

# Pediatric Nasotracheal Intubation Assistive Device

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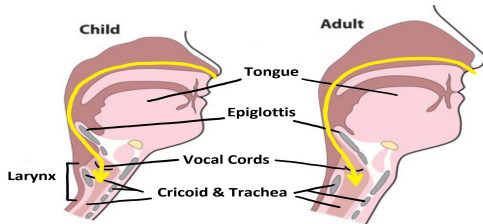


## Need

**57%** of complications in **pediatric** intubation involve **pre-existing airway or craniofacial abnormalities**<sup>[1]</sup>

### Nasotracheal Path:

Sharper angle of pathway in child makes pediatric nasal intubation extremely difficult

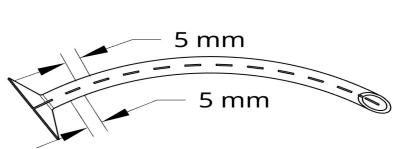


**Objective:** Create an **easily removable** assistive device for

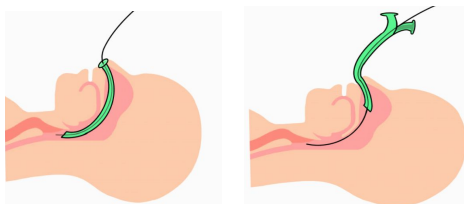
**pediatric nasal** fiberoptic intubation especially in challenging, difficult airways.

## Solution

### Design



### In Use



**Solution Statement:** Develop a removable assist device to guide the fiberoptic by adding pre-manufactured perforations along the length of a pre-existing nasal trumpet

## Testing Results

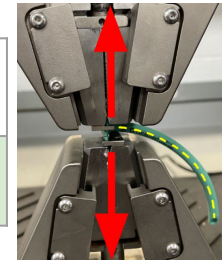
**Tensile tearing test (R4):** Find the max force required to tear along perforations

**Requirement:**

<14.3 N

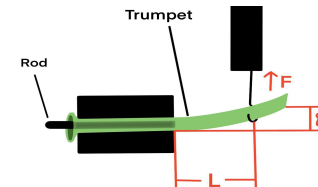
**Result:**

=13.5N



**Bending stiffness test (R5):**

Cantilever bending test for non-perforated and perforated trumpet



**Requirement:**  
( $4.5 \cdot 10^{-4} \text{ Nm}^2$ )

**Result:**  
( $3.4 \cdot 10^{-4} \text{ Nm}^2$ )  
 $p=0.09$

**Simulated-Use Testing:** Device was successful in a simulated procedure using mannequins at St. Christopher's Children's Hospital.

## Conclusion and Societal Impact

**Impact:** Benefits physicians, anesthesiologists, and patients by improving nasal intubation via fiberoptic guidance in emergencies

**Future Plans:** Manufacture device using injection molded Medical Grade Neoprene and scale for other sizes.

[1] Bai W, et al.; "Evaluation of emergency pediatric tracheal intubation by pediatric anesthesiologists on inpatient units and the Emergency Department," (2016)