Assessing the Performer's Voice: *a Wild-Goose Chase* for Acoustic Equivalence, or Redefining the Goal?

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Disclaimer

- This discussion is only possible thanks to the extensive and rigorous work of our colleagues.
- Our aim is ***not*** to challenge the validity of individual studies — it is to ***re-contextualise*** their collective meaning as we explore this ***paradigm shift***.

What the Field Has Been Searching For

- Contact sensors have been pursued primarily as an ***alternative*** to traditional microphones
  - Noise robustness, mitigating SNR limitations
  - Clinical voice monitoring usefulness
  - Pursue of sensor optimization, characterising signal fidelity relative to an airborne reference standard

But is it really interchangeable?

Two Sensors — Two Different Constructs

These sensors do not measure the same physical phenomenon.

Airborne = glottal source + vocal tract filter

Contact = glottal source mainly

Searching for interchangeability is like searching for acoustic equivalence between “a gramophone and a stethoscope”(!?).

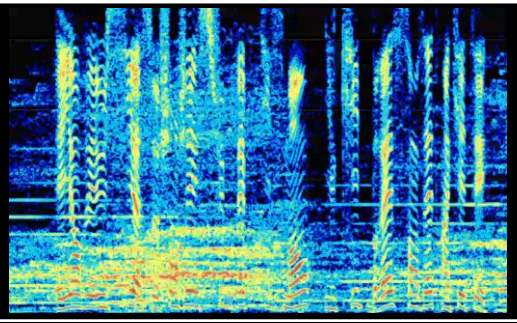
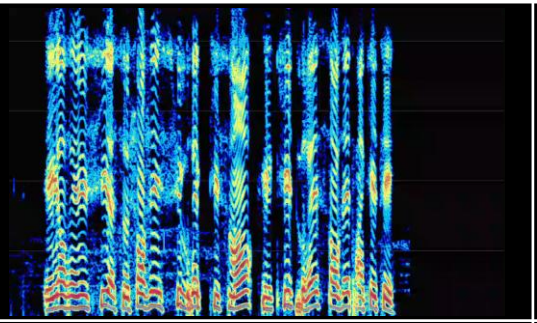
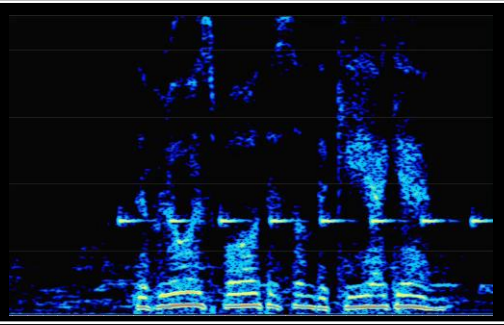
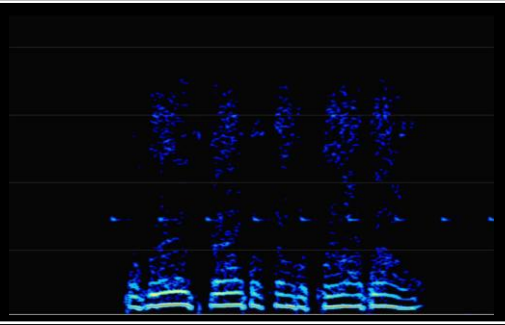
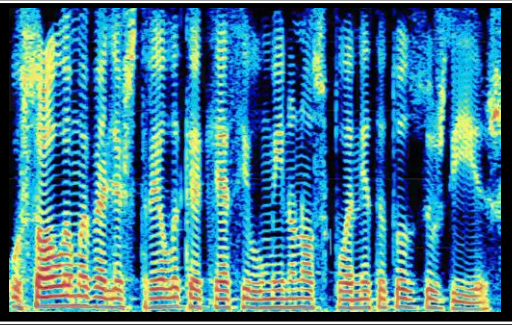
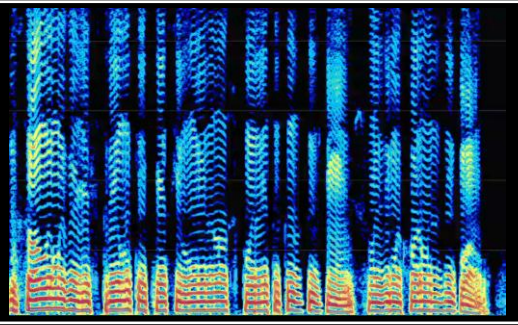
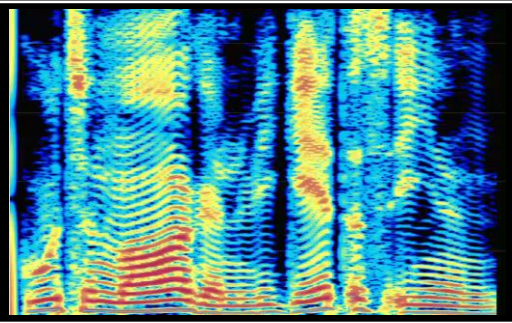
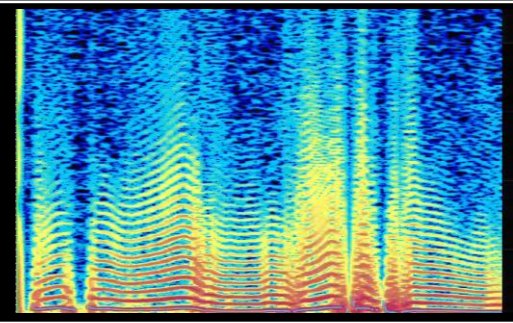
The Interchangeability Myth

- **Hillman et al. (2006); Van Stan et al. (2015)** — Contact-based ambulatory systems never validated for spectral/perturbation measures.
- **Schloneger & Hunter (2017)** — Contact sensors capture source vibrations only, bypassing vocal tract resonances.
- **Pestana et al. (2025 & other under review)** — High Spectral Slope bias; overestimated HNR. Calibration removed systematic bias but failed to improve ICC — it is a physically distinct signal acquisition.
- **Castillo-Allendes et al. (2025)** — Standard acoustic validation protocols insufficient for contact sensors.

Let’s Listen to the Difference!?

Same Voice, Different Constructs

Same phonatory event, recorded simultaneously

Study	Airborne microphone	Contact transducer	EGG
Hauret, J. et al. (2025) Vibravox open dataset			
Castillo-Allendes et al. (2026) *(kindly sent by Adrian)*			
Pestana et al. (under review)			
Saarbrücken Voice Database Open dataset			

A Paradigm Redefinition

- Contact sensors should not be viewed as secondary acoustic tools as it primary measures the physiological source.
- This distinction enables a clearer analysis of glottal mechanism vs. radiated sound in vocal pedagogy and voice science.

Redefining the Goal

- Should we start asking “what does it uniquely reveals about the glottal source?” ***instead of*** “can this replace the microphone?”
- Should we start looking for specific normative data?

Especially valuable for performers:
it can quantify the physiological engine robustly, even in high-noise environments where microphones fail.

Maybe the wild-goose chase is over.
Shall the goal be the complementarity instead of equivalence?

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