Muscle, nerve, and bone atrophy pose a significant risk for patients receiving critical care, such as mechanical ventilation, even for hospitalizations as short as one week. Although aggressive physical therapy and early mobilization of patients is effective in reducing the length of hospitalization, these measures require skilled physical therapists and may be difficult to apply to unconscious patients or patients otherwise unable to control their muscles.

**Multiple Actuator Vibration Therapy for Immobile and/or Unconscious Patients**

Vibration therapy is another method of treating muscle atrophy and has been successful in improving muscle mass and function in patients with low levels of physical activity. Researchers at the University of Michigan have developed a technology consisting of an exoskeleton coupled with vibration actuators that are capable of sending vibratory stimulation through the loaded axial musculoskeleton of the patients. Vibration may be applied at various locations on a patient, such as the plantar surfaces of the feet and the shoulders, based on the course of treatment. Both single tone and multifrequency stimulation can be provided and guided by an array of sensors ranging from accelerometers, temperature, oxygenation sensors, and others to provide precision application of the vibration stimuli to maximize response.

**Applications**

- Immobilized and/or unconscious intensive care patients
- General hospital wards, nursing homes, rehabilitation facilities, and even at home
- Use in critically ill patients as a means to enhance blood flow

**Advantages**

- Mobile
- Applicable to any patient at any time in ICU, hospital, nursing home, or home bed
- Tunable to an individual response
- Loading of entire axial skeleton
- Does not require patient cooperation

**Inventors**

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