# Novel Uterine Suture Technique for Treatment of Postpartum Hemorrhage

*Presenters: Neha Muvvala, Varu Vummidi, Christopher Tran, Christopher Tan*

Current Issue

# Postpartum Hemorrhage (PPH)

Primarily caused by uterine atony – failure of the uterus to properly contract after birth – leading to excessive blood loss

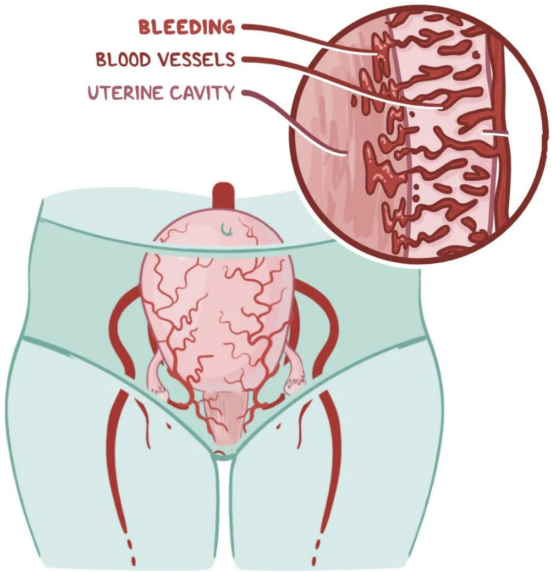



Image: osmosis.org

# The Data

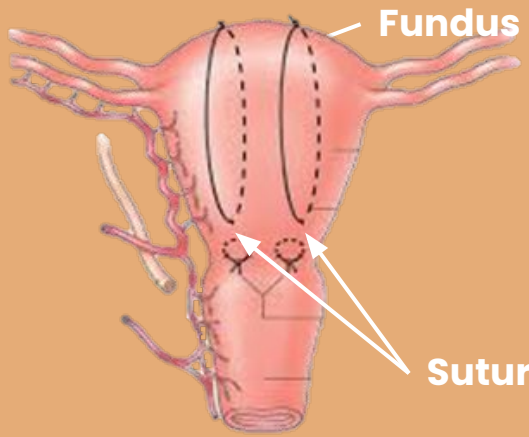
**PPH is the *leading* cause of maternal death globally**

Responsible for over 20% of all maternal deaths globally

More than 14 million women experience PPH each year

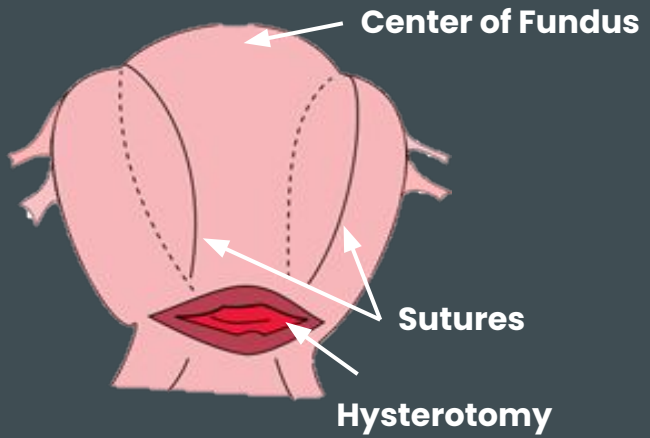
# Existing Solutions

## Hayman Compression Suture

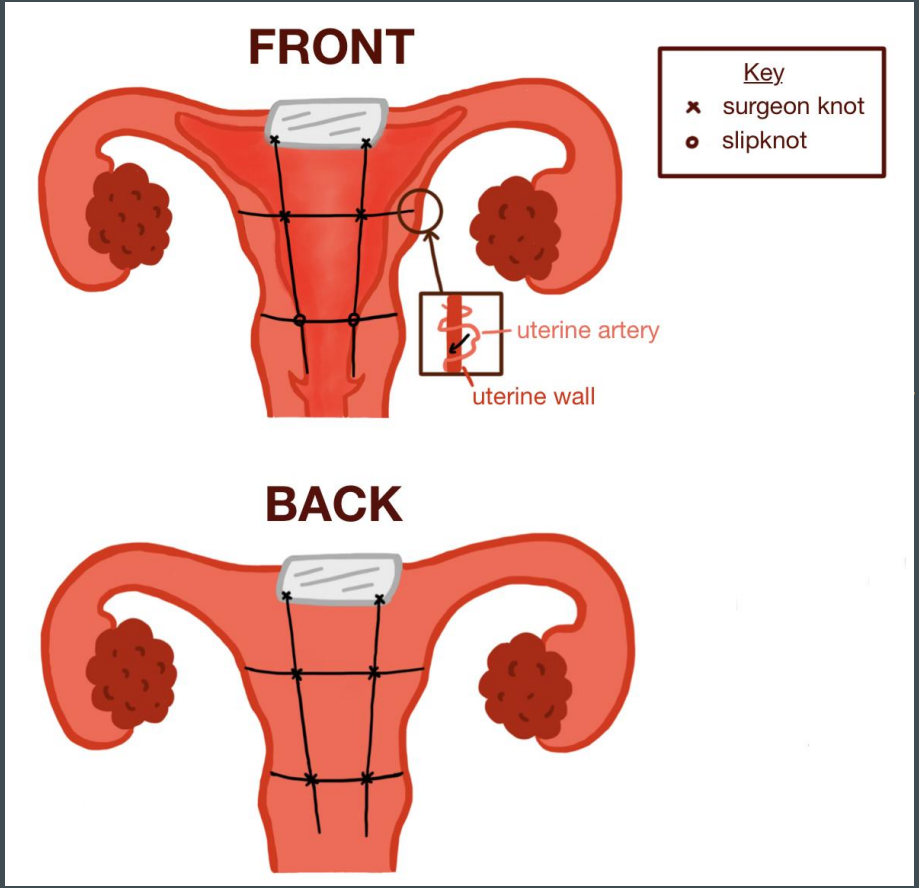



2-4 sutures fixed to back and front of uterine walls

## B-Lynch Compression Suture




Sutures may migrate to the middle of fundus




## Our solution

Reduce operation time
Limit complications
Minimally invasive

## Past Work

### Materials Validation

- Absorption
- Instron Testing
- SEM Image Analysis

Conclusion: They will not retain mechanical properties and will degrade in the body

## Current Work

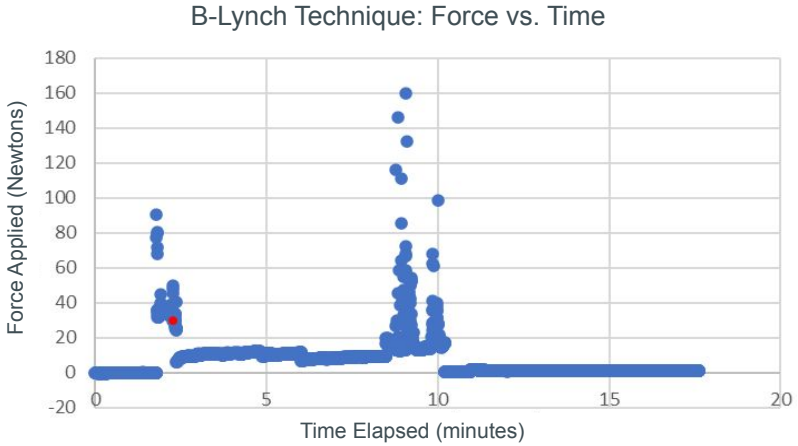
### Benchtop Validation Testing

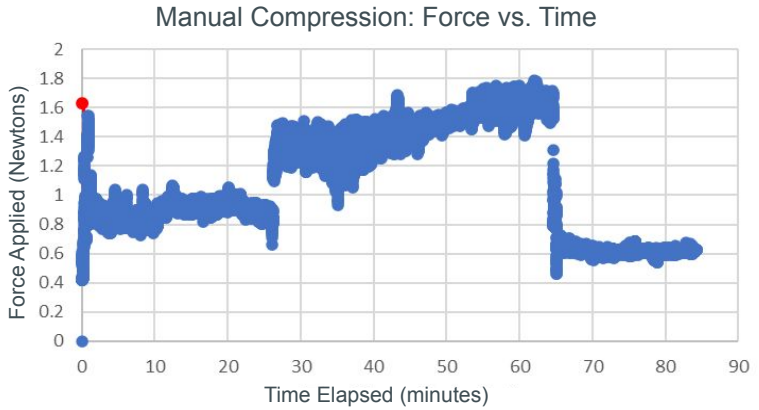
Compared prototype to B-lynch

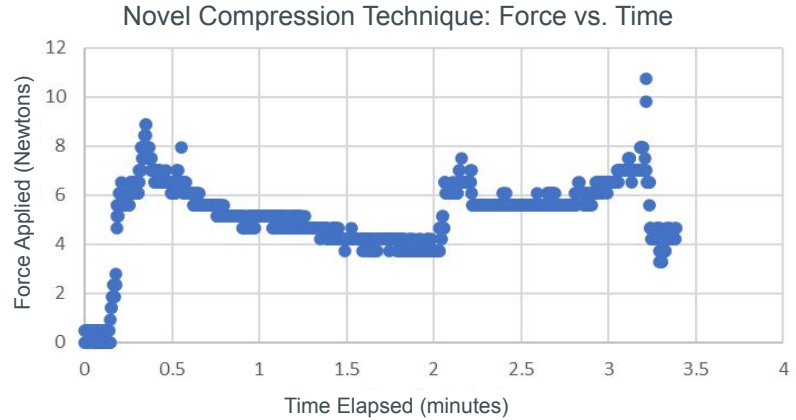
### In-Vitro Animal Testing

Tested prototype on a C-sectioned sheep uterus

# Validation Testing

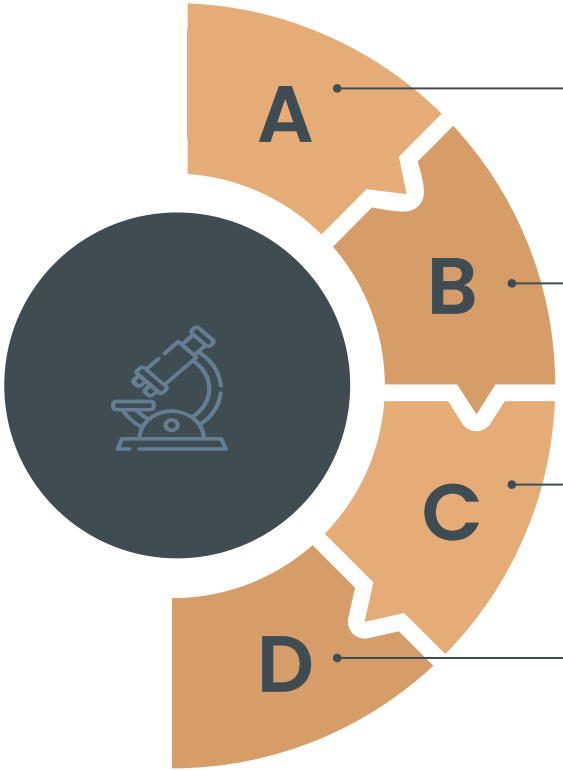



| Technique | Blood Flow (mL) | Total Time |
|---|---|---|
| Novel Compression Technique | 100 | 3 minutes, 3 seconds |
| B- Lynch | 350 | 15 minutes, 21.26 seconds |
| No Technique | 1000 | 1 hour, 20 minutes, 16 seconds |

# Future Work




**Prototype Consistency**

Additional reiterations will be made to make the technique more precise and reproducible

**Ex-Vivo Testing**

More quantitative ex-vivo testing with new and more accurate pressure sensor mechanism

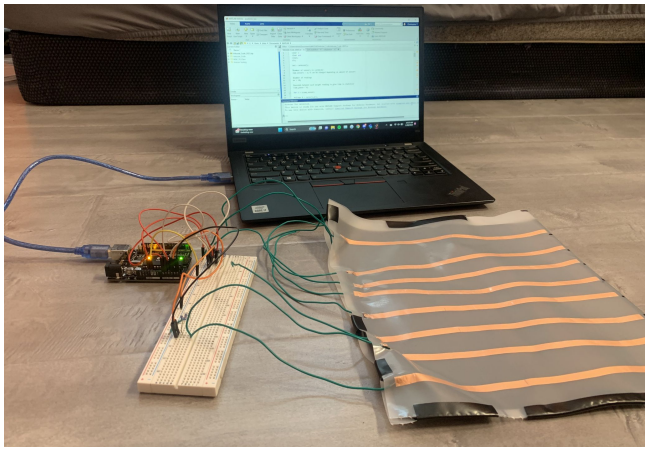
**Packaging**

Further adjustments to be made.

**Feasibility Test**

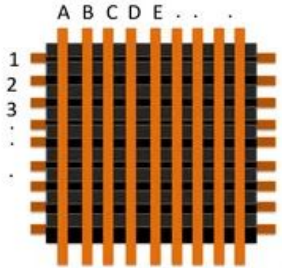
Product will be sent to and tested at the UCI Medical Center.

# New Pressure Sensor Grid

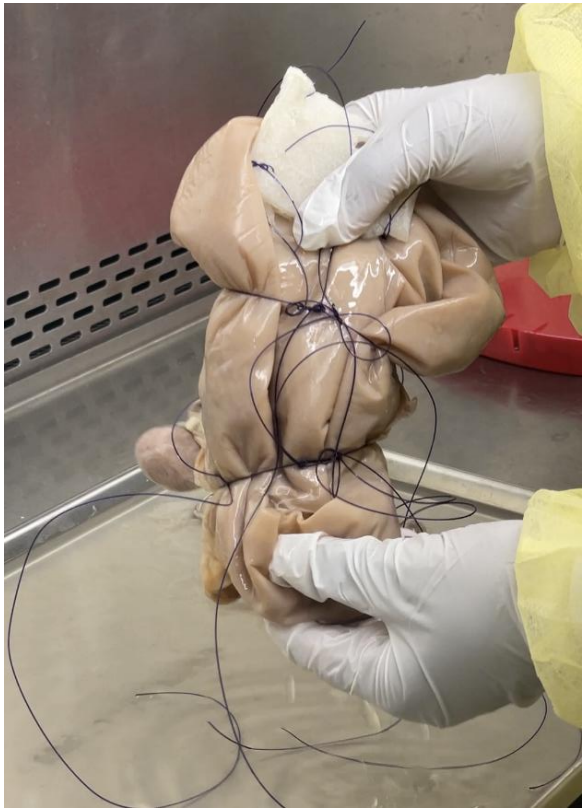
Better pressure sensor

- Provides better measurements
- 8 x 8 matrix
    - Forces will be averaged




Modeled after “Intelligent Medical Velostat Pressure Sensor Mat Based on Artificial Neural Network and Arduino Embedded System”

# In-vitro Animal Testing: Compression Technique



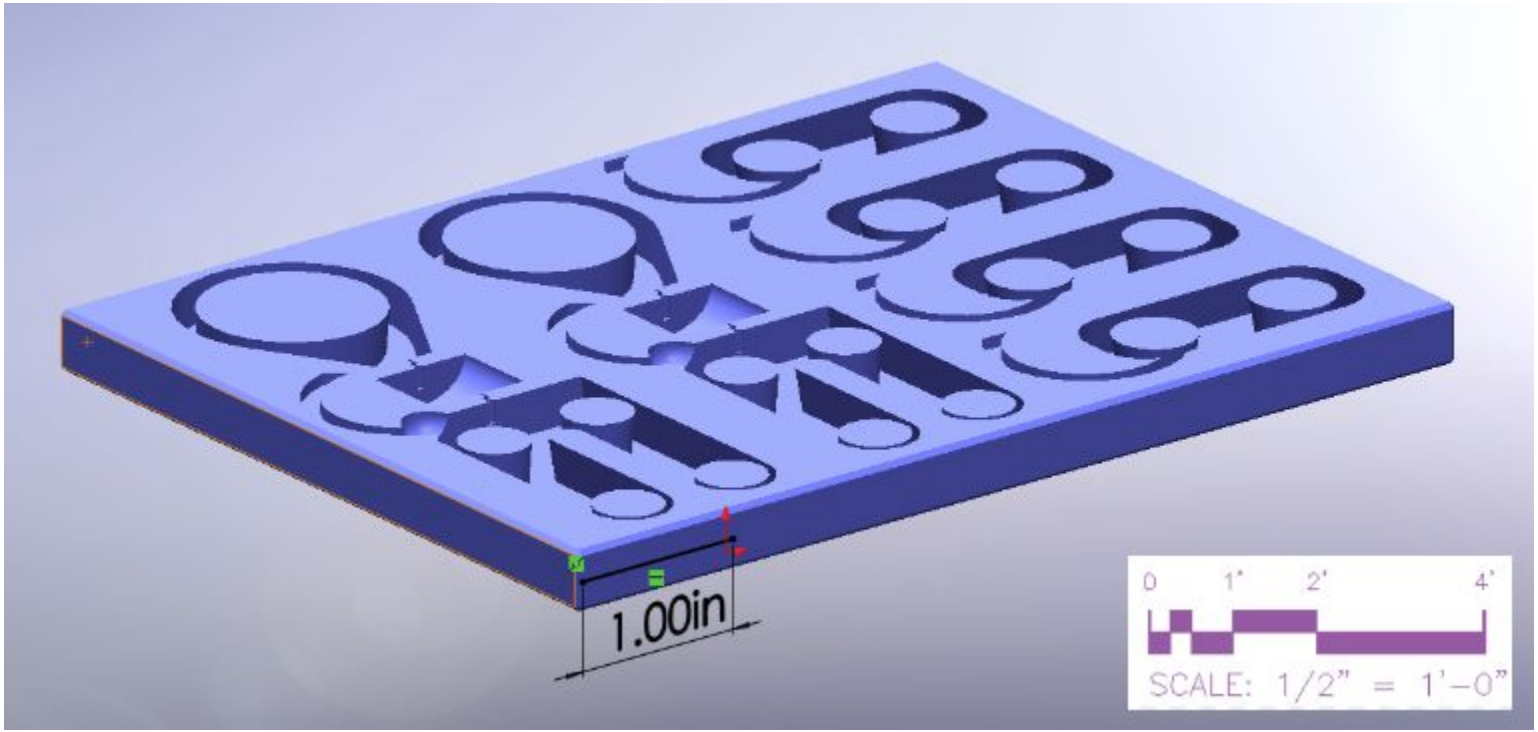
Methods:

1. Extracted fetuses from pregnant sheep uterus
2. Created and applied novel compression technique

Observations:

1. Uterus was visibly compressed.
2. Cesarean section cut was visibly compressed.
3. Vertical strands were too long
    a. Compression on fundus was not as effective

# Packaging Model



# Thank you!