Patient-specific neck brace with dynamic range of motion

Technology #cu16167

This technology is a neck brace that is optimized to the patient’s neck biomechanics and provides both passive and active support for muscular training and rehabilitation.

Unmet Need: Neck brace to aid rehabilitation in patients with neurodegenerative diseases

Patients with neurodegenerative diseases, such as ALS, are often unable to support their own head and neck, resulting in a significant decrease in mobility and quality of life. Current neck braces allow for sufficient support, but have limited range of motion. Providing active motion control in a neck brace can aid in rehabilitation and strengthening of patient muscular strength to improve mobility and quality of life.

The Technology: Neck brace with customizable active support

This technology utilizes elastic elements to provide passive support, coupled with multiple actuators to actively control motion via input commands from an eye-tracking input device. The combination of these two strategies provides continuous neck support while still enabling smooth, natural motion. Patient neck biomechanics are also analyzed to determine optimal positioning for the customizable actuators and provide a personalized design. Moreover, these actuators can then be continually adjusted to ensure optimal support throughout rehabilitation.

Prototypes of the active neck brace have been produced and tested.

Applications:

- Passive support for patients with a head or neck injury
- Active support to facilitate rehabilitation in patients with neurodegenerative diseases
- Rehabilitation in any patient with damaged or low neck muscle function
- Tracking of improvement in patient neck mechanics over time
Advantages:

- Combines both passive and active support
- Can be used for any patient with a head or neck injury
- Support systems are adjustable for each individual patient
- Tunable design is guided by analysis of patient neck mechanics
- Provides three degrees of freedom, thus permitting natural motion of the wearer’s head

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Patent Information:

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Related Publications:

Tech Ventures Reference:

- IR CU16167
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