

Portable Robotic Rehabilitation Device

Technology Overview

The present invention relates to a device that is designed to assist with upper limb rehabilitation, and allows the clinician to diagnose and make objective assessment on the rehabilitation progress.

The device utilizes biofeedback and intelligent controls to help patients undergo muscle stretching for 1) active-assisted therapy to strengthen the upper arm through self-initiated and self-directed voluntary exercise with visual feedback for interactive therapy, 2) passive therapy by providing continuous range of motion (CPM) and 3) thermotherapy to increase muscles stretch ability and reduce pain.

The device allows clinicians to make objective assessment of each therapy session by providing real-time diagnostic information. When equipped with remote monitoring and assessment, it also allows clinicians to assess patients remotely. The innovation has full potential to be adapted for homebased upper limb rehabilitation usage.

Technology Features & Specifications



- A novel solution that provides 5 degrees of freedom with only 2 electric motors to facilitate upperlimb movement.
- EMG Biofeedback, visual feedback, torque feedback, position feedback and stretch velocity control function available.
- Motivating game playing provides intensive training with goal oriented movements and real time performance feedback.
- One device suits all arm sizes and both left and right arm usage.

- Range of Motion (ROM): Finger Flexion 90°/ Extension 0°, Wrist Flexion/ Extension 60°, Forearm Pronation/ Supination 90°, Elbow Flexion 120°/ Extension 0°, Shoulder Rotation 90°
- Length: 54 cm, Width: 26.2 cm, Height: 30 cm, Weight: 8 Kg, System Rating: 115/230 VAC, Frequency: 50-60 Hz, DC output: 24V/ 14.6A, USB port: 2

Market Trends & Opportunities

Globe ageing population is expected to be 1.5 billion by 2050 and the likelihood of having a stroke increases as a person getting older and more common among the elderly. Global healthcare industry outlook 2018 highlighted the importance of value based care and the focus shift towards patient-centricity, adoption of visual and remote assessment. Present market is also urging for home rehab and assistive devices and expected growth of future global rehabilitation robot market size could reach to US\$1.1 billion by 2021. A much less empirical development available in the market to stretch tighter muscles and to practice at home limits to undergo rehabilitation more intensively. There is, therefore, potential to develop such devices to bridge the current market gap and to meet the growing demands.

Benefits

- Enables highly intensive upperlimb rehabilitation for all neurological disordered patients at any stages and covers cross all phases of rehabilitation to recover faster and better.
- Maintain or increase ROM, relax muscle spasms, reduce pain, prevent or retard disuse atrophy,

Potential Application

- Active and Passive ROM exercise
- Statics and isolated precise stretching exercise
- Muscle conditioning through self-initiate multi-Joint movement strength training
- Interactive therapy such as biofeedback and visual feedback
- Homebased rehabilitation
- Virtual and remote clinical trials

Commercialisation / R&D Opportunities

- ✓ Ready for commercialization
- ✓ Looking collaborators for further development / to develop new applications
- ✓ Available for licensing
- ✓ Accepting business plans from interested parties

Intellectual Property

- Patent pending

Contact Us

Department for Technology,
Innovation and Enterprise
(TIE)
Singapore Polytechnic
500 Dover Road
Singapore 139651
Email: tie@sp.edu.sg

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