

Live Speech Mapping with Trumpet: Towards Improved Hearing Aid Fitting Practices

PRODUCT INSIGHTS

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In recent years, hearing aid audiology has witnessed a technological evolution, with devices becoming increasingly sophisticated from a computational standpoint. However, verification and validation protocols for fitting are still, in many clinical settings, incomplete or primarily based on theoretical estimates and subjective feedback.

This document summarizes the rationale, methodology, and results of an observational data analysis aimed at illustrating the utility and relevance of Live Speech Mapping (LSM) as a key technique in the hearing aid fitting verification process, as it allows precise delineation of the patient's areas of sensory deprivation and adjustment of hearing aid output in the free field.

In this context, Trumpet is introduced—a device integrating Real-Ear Measurements (REM), Live Speech module to perform Live Speech Mapping (LSM), and the Oldenburg Matrix Sentence Test® (MST), designed to bridge the gap between prescriptive programming and the patient's real auditory experience.

BEYOND PRESCRIPTIVE FITTING

Traditional fitting procedures rely on validated prescriptive algorithms (e.g., NAL-NL2, DSL v5.0), which serve as a

fundamental starting point. However, these algorithms operate on statistical models and cannot account for individual variables related to ear canal anatomy, history of sensory deprivation, and subjective speech perception.

The consequence is that a fitting formally “correct” from a prescriptive standpoint may not translate into actual functional benefit, particularly regarding speech understanding in complex listening environments.

Live Speech Mapping (LSM) aims to address this issue, introducing real-time verification of hearing aid output using the stimulus most relevant to the end user: speech.

Several studies have shown that verification and validation has revolutionized hearing aid fitting, shifting from standardized procedures to dynamic, speech-centered verification. It is therefore not a new fitting method, but a verification tool that can be applied to any fitting algorithm, optimizing speech discrimination.

TRUMPET AS AN INTEGRATED CLINICAL PLATFORM

In the present analysis, Trumpet was used as the device for the fitting verification and validation process. The device enables:

- execution of in-situ REM measurements
- real-time visualization of hearing aid response to natural speech stimuli (as required to perform Live Speech Mapping)
- validation of functional outcomes through speech-in-noise testing (Oldenburg Matrix Sentence Test®)

METHODOLOGY

The data presented are derived from the application of a structured protocol using Live Speech Mapping (LSM) and the Oldenburg Matrix Sentence Test® (MST) via Trumpet.

43 patient cases were analyzed, including bilateral, preferably symmetric, sensorineural, conductive, and mixed hearing losses. Inclusion criteria required severe or profound high-frequency loss and a low-frequency loss of at least 35 dB. Figure 1 highlights the area between the two lines, corresponding to the hearing loss of the patients involved in the study.

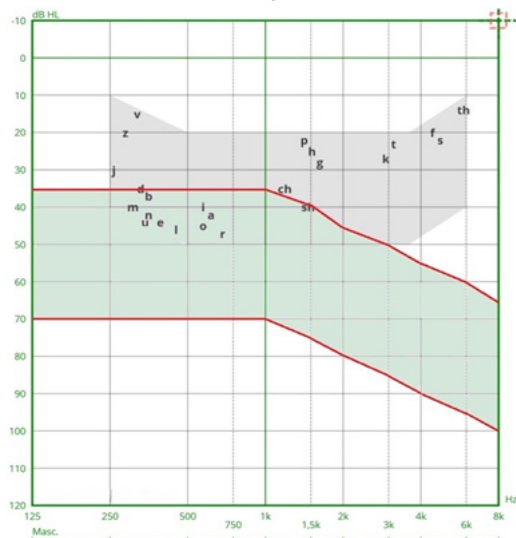


Figura 1: The area between the two lines represents the hearing loss of the patients included in the study

In these cases, the initial fitting performed with traditional procedures (REM or auto-REM) was adjusted using Live Speech Mapping (LSM). The effectiveness of this methodology was evaluated by comparing the Oldenburg Matrix Sentence Test® (MST) results before and after LSM-guided adjustments.

The protocol consists of three main phases:

1. Initial Fitting

Performed according to commonly adopted clinical procedures (proprietary software, traditional REM, or auto-REM).

2. Verification and Adjustment via Live Speech Mapping

Using Trumpet, the fitting is recalibrated by observing hearing aid output in response to real speech stimuli (ISTS signal: International Speech Test Signal). LSM allows identification of under- or over-amplification areas and targeted intervention.

3. Validation with the MST

The MST is administered before and after LSM-guided correction to assess the impact of adjustments on speech understanding in noise.

This approach clearly distinguishes between technical fitting verification and functional outcome validation.

MAIN RESULTS

Analysis of the total sample of 43 patients shows that Live Speech Mapping was associated with a reported “perceived improvement” in 65% of cases. This subjective perception was supported by psychoacoustic tests, showing MST improvement in 74.5% of patients, with a variation from 1.1 to 7.5 points on the MST.

Case-based observations suggest:

- The use of LSM via Trumpet was associated with improved fitting accuracy.
- LSM-guided adjustments were associated with improved performance on the MST, indicating enhanced speech understanding.
- In many cases, minimal but targeted adjustments to hearing aid output were associated with perceptible and measurable benefits.
- Patients showed increased acceptance of amplification, particularly in previously deprived frequency bands.

These observations suggest that Live Speech Mapping may play a relevant role in the hearing aid fitting and verification process, beyond its use as a counseling tool.

OPERATIONAL IMPLICATIONS

Adopting Live Speech Mapping reflects an evolution in the fitting process:

- clinicians can rely on objective data that are immediately interpretable to support fitting decisions;
- reliance on patient subjective feedback is reduced;
- the number of subsequent adjustments tends to decrease due to a more precise initial fitting.

From the patient's perspective, visualizing amplified speech allows enhanced understanding, engagement, and confidence in the rehabilitation process.

CONCLUSIONS

The observations presented suggest that Live Speech Mapping represents a valuable technique in supporting hearing aid fitting practices.

Integrating Live Speech Mapping and the Oldenburg Matrix Sentence Test® allows a more individualized

and data-informed fitting approach, complementing traditional programming methods.

Live Speech Mapping performed with Trumpet makes measurable what is essential for the patient: real-life speech understanding.

In this sense, it may represent a key technique, enabling real-time monitoring of hearing aid performance and offering the possibility to promptly correct under- or over-amplification, supporting the audiologist to ensure reliable, reproducible outcomes relevant to the patient's experience.

The data presented are derived from an observational project based on real-world use and reflect results observed in clinical practice with the Live Speech Mapping approach, without the intent to provide conclusive evidence.

