TECH OFFER

Neuro-Integrative Wearables - Restoring Independence and Enhancing Sports Performance

KEY INFORMATION

TECHNOLOGY CATEGORY:
Healthcare - Medical Devices

TECHNOLOGY READINESS LEVEL (TRL): TRL9
COUNTRY: SINGAPORE
ID NUMBER: TO175264

OVERVIEW

Patients recovering from brain injuries or neurological disorders often experience a plateau in recovery within 6-12 months, even though they haven't fully regained their abilities. Similarly, athletes face stagnation in their performance or increased risk of injury when pushing to new levels. These challenges stem from underlying maladaptive neuro-muscular patterns that are not adequately addressed by conventional methods.

This neuro-integrative wearable technology provides a breakthrough solution by giving users an “inside view” of their brain and muscle responses in real-time as they perform tasks. By monitoring these responses, the system helps users to self-correct maladaptive behaviors that are limiting their recovery or performance. This process allows users to break through recovery plateaus or avoid performance stagnation by training both brain and muscle function in unison.

Beyond aiding in recovery, this wearable is also suitable for new patients and novice athletes seeking a faster track to recovery or peak performance without relying on traditional trial-and-error methods. The technology can be applied across various

populations—children, adults, and the elderly—to help improve recovery from disabilities, enhance learning, boost performance, or even slow down the natural decline in abilities with age.

The device is portable, easy to use, and adaptable for a variety of settings including hospitals, schools, nursing homes, and home environments. Its potential applications are expanding, with uses in stress disorder prevention, injury prevention, and improving self-regulation in children and adults with special needs.

The tech owner is seeking collaboration with:

- Rehabilitation facilities offering neurorehabilitation for stroke and brain injury recovery.
- Sports performance centers aiming to prevent injuries and optimize athlete performance.
- Educational institutions focused on enhancing cognitive, physical and learning development.

TECHNOLOGY FEATURES & SPECIFICATIONS

Muscle and Brain Signal Capture: Combines EMG channels to capture muscle signals and EEG channels for brain activity, providing a comprehensive view of neuro-muscular function.

Real-Time Feedback & Guidance: Offers real-time feedback with an audio-visual interface that helps users adjust and improve their movements during tasks.

Quick Setup Brain-Muscle Interface: & Lightweight Design: Equipped with dry sensors for easy, quick setup and lightweight wearables that require minimal adjustments, ensuring comfort and portability.

Safety & Approvals: Regulatory approved by the HSA (Singapore) and USFDA, ensuring compliance with global safety standards.

Flexible Usage & Remote Support: Designed for use in hospitals, homes, and other settings. It is self-administered or used with minimal supervision, offering remote care capabilities for monitoring progress and adjusting programs as needed.

POTENTIAL APPLICATIONS

This neuro-integrative wearable technology has a wide range of applications in both medical and performance optimization settings. Its ability to monitor and correct neuro-muscular responses in real-time makes it versatile and effective for various conditions and populations, including:

- **Stroke Rehabilitation:** Helps stroke patients regain motor skills, balance, and cognitive functions by retraining brain and muscle coordination.
- **Traumatic Brain Injury (TBI):** Assists in recovery by addressing the neuro-muscular dysfunctions that hinder progress, improving both physical and cognitive outcomes.
- **Congenital Brain Injury & Developmental Delay:** Supports children and adults born with brain injuries or developmental delays by enhancing learning and functional independence.
- **Learning Disorders:** Provides a platform for children and adults with learning disabilities to improve cognitive skills such as reading, writing, and comprehension.
- **Sports Peak Performance & Injury Prevention:** Enables athletes to overcome performance plateaus and reduce injury risks by optimizing brain-muscle interactions during training.
- **Parkinson's Disease:** Slows the degeneration of motor functions and enhances cognitive abilities in individuals with Parkinson's disease by continuously stimulating neuroplasticity.

- **Mild Cognitive Impairment (MCI) in the Elderly:** Helps older adults maintain or improve cognitive and motor skills, delaying further decline associated with aging.

Additionally, this wearable can be combined with rehabilitation equipment such as robotics, stimulators, treadmills, and sports simulators. By providing an “inside view” of brain and muscle activity during various tasks, it enables precise and personalized rehabilitation protocols. This capability is essential for activities that may not be externally observable, ensuring a more comprehensive approach to recovery and performance enhancement.

UNIQUE VALUE PROPOSITION

This neuro-integrative wearable technology offers a different approach by training both the brain and muscles simultaneously, leading to faster and more effective recovery.

- **Accelerated Recovery:** By targeting brain-muscle coordination, the device facilitates a **70% improvement** in chronic patients within 6-8 weeks, allowing for significant gains in mobility, cognition, and independence compared to their baseline condition.
- **Increased Independence:** Patients in early stages of recovery, particularly stroke survivors, can achieve higher levels of independence upon hospital discharge, surpassing the progress typically seen with standard care.
- **Remote Rehabilitation:** The wearable enables **80% of neurorehabilitation sessions to be conducted remotely**, without the need for a therapist’s physical presence. This flexibility supports continuous therapy in both clinical and home settings.
- **Enhanced Therapist Productivity:** By reducing the need for constant supervision, therapists can oversee multiple patients simultaneously, resulting in a **3X improvement** in productivity.

This technology's ability to deliver highly personalized, real-time neuro-muscular feedback makes it faster, more accessible, and more efficient than conventional rehabilitation methods.