

Developing World Socket Technology

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Vacuum Casting

- A cheap and fast way to produce sockets from simple materials.
- Replaces Plaster-of-Paris for rapid forming of negative and positive sand mold.

Vacuum Casting Demo

<http://www.youtube.com/watch?v=Yvev6shNvSg>

<http://www.youtube.com/watch?v=IS0FnIcXZ6s&feature=related>

Images of socket and prosthetic, residual limb, negative sand mold, positive sand mold, and soft insert vacuum socket removed due to copyright restrictions.

DWP Projects

- Develop a pyramid for the vacuum cast socket

Images of socket and photo of man milling to shape socket have been removed due to copyright restrictions.

- Current: epoxy and duct-tape. Short life-span.

DW Pyramid

- Current technology available in India from the Jaipur foot organization does not include a well developed pyramid for a socket. This results in easily broken shafts for amputees and requires frequent visits to prosthetic outfitters.
- Given the low-rate of follow up in most parts of India, an improvement in pyramid design will reduce the need for replacement and follow-up and the cost associated with full leg replacement.
- Deliverable: make a pyramid that can be attached to the current sockets in use at Jaipur foot organization in India.

Fablab Casting of Sockets

- In order for new socket designs to be disseminated across the globe and to meet the needs of local design considerations, fab-lab tools will be used to create prosthetic parts. Using 3D printing and CAD tools, this project will design a socket that can be 3D printed. Project involves stress testing of the socket design and simulation of the wear-and-tear associated with prolonged socket usage.
- There is potential overlap with other projects in the class.
- Can be done as a small part of another project or independently.
- Deliverable would be a 3D model in solidworks or other CAD software that could easily be printed using materials produced by a 3D printer.

Improvement of Socket Procedure

- A recent method has shown the viability of using sand and high pressure with plastic bags to create negative molds for sockets. This project would seek a way to improve the speed and accuracy of the positive and negative molds developed using this method. A more thorough and **consistent** methodology will be developed.
- Improving the quality of the mold
- Reduce the amount of time needed to produce a mold
- Decrease the need for clay or extra shaping on the mold.

Photos showing use of negative molds for building prosthetic removed due to copyright restrictions.

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