



# Obstetric Belly Band

Kelsey Duxstad  
Michael Stitgen  
Andrew Pierce  
Emma Weinberger

Lea Minton— Columbia University  
Professor Willis Tompkins— BME Department

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# Point of Interest

- Client Information
- Background
- Problem Statement
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- Alternative Designs
- Design Matrix
- Design Criteria
- Final Design
- Future Work
- Conclusions
- Questions



# Client Information

- Lea Minton
- Columbia University
  - Nursing student
  - Concerned for patient comfort
  - Has worked as a doula

# Background

- Electronic Fetal Monitoring
  - Two types
    - External
    - Internal
  - Ultrasound Transducer
  - Tocometer
- Continuous monitoring



<http://naturalchildbirthedu.com/2010/01/11/electronic-fetal-monitor-efm/>



<http://www.centrusmedical.com/tocos.html>



# Problem Statement

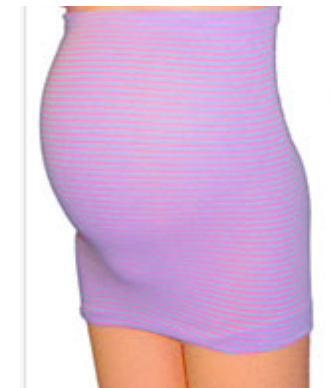
- Redesign an obstetric belly band so that it has more rigidity in the transverse direction and will not roll up during use
- The team's solution fit the needs of health care professionals using the device for monitoring purposes and ensure comfort for laboring women

# Competition

- **Belly Band**
  - Easy to mass produce leads to cheap cost
  - Uncomfortable
  - Bunching up
  - Hot
  - Getting in and out of it
- **Straps**
  - Easily made and used
  - Cheap cost
  - Do not have to step into it
  - More comfortable
  - Hard to place
  - Sometimes get the wrong angle



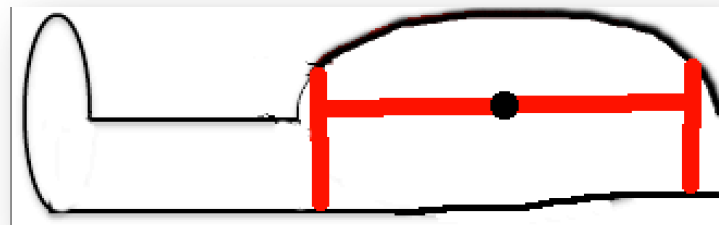
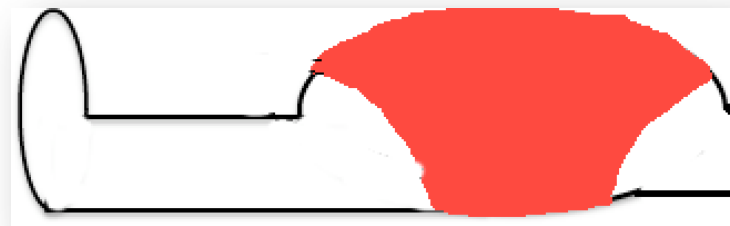
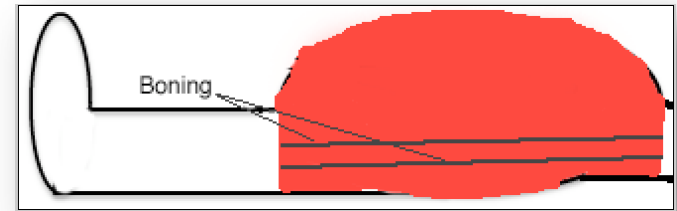
[http://dmitrinity.com/Fetal\\_Monitoring\\_Belts.html](http://dmitrinity.com/Fetal_Monitoring_Belts.html)



<http://fetamed.com/index.php?page=fetaband-body-stockings-2>

# Structure

- Uniform band with boning
- Tapered band
- Formed hemisphere
- Tracking system



# Fastening Methods

- Uniform band
- Velcro
- Zipper
- Snaps
- Eye hooks



<http://fetamed.com/index.php?page=fetaband-body-stockings-2>



# Structural Design Matrix

	Weight	Uniform Band with Boning	Tapered Band	Formed Hemisphere	Tracking System
Comfort	1	2	4	5	3
Reliability	1	5	5	4	3
Cost	1	3	4	2	3
Ease of Use	0.75	3	4	3	3
Producability	0.5	4	4	2	3
Versatility	0.5	3	4	2	2
Size Ranges	0.25	5	4	3	4
Total	5	15.5	19	15	13.75

# Fastening Design Matrix

	Weight	None	Zipper	Velcro	Snaps	Pegs
Comfort	1	5	2	3	3	1
Ease of Use	1	3	4	4	3	2
Reliability	1	5	5	3	2	2
Cost	1	5	3	3	2	2
Total	4	18	14	13	10	7

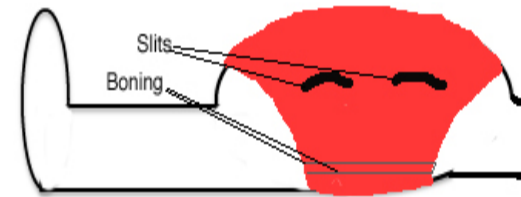


# Design Criteria

- **Comfortable**
  - Prevents rolling
  - Wicks moisture
  - Does not cause irritation
- **Reliable**
  - Withstands stresses of labor
- **Universal**
- **Cost effective- \$2-3**
- **Size**
  - No average belly size
  - 27-50" Circumference

# Final Design

- Tapered band
- Front 18", Back 8", Diameter 10"
  - Other sizes to scale
- Slits
  - 2 on the top
  - 2 on the bottom
- Boning
- Elastic





# Future Work

- Build an accurate prototype
  - Find proper latex-free fabric
  - Test durability and comfort
  - Test at the hospital
  - Fix any problems discovered
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# Conclusions

- Assist medical staff in more accurate, effective fetal monitoring
- Increase patient comfort
- Integrated Design
  - Cost effective
  - Functions in designated setting



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- Kathy Frigge– Meriter Hospital
- Karin Marshall– Abott Northwestern Hospital
- Nora Webster– Frontier School of Midwifery
- FetaBand, Inc.

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# Questions

