The challenge of anaesthesia for laser airway surgery revolves around three major considerations: combustion, the airway, and anesthetic risk. The causes and prevention of combustion will be considered first, as these will set the scene and help avoid repetition later. Management of the airway during induction and surgery is naturally of primary importance to the anaesthetist: this is often difficult due to pathology and the need to share the airway for surgical access.

Combustion – the risk is greatest with a collimated beam such as a CO$_2$ laser. Risk of combustion is also less in lasers that operate in a pulse mode, as heat can dissipate between bursts. Commonly used tubes such as rubber, latex and plastics such as PVC, are easily ignited in a typical anesthetic gas mixture, burning with a blowtorch like flame.

**Anaesthetic management:**

1. Water is fire retardant as well as being a heat sink, so all linen, swabs and fabric should be wet.
2. Protection of standard tracheal tubes – protection with wet swabs, reflective wrapping of tracheal tubes with aluminum foil, protection of the tracheal tube cuff with filling of cuff with saline, flexometalic endotracheal tubes, silicone rubber tubes with metallic protection
4. Intermittent apnoeic technique.
5. Tubeless anaesthesia²²

**Endotracheal Tubes Designed For Laser Airway Surgery**

- Norton: spiral wound stainless steel ETT, no longer in use.
- Bivona fome-cuff: Aluminium spiral tube with polyurethane foam cuff. Foam is self-inflating and prevents deflation in the event of cuff rupture. Only use with co2 laser.
- Xomed laser shield: silicone elastomer tube containing metallic powder designed for pulsed CO$_2$ laser.
Mallinkrodt laser-flex: airtight stainless steel spiral wound tube with two PVC cuffs which can be filled with Methylene blue to indicate rupture of cuff. Recommended for use for CO2 and KTP-Nd-YAG laser.

Mallinkrodt LaserFlex tracheal tube. A. Mallinkrodt paediatric uncuffed tube. B. Mallinkrodt adult cuffed tube.

- Oswal-Hunton flexometalic tube: These tubes have an appearance and construction similar to a 'swan-neck' desk lamp or the spiral metal covering of a shower hose, and are available in adult oral, adult nasal, and paediatric oral sizes. Having an all-stainless steel construction, they are totally non-combustible. As there is no cuff, an airway seal is obtained by placing wet square gauze pieces held by steel wire and packed in the subglottis.
Oswal-Hunton flexometalic tube

Xomed Laser Shield II cuffed tracheal tube: The Xomed Laser Shield tube was constructed of silicone that had a matt dark grey appearance, due to impregnation with aluminium powder. This tube could char and become very hot if repeatedly struck, and could also be ignited.