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Soft Wearable Device to Treat Plantar Flexion Contractures

Plantar flexion contracture (PFC), a painful condition where the ankle remains in a plantar flexed state, is common in patients who have suffered from traumatic brain injury, acquired brain injury or stroke. PFC makes it difficult for patients to walk, reduces their range of motion and causes gait changes. Current treatments for PFC, serial casts made of rigid and uncomfortable materials or adjustable splints, can't be used for extreme PFC cases and may result in pressure wounds and skin abrasions.

Researchers at Arizona State University have developed a flexible wearable robotic device to treat plantar flexion contracture. This soft, conformable and reusable device provides a prolonged plantar flexion stretch at the ankle to reduce spasticity and stiffness and subsequently increase range of motion. Velcro fasteners are utilized to secure the device onto the leg, making it easy for patients to don and doff it by themselves. Further, because it is made of commonly available and inexpensive materials, this device is a more cost-effective solution than those currently on the market.

The nature of the design and components of this wearable device make it an effective, flexible, and comfortable therapeutic option in the treatment of PFC.

Potential Applications

- Treatment of PFC
  - Stationary rehab
  - Therapeutic aid

Benefits and Advantages

- Reduces reaction forces and torque caused by the ankle
- Increases range of motion of ankle
- Flexible and comfortable

- Relatively inexpensive and uses common items which can be purchased in bulk
- Effective – creates the necessary forces to counter the contracture
- Quick don and doff times – around 2 minutes
- Reusable and durable
- Safe

For more information about the inventor(s) and their research, please see

Dr. Sugar's departmental webpage