

Medical Anthropology: Prosthesis Design

Guest speaker: Steve Kurzman

Steve's interest began with a personal interest in prosthetic limbs, e.g. legs, following losing a leg in a motorcycle accident. In Asia, people tend to be barefoot in homes; they squat rather than sitting on chairs; for reasons like this, "western" style prosthetic designs may not be cultural appropriate. Such a technology is tightly bound to cultural concepts of the body and of disability.

A state of the art western below-knee prosthesis: carbon fiber, costs \$8k, can't get wet, isn't suited to "barefoot" use, and requires extensive medical support infrastructure.

- In countries like India, there's a strong tradition of building one's own prostheses.
- Image: a person in Jaipur that built a pair of shoes that fit on thigh stumps out of car tires.
- Image: a woman lost lower leg due to leprosy, that fabricated her own wheeled cart
- Series of images showing Jaipur lower-leg prosthesis fabrication, with aluminum casts for foot and leg, vulcanized layers of rubber + foam and then coated to look like skin.

Jaipur, India

Most common accident is falling under train wheels.

Jaipur leg design used three key principles.

- Appropriate for local body culture: i.e. flexible foot makes it easier to squat, split toes support wearing flip flops, water-proof foot design allows frequent foot washing.
- Open design at interface to stump: many users had suboptimal medical care, their stumps are sensitive to pressure.
- Locally available materials and artisanship: hard to sustain this, aluminum casting and rubber not always present, especially in other countries. Goal was to manufacture the feet centrally, then have final limb fabrication/fitting be decentralized – but hasn't worked, people are traveling to Jaipur.

Additionally, it's relatively low cost: \$30 US, vs. about \$2,000 for typical Western import model.

Q: Who funds these limbs?

A: The Jain community has created a local charity to run the limb clinic.

Cambodia

Many victims of civil war and leftover landmines. It's the highest per-capita incidence of amputation in the world.

Steve shows slides of traditional designs, i.e. with bamboo and woven reeds. He passes around an example made by a Khmer Rouge, with an artillery shell for upper section, joined to hardwood ankle and car tire foot.

What's a locally appropriate design? Most houses built on stilts due to rains, so the limb must let its user climb those stairs. At their rehab facility, patients learn to navigate climbing structures and a rock-strewn path.

Limb labs in Cambodia are dependent on foreign aid funding, less sustainable than in Jaipur.

Mindset issues regarding disability:

- Western mind/body duality, mind over matter. It's an individual issue, an individual misfortune. Hospitals are set up to equip amputees such that they reintegrate with the rest of society.
- In Cambodia, there's a more holistic concept in which a person's disability is seen more connected to the rest of the culture. Less about individual misfortune, more seen as the result of issues with social relationships. Being an amputee carries some moral stigma: dominant Theravada Buddhism suggests the accident is the result of bad karma.

Q&A

Q: Can you compare these different approaches?

A: Western "biomedical" or clinical model tends to evaluate programs in terms of numbers of users. And it's willing and able to use more expensive techniques. Less likely to talk to users and local craftspeople about their specific needs and knowledge.

Overall in the prosthetics field, there's not much help for patients after the limb is fit and they've had some gait training. Needs for catch-up education, jobs training, etc, tend to be unsupported.