

## Evaluation of a Novel Method for Lung Isolation Using a High Fidelity Infant Mannequin – Preliminary Results

**Presenting Author/PI:** F Robert Purdy, BSc, MSc, DVM, MD, FRCPC

**Co-authors:** Christopher Badenhorst BSc, MB, ChB, FANZCA, Andrew Poznikoff BSc, Matthias Görge PhD, Jimmy Lam MD, Michael Barker MD, FRCPC, Louis Scheepers FRCPC, Alex Zheng MSc, Richard Lee FRCPC

**Background:** Techniques of lung isolation and one lung ventilation for infants can be challenging; several methods using an Arndt bronchial blocker have been described<sup>1-5</sup>. We developed a novel device<sup>6</sup>, whereby the bronchial blocker is securely attached to an endotracheal tube (ETT) prior to intubation and blocker placement. This study compares the novel device with five previously published methods. The primary outcome was total time to lung isolation, defined as the laryngoscope entering the oral cavity to confirming blocker placement by ventilation.

**Methods:** After ethics approval, 18 pediatric anesthesiologists were recruited to participate in a simulation study with a high fidelity infant mannequin<sup>7</sup>. Following one practice laryngoscopy and intubation, each participant trialed six different methods for extra-luminal bronchial blocker placement in a randomized order. The six methods tested were: Novel method<sup>6</sup>, Bent blocker<sup>1</sup>, Endobronchial ETT placement of blocker<sup>2</sup>, Blind insertion of blocker<sup>3</sup>, Blocker looped to endotracheal tube<sup>4</sup>, and Blocker looped to bronchoscope<sup>5</sup>.

**Results:** Data from 18 pediatric anesthesiologists were available for analysis. The novel method was as fast as, or faster than all methods tested. The total time to lung isolation with the novel method was significantly faster than the endobronchial ETT (91 sec; 95% CI: 36-146; p=0.002) and blind methods (97 sec; 95% CI: 42-152; p=0.001) (Figure 1).

**Conclusion:** The novel method of bronchial blocker placement shows promise as an alternative method for lung isolation in infants. The simplicity of the design, low cost, and ease of use may allow early adoption in developing countries. We believe there may be many other advantages including: a) security of the blocker once positioned, b) opportunity to delay lung isolation until after patient positioning, c) ease of repositioning a misplaced blocker, d) improved accuracy of placement and e) improved success with blind placement. Alternate patient populations, including rapid lung isolation in adults with massive pulmonary hemorrhage, unilateral lung trauma, and lung isolation for large bronchial tree air leaks, may also benefit from this approach. Further clinical trials are needed.

**References:** [1] Pediatric Anesth. 2016;26(5):512-20; [2] Pediatric Anesth. 2018 ;28(7):668-669; [3] Medicine. 2016;95(19):e3687; [4] Can J Anesth. 2006;53(2):159-61; [5] Principles and Practice of Mechanical Ventilation McGraw-Hill Education/Medical: 3<sup>rd</sup> edition 2012 [6] USPTO US2018/0326168A1 [7] <https://www.trucorp.com>.

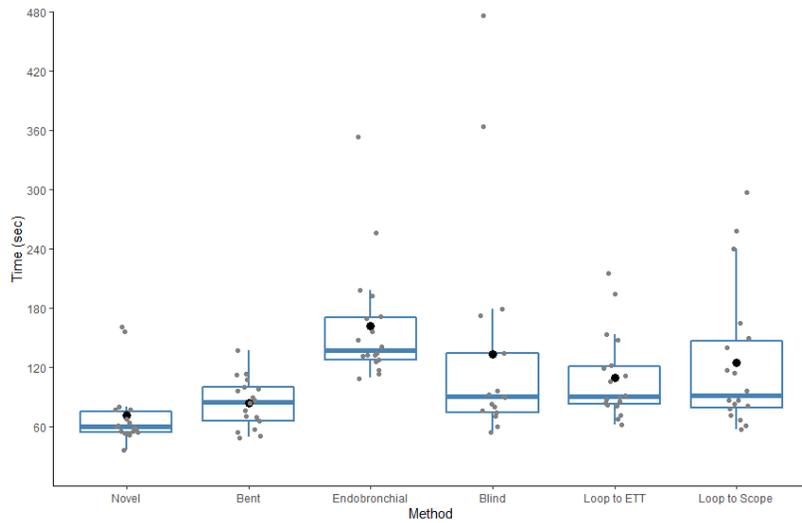


Figure 1. Total time to lung isolation; from laryngoscope entering the oral cavity to confirming blocker placement. One outlier was censored in the blind method at 756 sec.

**COI:** Dr. F. Robert Purdy Ltd. has a patent pending for the novel bronchial blocker design. This has been assigned by Dr. Purdy to the Provincial Health Services Authority (a publicly funded health service provider in British Columbia, Canada).