirator must be removed from the respirator at intervals for nursing and other care. At these times their ventilation must be maintained by some other method. In this situation we insert the proper sized T-tube into the tracheotomy tube, attach one arm of the cross piece to a rebreathing bag while the other is sealed, and maintain assisted or controlled respiration until the patient is returned to the respirator (fig. 3).

**Summary**

A T-tube slip joint adapter in seven sizes has been devised which provides a metal adaptation between a tracheotomy and inhalation therapy apparatus.

In the tracheotomized patient such a device can be used to administer anesthesia, to ventilate artificially or to provide oxygen therapy.

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**CORRESPONDENCE**

To the Editor:

The formula proposed by Dr. Cole in the latest number of *Anesthesiology* 14: 506-507 (Sept.) 1953 for estimating the size of endotracheal tube to be used in children is very like one that I evolved several years ago, and soon abandoned in favor of one published in my communication to *Anesthesiology* 12: 255 (March) 1951. Dr. Cole’s formula is: the French catheter gauge number equals the age in years plus 18 or 19. My formula varied only 5 or 10 per cent from this.

I was led to question this earlier formula on finding a 4 year old child whose larynx easily accommodated a French 25 tube, and a 7 year old child in whom the French 25 tube made too snug a fit. The records showed that the 4 year old was 4 inches taller than the 7 year old. My later formula, based on the patient’s height, would have suggested (not prescribed) a size 28 tube for the 4 year old.

Experience soon brought out another pair of discrepancies. A French 27 tube was annoyingly loose in a 7 year old child, and a French 29 was too snug in a 10 year old; both sizes were in line with the Cole and early Woodbridge formulas. Again, records showed that the 7 year old was 6 inches taller than the 10 year old. The later Woodbridge formula would have suggested size 30 for the 7 year old and size 28 for the 10 year old child.

Dr. Cole’s formula may be well adapted to the average larynx for each age. But we are not intubating averages; we are intubating individuals. It is a matter of common observation that individuals of the same age differ greatly in size, and that miscellaneous bodily dimensions such as breadth of shoulders, circumference of chest, arm span and the like follow more closely a child’s height than his age. In estimating the size of a child’s larynx it may be assumed that in this structure also his height will be a better guide than his age, especially for the child whose height is well above or well below the average. For this reason my later formula is based on the patient’s height; it has worked out well in practice. The earlier formula, nearly a replica of Dr. Cole’s, did not work out well because of the variation in bodily size in children of any one age.