PEVOC 2026 · ISTANBUL

A Novel High-Technology Device for Active Positive, Negative, and Alternating Pressure Modulation of the Vocal Tract

Bridging Voice Therapy, Respiratory Training and Autonomic Regulation

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⚑ **PROVISIONAL PATENT FILED — NOVEMBER 2025**

No comparable technology identified in patent databases or scientific literature prior to filing

This work is the result of what I have learned from all the voice researchers, many of whom are here today.

For that reason, I dedicate this presentation to you as a token of my deep gratitude.

This is your voice, too!

The Clinical Gap

What exists today

Voice therapy

Low-cost, minimally invasive, clinically effective

Vocal assessment technology

High-resolution and multiparametric

Respiratory training devices

Positive pressure and flow resistance

SOVT exercises

Passive back-pressure only

What does NOT exist

No device actively modifying the aerodynamic environment of the vocal tract during phonation and/or respiration.

Active positive, negative or alternating pressures applied to the airway during phonation

An integrated solution comprising: assessment, therapy and/or biofeedback

Real-time aerodynamic modulation during phonation

Existing tools are ***passive by design.***

No similar technology found in patent databases or scientific literature prior to filing.

The Concept

Some pre-clinical thoughts yet to be explored

What if we could actively control the aerodynamic environment of the vocal tract — on demand, during phonation?

A single device. Three modes. Several potential clinical applications to be explored.

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ACTIVE POSITIVE PRESSURE

Hyperfunctional disorders

MTD · Nodules · Polyps

Expands SOVTE principles actively. Optimises inertive reactance — pharyngeal expansion, epilaryngeal narrowing. Reduces minimum phonation pressure and vocal fold collision trauma.

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ACTIVE NEGATIVE PRESSURE

Hypofunctional disorders

Vocal fold paralysis · Presbyphonia

Creates an anti-gravitational aerodynamic environment: subglottic pressure threshold is lowered, while transglottic pressure gradient is increased — challenging adductory force and driving neuromuscular recruitment.

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ACTIVE ALTERNATING PRESSURES

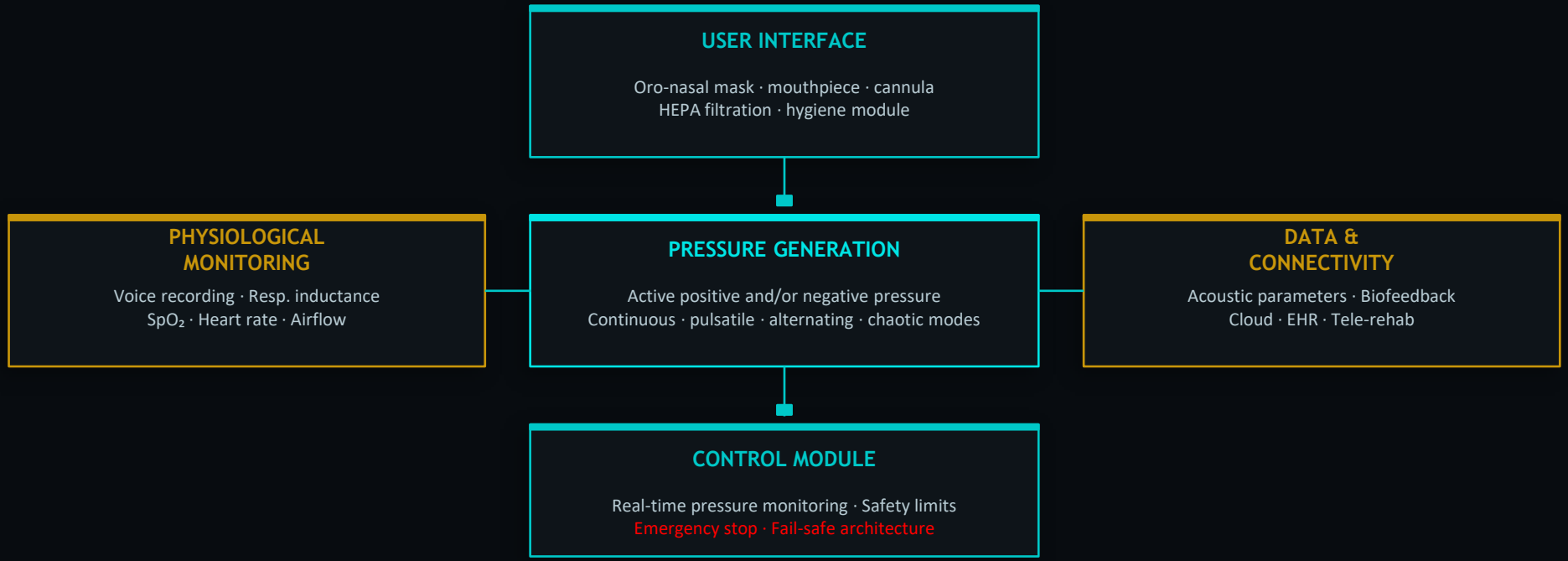
Training & ANS regulation

Vocal athletes · Resp. rehab · Vagal activation

Unpredictable aerodynamic challenge drives neuromuscular adaptation. HRV monitoring enables parasympathetic/autonomic modulation protocols.

⚑ Provisional Patent · Nov 2025

Device Architecture



Simplified functional architecture · Full specification subject to patent protection

⚑ Provisional Patent · Nov 2025

Current Status

DONE

Provisional patent filed

Novel concept confirmed absent from patent databases and scientific literature prior to filing. Filed: November 2025.

DONE

Working prototype built

Functional proof-of-concept prototype assembled and operated. Pressure modulation of the vocal tract during phonation demonstrated in preliminary testing.

NEXT

Clinical trials — forthcoming

First-in-human clinical studies about to begin.

✦ **This presentation marks the first public disclosure of this device concept**

Article

Not peer-reviewed version

Open-Source Device to Apply Controlled Positive or Negative Airway Pressure for Vocal Training

Raffaella Salama , Miguel A. Rodriguez-Lazaro , María Borragán , Antonio Jimenez , Carles Expósito-Rovira , Isaac Almendros , Alfonso Borragán-Torre , Ramon Farre * , Jorge Otero *

Posted Date: 9 December 2025

doi: 10.20944/preprints202512.0618.v1

Keywords: phonation; voice therapy; vocal folds; mechanical loading; positive airway pressure; negative airway pressure; airway impedance; airway wall compliance

An Invitation to Dialogue

Working prototype exists. Conceptual and physiological framework established.
Clinical trials are about to start! This is the beginning.

Clinical feasibility

What populations, protocols, and outcome measures should be prioritised in first trials?

Methodological challenges

How do we control for acoustic noise, masking, and placebo in aerodynamic intervention studies?

Interdisciplinary scope

How can vocology, SLP, respiratory physiology, and biomedical engineering best collaborate?

⚑ **PROVISIONAL PATENT FILED — NOVEMBER 2025**

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Next step…

Off we go!