MAIRWAY

An Improved Oral Airway for Bag-mask Ventilation and Fibre-optic Intubation & Endoscopy

Available for Licensing or Collaboration

Principal Investigator:

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An avid inventor, Dr. McKay is an experienced anesthesiologist, providing instruction and mentorship to anesthesiology residents.

Patents:
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Need: A need for emergency airway management and ventilation often confronts healthcare providers who are not experienced anesthesiologists. Ventilation is first provided with a bag-mask hand-ventilating device. It has been shown that it requires learning on 25 to 30 patients to achieve reliably adequate ventilation. The Mairway makes it easy to learn and perform good bag-mask ventilation that can save lives. For the specialist anesthesiologist, the Mairway is a better bite block for fibre-optic intubation because it provides helpful jaw thrust to open the airway without causing gagging.

Problem: In comatose or anesthetized patients the airway becomes obstructed with loss of muscle tone, making bag-mask ventilation difficult or impossible. This obstruction can often, but not always, be overcome by introducing an oral airway into the mouth and/or by jaw thrust – pushing the jaw forward relative to the face. However, bag-mask ventilation even with attempts at these measures has been shown to usually provide inadequate ventilation except in the hands of very experienced practitioners. This is due to the complex hand maneuver required to pull the jaw forward relative to the face to open the airway (the jaw thrust) at the same time as pushing the mask firmly backwards onto the face to achieve a good seal.

Solution: Dr. McKay created an oral airway that opens the airway with minimal stimulation of gag, choke, or cough and is easily maintained by simply pulling the jaw anatomically upward, and does not require the complex set of hand manoeuvres used by experienced anesthesiologists.

The result is the MAIRWAY!

The Mairway solves the problem of holding jaw thrust for the novice. After opening the mouth, insert the Mairway, engaging the upper incisors in the upper notch, then thrust the jaw as far as it can easily go and close the bottom teeth in the appropriate bottom notch.

Mairway Disposable Market: The global airway management market in 2015 was $750 million. Worldwide, 200 million intubations are performed annually, virtually all preceded by mask ventilation. Trauma patients add to this number as paramedics perform intubations in the Emergency Medical Services (EMS) setting. The number of endotracheal intubations performed is estimated to be increasing at over 3% per year based on three current trends: the aging population, the increased number of people undergoing aesthetic operations, and the growing obesity epidemic. 10% Market preparation with a $10 unit cost results in $200 million in annual revenue globally. Over 40 million tracheal intubation procedures are done in the US. Given the same market penetration this would result in a $40 million US market.

Annals of Emergency Medicine confirmed that 37% of intubations performed in the EMS setting result in the improper placement of the endotracheal tube. Injuries involving endotracheal intubations constitute the single largest source of liability in anesthesiology practice, accounting for 25% of total anesthesia malpractice claims in the United States.

Addressing Issues of awake fibre-optic intubation: An important problem is commonly encountered in attempting awake fibre-optic intubation. Humans are very sensitive to hard foreign bodies touching the tissues of the pharynx (back of the mouth - gagging and wretching) and within the larynx (voice box – spasm and choking) and within the trachea (violent coughing). Topical local anesthetic or nerve blocks are used to anesthetize the airway to enable intubation. The most sensitive and difficult to adequately anesthetize and suppress in many patients is the gag reflex, activated by pressure on the back wall of the airway behind the tongue. All currently used devices, except the simple bite block, can cause gagging when inserted. The Mairway uses jaw thrust rather than pushing directly on the back of the tongue like the Guedel-inspired intubating airways, to hold the tongue away from the back wall of the pharynx. Because the Mairway does not reach into the pharynx, it is gag-free while opening a pathway for the bronchoscope (Figure 3). The simple bite block that is currently used does not cause gagging but does not open the airway behind the tongue and give the good view seen in Figure 3.

Figure 3. Anesthesia Residents use the Mairway to visualize the vocal cords

Technical description:
A disposable device made of plastic – probably polyurethane with hardness about Shore 40a to 50a. Wrapped sterile in a blister pack. (Figure 4)

Advantages and improvements over existing technology:
1. Allows inexperienced or infrequent resuscitators to learn and obtain a clear airway for mask ventilation more easily and reliably than with current airway devices.
2. Allows awake intubation without gagging.
3. Allows unobstructed sliding of an endotracheal tube down a bronchoscope while protecting the bronchoscope for bite damage.
4. Provides a clear passage in the upper airway to visualize the vocal cords.

Figure 4. AutoCad drawings of the MAIRWAY.