Developing World Socket Technology

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and

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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=1S0FnlcXZ6s&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

• Current: apoxy and duct-tape. Short lifespan.

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