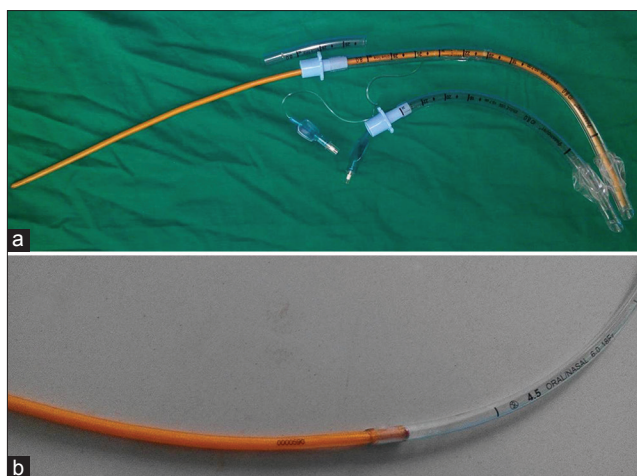


## Gum elastic bougie as a tube exchanger: Modified technique

Sir,

The standard gum elastic bougie (GEB) which is used mainly for aiding in difficult laryngoscopy and intubation can be used as a tube exchanger also. The essential steps of tube exchange using GEB require it to be inserted into the lumen of the endotracheal tube (ETT) until the markings of the GEB correlate with the markings on the ETT. This indicates that the tip of the GEB is at the tip of the ETT.<sup>[1]</sup> Subsequently, cuff of the ETT is deflated and the

ETT withdrawn gently over the GEB, whereas the operator end of the GEB is held securely. However, by the time, the tip of the ETT comes to lie in the oral cavity; the whole length of the GEB gets lost within the ETT lumen and the oral cavity resulting in the anaesthesiologist losing control over the GEB completely. This is because the GEB measures 60 cm in length and an ETT of 8.0 mm inner diameter (ID) measures 36 cm [from its distal end to the edge of the blue connector, Figure 1a], thus resulting in only 24 cm of GEB length remaining outside the ETT. Furthermore, the ETT is usually fixed around 22–23 cm at the angle of the mouth. Hence, overall 59–60 cm length of the GEB is required to be inserted into the ETT (36 cm ETT length and 22–23 cm



**Figure 1:** (a) Length of the 8.0 mm internal diameter endotracheal tube is seen to be approximately 36 cm, and when gum elastic bougie is inserted appropriately, 24–25 cm of it projects outside the endotracheal tube. The figure also shows a shortened endotracheal tube of 8.0 mm internal diameter, which is cut at 24 cm mark. This allows for nearly 36 cm of the gum elastic bougie projecting out of the endotracheal tube. (b) A 4.5 mm internal diameter uncuffed endotracheal tube snugly fits the distal end of the gum elastic bougie thus lengthening the gum elastic bougie to >80 cm

length inside the oral cavity) before the shaft of the GEB could be recovered outside the oral cavity, when the ETT tip comes out. Therefore, invariably the anaesthesiologist ends up losing control over the GEB for a brief while. This total loss of control over the GEB can result in the GEB either migrating deeper into the trachea, thus stimulating the carina in an already/almost awake patient, or there is a risk that the GEB comes out of the larynx along with the ETT and gets accidentally placed in the oral cavity or oesophagus. The traditional airway exchange catheters measure more than 80 cm (83 cm, 11 and 14 G), and, therefore, do not have this problem.<sup>[2]</sup> As long as the length of the GEB is more than twice that of the ETT, this problem should not happen. Bougies from other manufacturers that measure approximately 70 cm in length are available, and these problems are unlikely to be encountered with these.<sup>[3]</sup>

Having experienced these problems with the traditional GEB when used as tube exchanger on a couple of occasions, we have devised two unique solutions to overcome these problems.

First, prior to planned extubation of the ETT,

the ETT is cut at its 24–26 cm mark (1 or 2 cm above the oral cavity), and the blue connector is fixed [Figure 1a]. Since the ETT length now is reduced by almost 10 cm relative to ETT, it ensures that the length of GEB (60 cm) is now more than double that of the ETT ( $26 \times 2 = 52$  cm). Hence, nearly 34–36 cm of it lies outside the ETT when correctly positioned and therefore, it allows the anaesthesiologist to be always in control of the GEB during the procedure of extubation. However, it requires that another ETT be cut to similar length and kept beside the patient for future tube exchange if need be. The second solution involves attaching an uncuffed 4.5 mm ID ETT to the proximal end of the bougie. This snugly fits the GEB [Figure 1b] and requires considerable force to separate the two. Thus, this setup helps in lengthening the GEB to >80 cm.

We are confident these solutions to GEB can help minimise the complications discussed earlier. While a GEB may not be suitable for tube exchange through the nasal route due to the limitation of length, these 2 modifications can enable the traditional GEB to be used through both oral and nasal routes. Though an airway exchange catheter is ideal for extubation of the difficult airway and tube exchange, the modified GEB with the second solution that we have provided appears to have an edge as it is useful in aiding difficult intubation also.

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#### Conflicts of interest

There are no conflicts of interest.

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