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Haptic Neuro-Spatial Rehabilitation and Therapy Device

-Often after an individual experiences a neurological event such as traumatic brain injury (TBI), cerebrovascular accident (CVA), multiple sclerosis (MS), stroke, etc., they suffer from a condition called midline shift syndrome (MSS). MSS causes those affected to lean their body away from the non-paralyzed side on a continual basis due to a change in their perception of their body's orientation. Clinicians who work with these individuals for rehabilitation have expressed frustration at current techniques for treating MSS. A cost-effective, automated method, which can be utilized at home or in a medical establishment is greatly needed.

Researchers at Arizona State in collaboration with researchers at Barrow Neurological Institute have developed a user-friendly device for treating patients suffering from MSS. This device assists them in relearning their midline position through a haptic-feedback mechanism without the need for manually applied haptic techniques. Further, an interactive smart mirror provides visual feedback to the patient and communicates with the wearable device. The design's wearability meets both functional and usability requirements by targeting the torso and neck to provide gentle but effective feedback to the patient. By detecting the patients position in space, this device provides both visual and haptic cues to the patient to help them reorient back to their midline position. A mobile application was also developed which allows for real-time data acquisition, monitoring of patient progress and report generation. This information can be provided to a clinician so that they can objectively measure results and demonstrate patient progress, which could help get insurance companies to cover this MSS therapy.

This novel wearable device is comfortable and effective and allows a patient to undergo rehabilitation in a medical establishment or in the comfort of their own home.

Potential Applications

- Rehabilitation of those impacted by midline shift syndrome arising from:
 - Stroke, MS, CVA, TBI, cerebral palsy and other neurological events

Benefits and Advantages

- Provides gentle but effective haptic and visual cues to the patient
 - This helps act on the muscle memory of the body to help patients learn proper posture and orientation
- Comfortable to wear
- Designed for ease of use
- Cost-effective
- Mobile - can be used in a medical establishment or at home
- Does not require a trained clinician for use
 - Does include a mobile application which provides patient progress and objectively measured results
- A smart mirror communicates with the device and provides visual feedback to the patient to help them reorient to the midline range

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

[Dr. McDaniel's departmental webpage](#)