ThoraClip

Pediatric Chest Tube Securement Device

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Overview

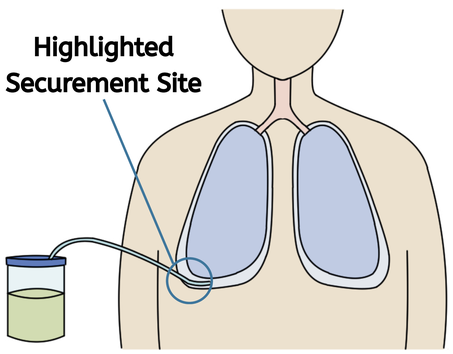
Chest tubes dislodge in pediatric intensive care patients at rates reaching 40% in neonates and infants using current suture-based securement. Dislodgement can cause life-threatening complications, extended hospital stays, and restrictions on early mobilization critical to neurodevelopment. Existing alternatives fail to address the unique anatomical and clinical demands of pediatric patients.

Our Solution

This project presents a novel prototype for chest tube securement for pediatric applications. The device aims to reduce dislodgement rates while enabling safer early mobilization in the PICU

Need

An improved method to secure chest tubes is needed in pediatric patients to reduce dislodgement rates.

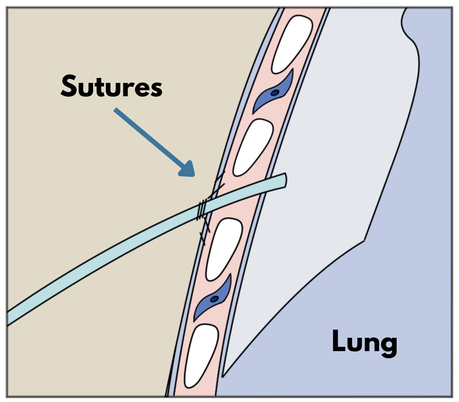


Dislodgement: the endpoint failure where the tube is no longer correctly positioned in the pleural space.

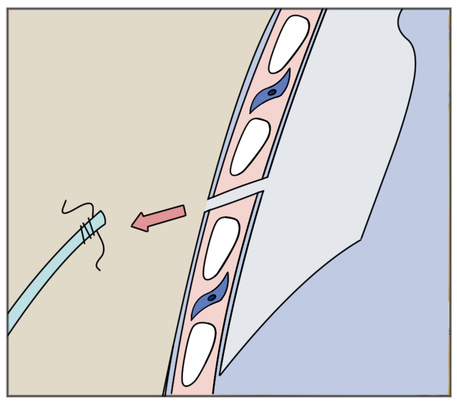
Migration: gradual shifting of the tube over time

Why does this matter?

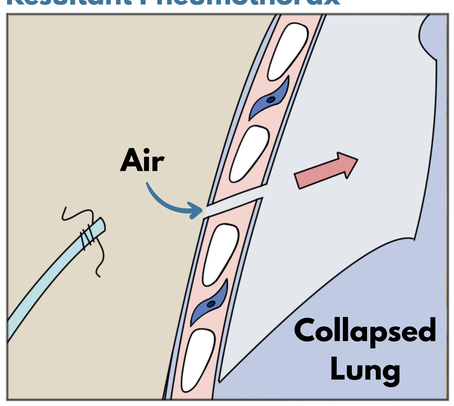
Securement Standard of Care



Dislodgement



Resultant Pneumothorax



Peds Chest Tubes Placed/Yr[1-6]
~34,500

Peds Dislodgement Cost/Yr[1-6]
$30-50M

Total Patients Treated/Yr[1-7]
1.9M

*All above statistics are US-based

How often do sutures fail?

Adult Average Failure Rate[8-9]
6.6%

Neonate Max Failure Rate[10]
40%

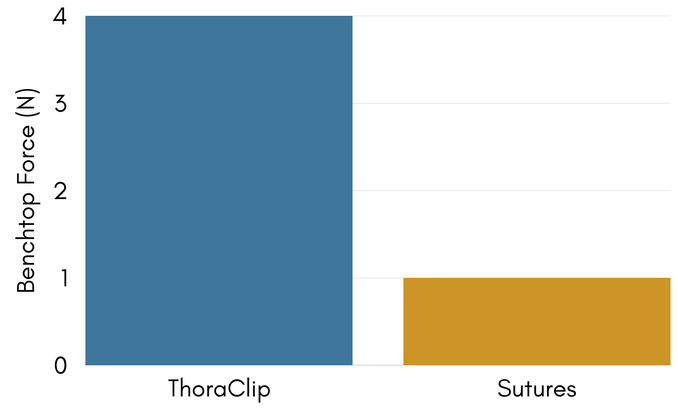
Neonates face highest dislodgment risk due to delicate skin, increased restlessness, and smaller organs.

Our Design Goals

1. Resists over **4N** of pull force **without displacement**
2. Compatiable with chest tubes for **neonates & children of all ages**
3. **Low-profile** assembly
4. **At-site securement**
5. **Minimal migration** of chest tube over **2 weeks**

Proof of Concept for ThoraClip

ThoraClip demonstrates 4x stronger securement of a 14 Fr pediatric chest tube compared to sutures



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