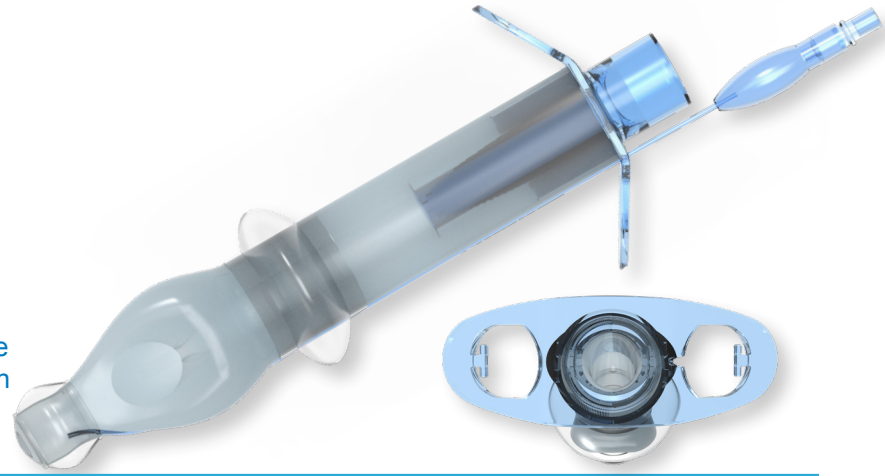


NuMatuSeal

Beyond an Airway

A gap exists between advancements in technologies revolutionizing minimally invasive precision-focused bronchoscopy and their basic supportive devices.

NuMatuSeal (NMS) is the first and only airway device designed to support all types of bronchoscopy and an ideal supraglottic device for general anesthesia.



THE PROBLEM

Two classes of airway devices support general anesthesia: endotracheal tubes (ETT) and supraglottic devices (SD).

Neither are designed to support unique challenges during flexible bronchoscopy (FB):

- FB via these devices often encounter resistance and ventilation difficulties secondary to unsuitable airway to bronchoscope diameter (ABD) ratios and device buckling, requiring lubricants (Fig. 1A, B) and oral devices to avoid bronchoscope damage (Fig. 1C).
- SD require multiple sizes to ensure optimal fit and airway seal (Fig 2A). Occasionally, poor seals require intubations with ETT.

- Interruptions of procedures related to disconnections of proximal ETT connectors (during bronchoscope manipulations) (Fig. 3A).

Neither offers an all inclusive safe and efficient method for intubation, ventilation and recovery supporting rigid bronchoscopy (RB):

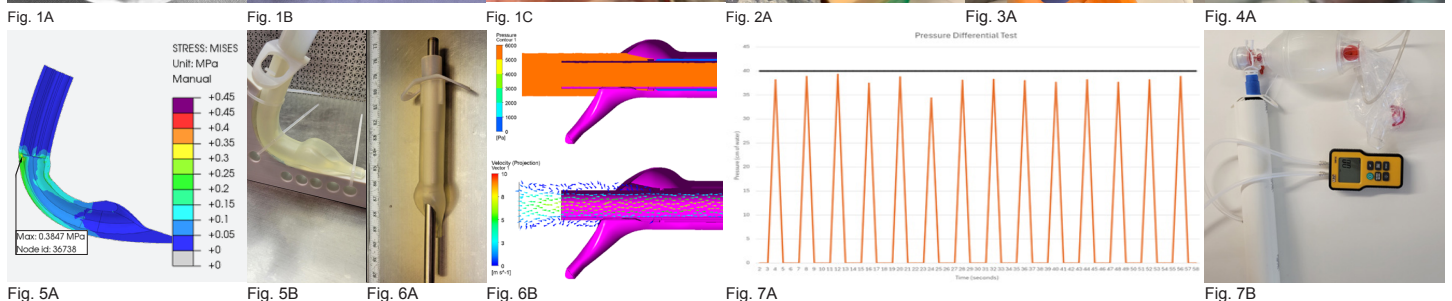
- RB intubation relies on operator's competence to avoid airway injury, requiring adjunct devices and techniques for protection and optimization of oxygenation/ventilation (Fig. 4A).
- 67% of anesthesia providers place recovery airways (i.e., ETT or SDs) for respiratory recovery once RB removed¹.

PRELIMINARY BENCHTEST:

Functional features evaluated included anti-buckling (Fig 5A,B) properties, and inner-luminal O-ring seal (Fig. 6A,B), the latter for rigid bronchoscopy, and proximal hypopharyngeal seal (7A,B).

Figures:

- 5A. Finite Element Analysis-sagittal plane of device bent at 90° angle.
- 5B. Bend test of device in ISO 11712 jig.
- 6A. Device at 180° accommodating 14mm rigid rod.
- 6B. Computational Flow Analysis Seal Test of Inner-luminal O-Ring.
- 7A. Balloon Seal test with Pressure-Time graph depicting conserved inspiratory and expiratory pressures.
- 7B. Model of preliminary balloon seal test.



OUR SOLUTION

Design features overcome these challenges during all bronchoscopy (i.e., diagnostic, therapeutic, flexible or rigid) and is a universal size supporting general anesthesia cases.

- Larger lumen: improved ABD minimize ventilatory challenges; obviates lubricant requirements.
- Anti-buckle lumen: avoids resistance.
- O-ring and balloon minimize ventilatory leaks and avoids multiple device sizes.
- Esophageal balloon minimizes aspiration risks.
- Teeth and oro/hypopharyngeal protection during RB intubation.
- Eliminates complimentary devices: i.e., teeth guard, nose clip, gauze packing.

- Direct alignment with vocal cords: facilitates RB intubation.
- Distal outlet matches physiologic “flow limiting segment” of vocal cords.
- Recovery support: upon withdrawal of rigid bronchope.
- “Wing Anchor”: Stabilization anchors.
- Suction access: oropharyngeal secretion clearance.

CONCLUSION

NuMatuSeal’s innovative versatility focuses on providing a safer and more efficient universal supraglottic airway device.



www.BeyondAnAirway.com

*United States Patented. Patent pending in Canada and Europe.

References:

1. Matus I, Wilton S, Ho E, Feng L, Murgu S, Sarkiss M. Current Practices Supporting Rigid Bronchoscopy - An International Survey. J Bronchol Interv Pulmonol. 2022 Aug 2

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