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Patient Controlled Dynamic Therapeutic Compression Tension Garment

Provides dynamic compression for therapeutic relief

A new design for a shape memory alloy compression garment (SMA-CG) provides dynamic compression for therapeutic relief. The garment features nickel titanium (NiTi) alloy SMA spring actuators that provide compressive force when electrical power is applied. A novel tension limiting switch gives patients independent control of compression and offers hands-free power switching for constant tension/pressure. The easy-to-adjust garment, currently modeled as separate calf and thigh garments, features a three-layer system with an inner layer that protects the leg from heat and distributes force circumferentially.

Closed-loop sensing for continuous monitoring

Medical compression garments used to treat lymphatic disorders or conditions of poor venous return (e.g. orthostatic intolerance) may offer relief of these conditions but are limited in usability (e.g., they are uncomfortable, difficult to put on and take off, and may need tethering to an inflation source). A closed-loop sensing system is needed for such compression/tension systems in order to both monitor and regulate the values produced by the system. The unique feedback mechanism of the tension switches consumes no electrical power: it instead uses the mechanical properties of its material. Not only does this design consume fewer resources, but it requires less constant human intervention.

Phase of Development

- Prototype developed and tested.

Benefits

- Dynamic compression for therapeutic relief
- Less constant human intervention required
- Feedback mechanism does not consume electric power

Features

- Shape memory alloy compression garment (SMA-CG)
- Nickel titanium (NiTi) alloy SMA spring actuators
- Novel tension limiting switch
- Closed-loop sensing system
- Separate, adjustable calf and thigh garments; easy to wear outside of clinical environments

Applications

Technology ID
20180120

Category
Engineering & Physical Sciences/Design Specifications
Engineering & Physical Sciences/Instrumentation, Sensors & Controls
Life Sciences/Human Health
Life Sciences/Medical Devices
Agriculture & Veterinary/Veterinary Medicine

Learn more

- Medical compression garments (e.g., orthostatic intolerance, etc.)
- Active compression garments
- Cardiovascular, lymphatic, and anxiety disorders
- Torso, shoulder, arm, and leg garments
- In-home use, outside of clinical environments

Researchers

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Publications

Treatment of Orthostatic Intolerance

ASME, Paper No. DMD2018-6884, pp. V001T10A005; 4 pages

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