

Adjustable Smart Robotic Prosthetic Socket

In the United States of American, 2 million Americans are living with limb losses and approximately 185,000 undergo a limb amputation every year. Of those who undergo a limb amputation, almost 50% of patients wear a prosthetic limb. The technology currently on the market for prosthetic sockets is very limiting and has not significantly improved in the past decades. One problem with the currently technology is that it is a passive device that does not interact with the use nor does it allow for significant manual fine-tuning. As a result, patients may experience significant pain, swelling, rashes, or skin breaking down while using the prosthetic socket. These side effects may cause the patient to remove the prosthetic socket for a significant amount of time. For example, in an above knee prosthetic, the bone can press into the end of the socket and wear away the skin and strangle the tissue while causing ulcers. Additionally, the prosthetic socket causes a temperature rise when put in place and skin abrasion can occur. As an alternative and solution to the problematic prosthetic sockets, a new technology has been developed by researchers at Worcester Polytechnic Institute that uses soft robotics. The smart prosthetic socket will adapt to the shape and physiology of the residual limb by continuously measuring pressure and blood flow. In response, the shape of the soft robotic muscles changes to minimize problems with blood circulation while maintaining a secure interface with the limb. This will ultimately lead to significantly improved comfort, an increase in safety, and overall quality of life. This technology is also believed to have the power to lead to a reduction in long term health costs for the amputee.

Key Features

- Smart robotic prosthetic socket
- Physiological monitoring socket system
- Adjustable socket
- Reduces long term costs
- Uses hydro muscles
- Increased comfort
- increased safety
- Increased quality of life

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USPTO Number

62/193,719

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