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Adjustable Prosthetic Liner

There are an estimated 2 million lower limb amputees in the United States alone and many types of prosthetic limbs have been developed to recreate functionality of those amputated limbs. Prosthetics often contain a liner to provide cushioning, support and improved fit between the residual limb and the prosthetic socket. However, current prosthetic liners are universally sized, while human limbs are not, resulting in amputee pain or discomfort and subsequent high rejection rates. Liners which are not adjustable do not have the capability to reduce volume fluctuation and redistribute pressure inside the pocket. Additionally, liners have no impact protection, thus they often cause damage to the skin leading to sores and possibly infections.

Researchers at Arizona State University have developed a novel prosthetic liner which has greater comfort for the wearer. This liner reduces volume fluctuation inside the socket using air technology, soft robotics and additional proprietary materials. It helps amputees maintain prolonged walking, standing, running and even exercise. Further, the novel design elements enable amputees to make on the fly adjustments to redistribute pressure and reduce pain and discomfort.

Improving comfort and relieving pain and tissue damage may result in reduced prosthetic rejection rates and greater quality of life for amputees worldwide.

Potential Applications

- Prosthetic liners

Benefits and Advantages

- Reduces pain and skin damage
  - Lessens the chance of infections
  - Improves quality of life
  - Greater comfort and stability for wearer
- Adjustable on the fly

- Could replace stump socks and socket fillers
- May reduce the frequency of refitting visits with the prosthetist