Prana Tech: Innovative Wearable Platform for Training any Breathing Exercise

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Introduction

Breathing exercises and breath control techniques are increasingly being investigated as potential **interventions** for a wide range of health conditions including COPD, asthma, hypertension, insomnia, and various psychophysiological conditions including anxiety, depression, and PTSD. Numerous recent and ongoing clinical studies have evaluated the efficacy of these breathing techniques, with some promising results.

Background

Breathing exercises can be complex. Studies conducted so far have employed a wide variety of **breathing exercise protocols**, testing multiple variables including different rates, depths, and patterns of breathing. Breath pattern parameters include varying inhalation and exhalation counts, inspiratory and expiratory holds, and the variation of these parameters over a sequence of breaths.

Two additional important variables frequently considered by researchers are whether **diaphragmatic breathing** and a particular **posture** are employed, as both can potentially impact pulmonary measures such as FEV1, FRC, and FVC[1,2]

The Problem

Ensuring that patients comply and adhere to the chosen breathing protocols can be a challenge, especially when breathing exercises are performed outside the clinical setting, and for extended durations.

Furthermore, patients interested in adopting such breath control practices in their daily lives as a therapy face several challenges:

- Lack of feedback to confirm if they are performing the breathing exercises correctly and consistently
- Loss of interest due to boredom and lack of engagement
- Lack of shareable breathing session data for healthcare providers, and for charting progress
- Lack of controlling for diaphragmatic breathing and posture variation

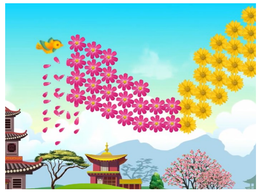
The Solution

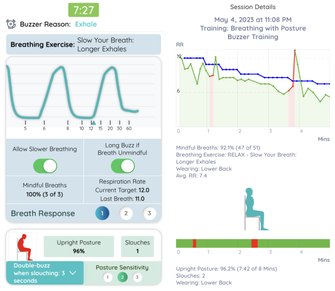
Prana Tech presents a comprehensive wearable platform and app for training any at-rest breathing exercise using real-time sensor feedback. Prana offers over 80 exercises, with dozens derived from clinical study protocols. The device was recently launched and can be currently purchased at www.prana.co

The patented wearable offers a new retractable form factor with numerous advantages over existing respiratory sensing devices:

- Can be quickly worn over or under any style of clothing
- No need for adhesive skin patches or clipping to tight waistbands or bras
- Can be worn at multiple positions on the trunk for tracking diaphragmatic or chest breathing, as well as lower or upper back posture
- Retractable belt more compact than chest strap devices, only 37g total weight
- Advanced sensors and signal processing for accurate respiratory/posture data

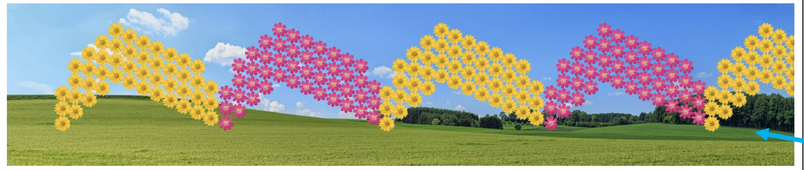
Prana's app offers two training modes: **Visual** (lightly gamified), and **haptic**, and offers detailed shareable session data, and an advanced passive tracking mode.

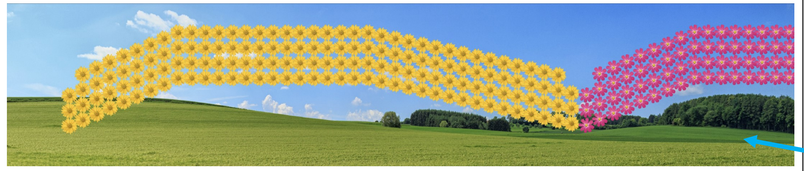


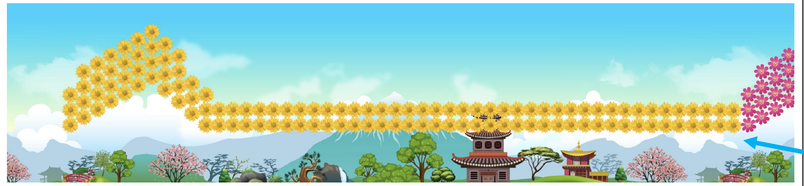


Inhales and exhales control motion of an animated character to follow scrolling target breath patterns.

Prana Tech's Breath Training Matches Study Protocols for Breathing Exercises







In addition to guiding complex and fully customizable breathing patterns, the Prana Wearable and app can optionally detect and enforce diaphragmatic breathing and upright posture during the breathing exercise training modes. For example, in the visual breath training above, slouching can cause the scrolling to momentarily pause.

US Pat. 11,172,850 Contact: andre@prana.co

Examples of Recent Studies Evaluating Breath Control Techniques

The Impact of Pursed-lips Breathing Maneuver on Cardiac, Respiratory, and Oxygenation Parameters in COPD Patients

Study breathing exercise: Inhale 2s, exhale 5s

Effect of 4-7-8 Breathing Technique on Anxiety and Depression in Moderate Chronic Obstructive Pulmonary Disease Patients

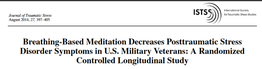
Study breathing exercise : Inhale 4s, hold 7s, exhale 8s

Effects of Farinelli Breating Exercise on Respiratory Function and Symptoms in Patients with Chronic Obstructive Pulmonary Disease

Study breathing exercise : Farinelli Sequence vs. DB

Physiotherapy breathing retraining for asthma: a randomised controlled trial

A Study breathing exercise: Controlled breath holds



Breathing-Based Meditation Decreases Posttraumatic Stress Disorder Symptoms in U.S. Military Veterans: A Randomized Controlled Longitudinal Study

Study breathing exercise : Sudarshan Kriya Yoga

References

1. Katz, S., Arish, N., Rokach, A. et al. The effect of body position on pulmonary function: a systematic review. BMC Pulm Med 18, 159 (2018).
2. Yong MS, Lee HY, Lee YS. Effects of diaphragm breathing exercise and feedback breathing exercise on pulmonary function in healthy adults. J Phys Ther Sci. 2017 Jan;29(1):85-87. doi: 10.1589/jpts.29.85. Epub 2017 Jan 30. PMID: 28210046; PMCID: PMC5300812.