

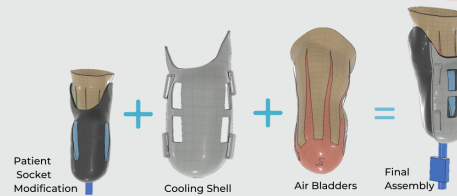
# Adaptive Cooling System for Prosthetics by Artificial Motion

NOVEL SYSTEM FOR A PROSTHETIC SOCKET THAT ACTIVELY COMPENSATES FOR HEAT BUILDUP AND VOLUME FLUCTUATION WITHIN THE RESIDUAL LIMB

- Cut two holes into socket
- Add heat spreaders in the holes

## PRODUCT

### 1. MODIFICATION TO PATIENT SOCKET



### HOW?

- Strap on cooling shell as ~~needed~~ ADDITION OF KIT
- Add air bladders in the socket when desired

### UNIQUENESS

- Removable - Original patient socket is still functional without kit
- Universal-fit - Range of S, M, L sizes
- Accounts for volume fluctuation

## NEEDS AND SOLUTIONS

### 1 HEAT BUILDUP

Issue 1: During exercise, the residual limb builds heat and sweat inside of the prosthetic

#### WHY ARE THESE ISSUES?

- SKIN IRRITATION
- SWEAT
- Potential INFECTION

#### OUR SOLUTIONS

- REMOVABLE, LIGHT-WEIGHT, and UNIVERSAL-FIT cooling system that uses similar techniques as a computer

### 2 VOLUME FLUCTUATION

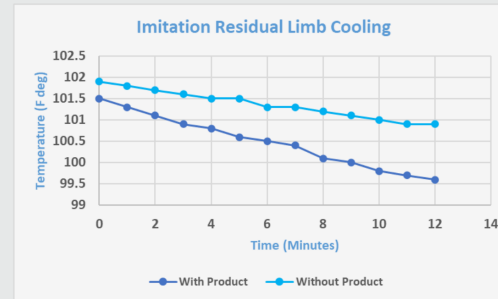
Issue 2: Throughout the day the residual limb swells and shrinks

- Typically SOCKS are added to account for shrinking
- This requires the prosthetic to be completely removed which is TIME CONSUMING

- ADJUSTABLE air 'bladders' inside socket
- DOES NOT require socket removal

## PROOF OF CONCEPT

- Temperature of imitation residual limb was tracked with and without the system using thermocouples
- At the end of 12 minutes the temperature was decreased 1.3 degrees more with the system



## COMPETITORS

### HEAT ISSUE

#### VIVONICS

- Military only
- Bulky
- Loud

### VOLUME FLUCTUATION ISSUE

#### KNIT-RITE SOCK

- Inconvenient
- No longer effective when sweaty

## MARKET ANALYSIS

PRODUCT COST: \$83  
SELLING PRICE: \$282 (225%)  
CLINIC SELLING PRICE: \$482

### CUSTOMERS:

- Active lower-limb prosthetic users
- National prosthetic clinics

### MATERIAL COST: \$82.75

- Cost of all components per unit
- ABS injection molded (400 units)
- 36 days shipping

### COST OF LABOR PER KIT: \$5.67

- \$11 hourly rate for 22 minutes \$4.03
- Cost of electricity for printing time of 9 hours (will decrease with bulk production): \$1.64

### OVERHEAD (ANNUAL)

#### • Fixed

Business license renewal:	\$70
Website domain and hosting	\$20
Ecommerce:	\$165
Employee Comp - Marketing Specialist	\$70K
Employee Comp - Business Consultant	\$72K
Employee Comp - 5 Engineers (Us)	\$5K
Office cost	\$10.8K
Workers Comp Insurance	\$1,440
General Liability Insurance	\$360
Commercial Property Insurance	\$744
Product Liability Insurance	\$504
Annual Patent Fees	\$392

#### • Variable

Marketing (10% of total revenue)	Revenue: \$85K
Packaging (300 units)	Total: \$8.5K
	\$5,700

TOTAL FIXED: \$101,745  
+ TOTAL VARIABLE: \$45,702

TOTAL OVERHEAD: \$147,447

### GROSS REVENUE

Selling price \$282

- Year 1
  - 284 units \* \$282 \$80K
- Year 2
  - 1215 units \* \$282 \$342.6K
- Year 3
  - 4374 units \* \$282 \$1.2M

### TOTAL COST

Total Cost= Materials + Labor + Overheads

Year 1 \$172,558  
Year 2 \$254,877  
Year 3 \$534,196

### NET REVENUE

- Year 1
  - 80K - 172.558K -\$92.558K
- Year 2
  - 342.6K - 254.877K \$87.723K
- Year 3
  - 1.2M - 534.196K \$665.804K

Early Year 3 Breakeven

### SEED MONEY

- Business License \$300
- Website domain/hosting for online store \$75
- Trial products (100 units) \$8,842
- Patent: \$31,890
- 2-Year funding: \$294,894

Total Seed Money: \$336,001

## CONCLUSION

A global survey 83% of amputees struggle with skin damage due to heat and swelling within their socket

A system to increase prosthetic socket usability by reducing heat buildup, minimizing skin damage, and accommodating volume fluctuations of the residual limb for prosthetic customers

## WHAT'S NEXT?

### PATENT

### PLAN FOR DISTRIBUTION

- Kits are sold to clinics
- Clinics sell kits to customers
- Prosthetist modifies customer's socket and attaches kit

### TEAM ADDITIONS

- Marketing Specialist
- Business consultant
- Finance CPA/Accountant

### PARTNERSHIPS

- Hangar Clinic
- Ark Valley Clinic