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

References


