Vac-Cast Prosthetics

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Project Summary

- **Problem**: 250,000 new amputees each year worldwide
- **Community partners**: Jaipur Foot and the Center for International Rehabilitation
- **Device**: allows rapid prosthetic fitting in rural areas, resulting in a 5 fold increase in patient throughput
- **Feasibility**: low cost, local materials, easy integration into existing system
- **Future plans**: Field testing, redesign, implementation
Problem

- There are more than 10 million amputees worldwide.
- In the US, a prosthetic leg costs $8,000.
- The majority of amputees live in the developing world and below the poverty line.
Community Partner

- Jaipur Foot has fit over 290,000 amputees with limbs over the past 30 years.
- Prosthetics and fittings are funded by donors at $30 per patient.
- There is no cost to the patient.
Community Partner

- The Jaipur Foot and post are mass produced.
- The socket must be custom fit to each patient.
- Socket-making methods are currently slow and wasteful or restricted to areas with grid electricity.
Current Technology: Plaster of Paris

3. Make a mould by wrapping the wet plaster bandage around the stump.

4. Place the patellar press into the mould taken.

5. Liquid plaster of Paris filled in negative mould.

6. Mould is ready. Fill up socket.
Current Technology: Plaster of Paris

- Takes 3-5 hours to make a socket.
- Non-reusable materials.
- 4 kg materials per patient must be transported to camp sites.
Current Technology: Vacuum Sandcasting
Current Technology: Vacuum Sandcasting

- 10 minutes to make a socket.
- Reusable materials.
- Higher quality mold than POP.
- Currently requires grid electricity and an expensive compressor.
Our Solution

• Human-powered.
• Built using locally available materials.
• Easily repaired.
• Costs $100.
• Same critical capacity as electric technology currently in use in urban areas.
• Easily integrated into current infrastructure.
Impact

5 fold increase in patient throughput.
This Summer: in Jaipur

- Getting to know our community partner.
- Learning about their manufacturing capabilities.
- Discussing other projects.
This Summer: in Delhi

- Getting feedback on our device.
- Building a prototype using locally available materials.
- Testing in an urban center.
- Testing in a fitment camp if possible.
Future Work

- Finding community partners in other countries.
- Working on other projects with Jaipur Foot.
- Starting a seminar with professors from MIT on rehabilitation.
Questions?
EC.715 D-Lab: Disseminating Innovations for the Common Good
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