



Description of a novel oral airway: the McKay airway

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To the Editor,

We report initial experience with a novel airway device, the McKay airway, a Health Canada class-1 medical device made of medical-grade sterilizable plastic. It is designed to make bag-mask ventilation (BMV) easier for beginners. Although BMV is a core resuscitative skill, it is often difficult to teach, learn, and maintain. Beginners often require > 25 attempts to achieve acceptable ventilation.¹ Difficulty maintaining minimum BMV standards by emergency medical technicians has also been reported.²

The effect of gravity and loss of tone in supine unconscious patients often results in airway obstruction by the tongue and other soft tissues of the oropharynx, making BMV difficult or impossible. This is often mitigated by using a Guedel airway, with or without a jaw thrust maneuver. The temporomandibular joint in humans allows for two main movements: *hinge* (open and close for biting) and *slide* (subluxation, for the lateral movement of mastication).³ Subluxation also allows for forward protrusion of the jaw to relieve soft tissue airway obstruction.

During BMV, experienced practitioners hold the jaw of the supine patient *upward* (jaw thrust pressure) while also holding the jaw *shut* (hinge pressure), meanwhile pressing firmly *downward* on the mask (mask seal pressure). All are subtly adjusted by the expert for different bite and soft tissue configurations. Hinge pressure alone is easy for the novice to accomplish but usually does not provide adequate ventilation in most unconscious patients. Tilting the head back and/or inserting an oropharyngeal airway (OPA) may

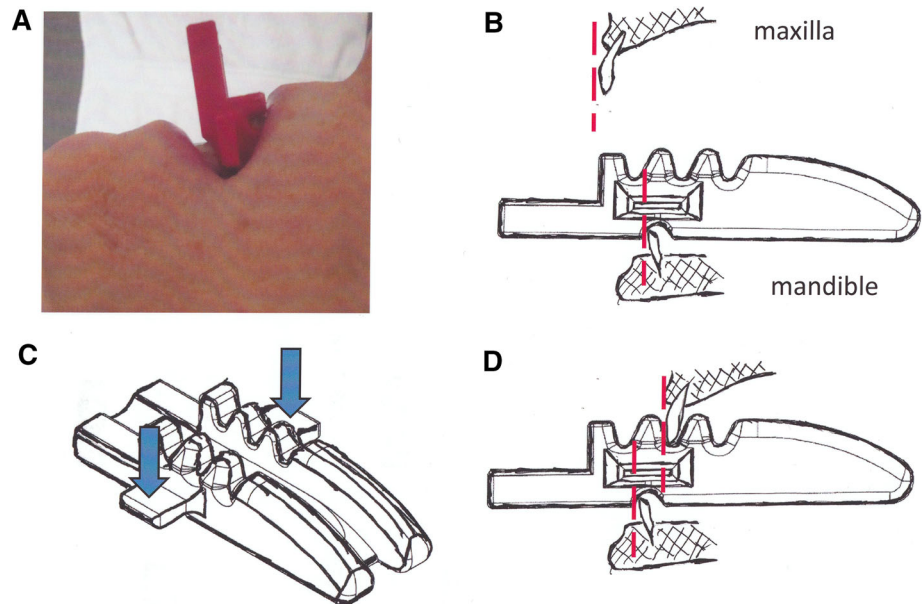
aid ventilation but cannot be relied on to do so without using concomitant jaw thrust. The OPA holds the tongue and other oropharyngeal soft tissues forward, but does not maintain jaw thrust. Two-handed jaw thrust is easier than one-handed for beginners, but requires an assistant to squeeze the bag. This limits the assistant from participating in other crucial resuscitative tasks such as chest compressions or obtaining intravenous access.

Maintaining jaw thrust during BMV is difficult because holding the jaw forward while pushing the mask backwards are mechanically antagonistic. Soft tissue obstruction causes mask-leak, which beginners attempt to correct by pushing the mask harder onto the face, often forcing the jaw further backwards and worsening obstruction. It may be simpler for learners to apply only hinge pressure and mask seal pressure while the McKay airway maintains jaw thrust.

The McKay airway (see Figure 1) is used by first engaging the lower incisors in its bottom groove. To ensure that the lower teeth stay engaged, the device and jaw are grasped with the thumbs on the McKay airway thumb wings and with the fingers below the jaw. Then, thrusting the open jaw and device forward as a unit, the jaw is hinge-closed so that the farthest back upper tooth groove engages the upper incisors. This maneuver is easy to teach and intuitive for beginners to perform after viewing a brief video (www.soteriamedtech.com/video) followed by a demonstration on a patient or mannequin. The temporomandibular joint allows lateral jaw movement, which might be expected to cause mask or device instability, but this problem is not seen with this novel airway. The McKay airway is contraindicated in those with loose incisors but can be used in edentulous patients when padded with a 1-cm sponge (Reston™ Self-Adhering Foam Pads; 3M, Maplewood, MN, USA).

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Figure 1 A) The McKay airway inserted into the mouth. B) Cross-section of maxillary and mandibular bones cross-hatched with incisors. The mouth is open and the bottom groove is on the lower incisors. C) Device showing thumb wings (blue arrows). When inserting the device, it should be held in place on the lower incisors with thumbs on top of the thumb wings and fingers below the mandible while moving the jaw forward. D) The mouth is closed on the device with upper incisors into the farthest back top groove that they will reach. The red dashed lines emphasize the jaw lying behind the mandible in B and ahead of the mandible in D.



In October 2018, with university research ethics board approval (BIO Research Ethics Board #17-202; September 13, 2017) and written informed consent, 12 staff anesthesiologists performed BMV using the McKay airway on 12 patients undergoing elective surgery. Their unanimous opinion was that the device should be further developed. All had very positive comments about the McKay airway for BMV. Further studies have been performed and submitted for publication.

Conflicts of interest None.

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Editorial responsibility This submission was handled by Dr. Hilary P. Grocott, Editor-in-Chief, *Canadian Journal of Anesthesia*.

References

1. Komatsu R, Kasuya Y, Yogo H, et al. Learning curves for bag-and-mask ventilation and orotracheal intubation: an application of the cumulative sum method. *Anesthesiology* 2010; 112: 1525-31.
2. Elling R, Politis J. An evaluation of emergency medical technicians' ability to use manual ventilation devices. *Ann Emerg Med* 1983; 12: 765-8.
3. Chang CL, Wang DH, Yang MC, Hsu WE, Hsu ML. Functional disorders of the temporomandibular joints: internal derangement of the temporomandibular joint. *Kaohsiung J Med Sci* 2018; 34: 223-30.

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