

# Automated Inspiratory Muscle Training for Patients Receiving Mechanical Ventilation

Published date: May 16, 2019

## Technology description

### Facilitates Ventilator Weaning By Strengthening the Inspiratory Muscles

This automated inspiratory muscle training combines hardware and software components, strengthening the inspiratory muscles while a patient is receiving mechanical ventilation. More than 300,000 patients receive mechanical ventilation in the United States each year. Though an indispensable therapy for patients experiencing respiratory failure, mechanical ventilation is not without significant risk. When a ventilator is used for as little as one day, the inspiratory muscles begin to atrophy and weaken, resulting in difficulty for about 40 percent of patients when liberation from mechanical ventilation is attempted.

University of Florida researchers combine hardware and software in this method of strengthening inspiratory muscles during ventilation to aid in weaning the patient from mechanical ventilation dependency. Their clinical trials and continued research with this patented muscle training system demonstrate an increase in the percentage of long-term patients who were weaned compared to usual care. The hardware and software can be integrated into a mechanical ventilator as an external device or as a software upgrade to existing ventilators. The system also can make recommendations on progressing the training program, providing visual feedback to the patient and therapist during training sessions and displaying training progression over time. Prophylactic use of the system is also feasible to avoid muscle loss during early stages of ventilation.

## Technology

The inspiratory strength training module is either incorporated into a conventional ventilator or as an external module for use with existing ventilators. Hospital staff members use the software component to set a strength training load for an individual patient, which comprises 4 sets of 10 training breaths over a 15 minute period. The hardware component, an electromechanical device, provides a threshold inspiratory load to the patient's breathing tube, forcing the patient to overcome the negative pressure when inhaling, strengthening the inspiratory muscles. The software component generates a report including graphical feedback regarding the patient's progress; evaluation of the patient's training

efforts; and recommendations for modifications in training in real time. The technology has the ability to provide long-term progress and clinical advice.

## Application area

Strengthening of inspiratory muscles during mechanical ventilation through combination of software and hardware

## Advantages

NIH-sponsored study demonstrates 50 percent more “failure to wean” patients were successfully extubated with Inspiratory Muscle Strength Training than with traditional treatments

Requires only 15 minutes of training per day, using a device either incorporated directly into conventional ventilator or when used as an external module with available ventilators

Potentially reduces duration of overall mechanical ventilation, saving money and improving the clinical outcomes of patients

## Institution

[University of Florida](#)

## Inventors

[Andrea Gabrielli](#)

Alumni

Anesthesiology

[Michael Banner](#)

ANESTHESIOLOGY

[Neil Euliano](#)

Anesthesiology

[Anatole Martin](#)

Professor

PHYSICAL THERAPY

## 联系我们



叶先生

电话 : 021-65679356

手机 : 13414935137

邮箱 : yeyingsheng@zf-ym.com