Clinical Evidence Regarding Prosthetic Liners for Lower Extremity Amputees

Overview

- Protecting residual limb tissues for lower extremity amputees is a challenge because they are not accustomed to bearing loads.[1]
- Loads can frequently cause ulceration and other skin conditions for the residual limb.[1-3]
- Prosthetic liners were developed to mitigate the load transferred from the residual limb to the prosthesis.[4-7]
- There is a growing desire in the prosthetics field for clinicians to prescribe the proper prosthetic liner using the wealth of scientific evidence on the subject matter.[8]

Clinical Evidence

Mechanical Properties

- Studies suggest that stiff liners would be best for patients with excessive soft tissue, while soft liners would be best for cushioning bony prominences.[9]
- Additional human studies are needed to test mechanical properties of liners.[8]

Heat and Moisture Transfer Properties

- Liner materials are highly impermeable to moisture transfer.[10]
- Liners and sockets are highly resistive to heat conduction and could be a major contributor to elevated skin temperatures.[11]
- Future research is needed to improve heat transfer coefficients in liners and to find a way to remove perspiration while maintaining suspension.[8]

Human Subjects Experiments

- Liners distribute pressures over the residual limb.[8]
- Thin stiff layers of tissue tolerated pain better than thick soft layers of tissue.[12]
- Liners composed of different material properties and geometries in different areas could improve functionality.[8]

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