A Novel Idea in the Treatment of Edema in Diabetics

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The Flexshoe addresses foot and ankle swelling and circulation issues, especially common in the elderly, targeting conditions like pedal edema, chronic venous insufficiency, and diabetic edema. These conditions often cause fluid buildup, restricting mobility and comfort. Current treatments, such as compression wraps and medical devices, limit mobility, making daily tasks difficult. The Flexshoe integrates compression therapy with the ability for the wearer to remain active while receiving treatment. Air bladders inside the boot exert periodic or static pressure on the ankle and leg to reduce swelling and fluid buildup, mimicking current medical devices. The Flexshoe houses air pumps, an Arduino, motor controllers, a switch, and a battery. A flex sensor measures ankle circumference and sends data to the Arduino, which regulates air in the bladders, ensuring pressure is consistent and safe (30mmHg - 80mmHg). The Flexshoe also incorporates WiFi connectivity, enabling control with customizable cycles through a connected app. The Flex Shoe offers enhanced features compared to current intermittent pneumatic pressure devices and the previous iteration, including a more accurate flex sensor, weight reduction(2.67-1.17Kg), and customizable inflation/deflation times for improved comfort and efficacy. Not only that, through testing using a model of a foot at various severities, (Mild:10-15%, Moderate: 15-20% and Severe: over 20%) the device was fully able to reduce ankle circumference measured by the flex sensors and displace simulated lymphatic fluid effectively. By combining mobility with therapeutic benefits, the Flexshoe empowers individuals to manage foot swelling and circulation issues, promoting independence and overall well-being.

Awards Won: