

Scrotal cooling device for use in Sauna



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Overview - Luke

- Background (Luke)
- Problem Statement (Luke)
- Design Criteria (Pablo)
- Competing Designs (Pablo)
- Design Matrices
 - Cooling Method (Nick)
 - Wearable Unit (Murphy)
- Selected Design (Oscar)
- Future Work (Oscar)

Background - Luke

- Client - Dr. Javier Santiago
 - UW-Health Urologist
- Sauna usage increasing year by year [1]
 - Significant health benefits [2]
 - Heat decreases sperm health [3]

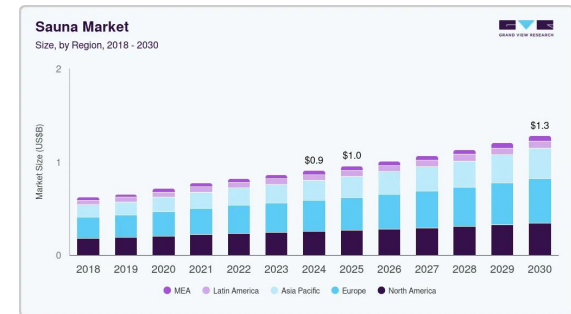


Figure 1. Sauna Market Growth 2018-2030 (extrapolated)

Problem Statement - Luke

- Heat-based recovery therapies like saunas offer health benefits but can raise testicular temperature above the optimal 34–35°C needed for healthy sperm production, posing a risk to male fertility.
- To protect fertility, cooling solutions are needed to keep testicles at a lower temperature during these therapies.

Design Criteria and Specifications - Pablo

- **Performance requirements**
 - 34 °C - 35 °C
- **Operating Environment**
 - 80 °C
- **Materials**
 - Insulating
 - Irritants
- **Size**
 - Adjustable

Sauna Types	Humidity	Temperature
Finnish Sauna	~ 2-5 %	~ 70-100 °C
Biosauna	~ 20-20 %	< 60 °C
Infrasauna	~ 2-5 %	< 60 °C
Steam	~ 90-100 %	~ 40-50 °C
Caldarium	~ 90 %	~ 40-50 °C
Tepidarium	~ 10-20 %	~ 37-39 °C
Sanarium	~ 40-50 %	~ 50-60 °C
Laconicum	~ 30 %	~ 30-50 °C
Hammam	~ 80-90 %	~ 40-50 °C
Banja	~ 30 %	~ 70-90 °C

Figure 2. Table of sauna temperatures



Competing Designs - Pablo

- The Underdog
- Snowballs
- UBreeze



Figure 3. Underdog product



Figure 4. Underdog product in use



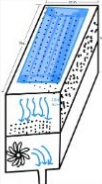
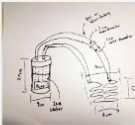
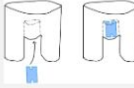
Figure 5. Snowballs product



Figure 6. UBreeze product

Cooling Unit Matrix - Nick

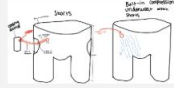
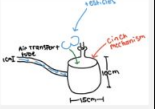
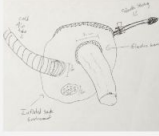
Table 1: Design matrix for the cooling unit

Design Categories (Weight/100)		Design One: Fan Cooling		Design Two: Liquid Cooling		Design Three: Icepack insert (direct contact)	
							
Design Criteria	Weight	Score X/5	Weighted score	Score X/5	Weighted score	Score X/5	Weighted score
Comfort	10	5	10	4	8	1	2
Concealability	20	3	12	5	20	4	8
Cooling effectiveness	30	4	24	5	30	2	12
Ease of use	10	5	10	4	8	2	4
Cost	10	3	6	3	6	5	10
Safety	20	4	16	4	16	5	20
Total Points:	100	78		88		58	



Wearable Unit Design Matrix - Murphy

Table 2: Design matrix for the wearable portion of the design

Design Categories (Weight/100)		Design One: Custom Underwear		Design Two: Cinch sack		Design Three: The Gift Basket	
							
Design Criteria	Weight	Score X/5	Weighted score	Score X/5	Weighted score	Score X/5	Weighted score
Comfort	25	5	25	3	15	4	20
Concealability	25	5	20	5	20	5	20
Cooling effectiveness	20	4	16	5	20	4	16
Ease of use	15	5	15	3	9	4	12
Cost	5	4	4	5	5	4	4
Safety	10	5	10	3	6	4	8
Totals	100	90		75		80	



Selected Preliminary Design

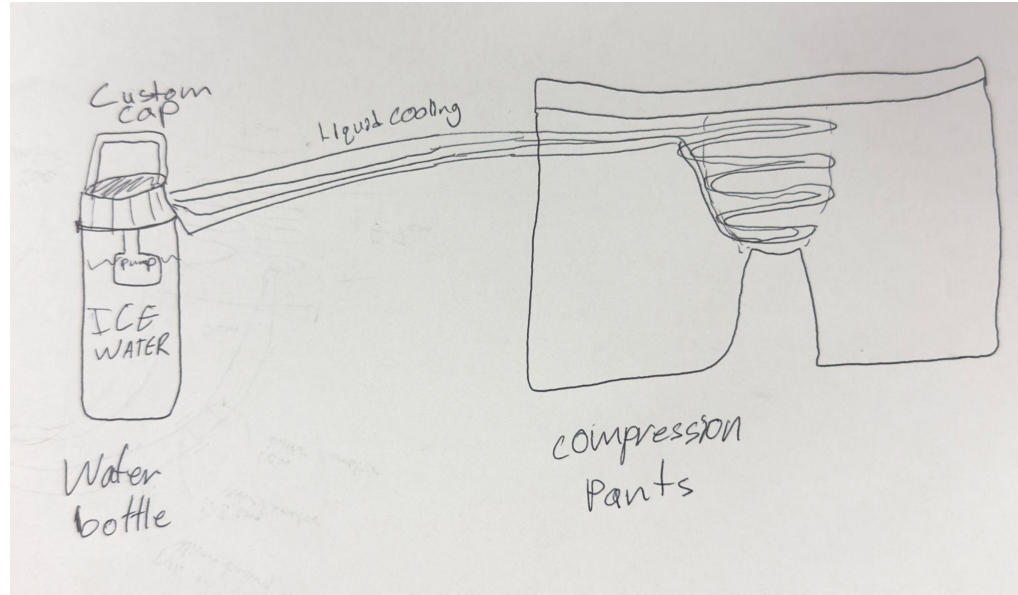


Figure 7 - Preliminary Final Design



Liquid Cooled Underwear

Lid attaches to standard 32oz water bottle



Figure 8



Figure 9



Future Work

Run thermodynamic simulation

- Will the system stay cold?

Create first prototype

- Sew in tubing, lid pump and attachment.

Establish testing protocol

- Thermal testing in a similar environment as sauna.



Figure 12

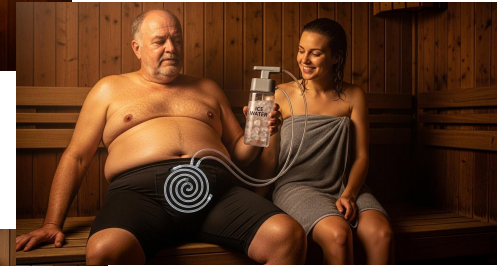


Figure 11



Figure 10



Acknowledgements

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References

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Figure Citations

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Figure 8, 9, 10, 11, 12, 13 - AI generated by Chatgpt, Google Veo3, Google Whisk, Midjourney

