EXPLORING AUDITORY ENCODING IN MISOPHONIA USING FREQUENCY FOLLOWING RESPONSE

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Motivation

Frequency Following Response (FFR) provides insights into the subcortical neural encoding of sound, with contributions from brainstem structures, which may help explain the heightened reactivity to everyday auditory stimuli reported in misophonia.

Methods

Participants

- 30 participants recruited
- Misophonia group (n = 15)
- Control group (n = 15)
- Misophonia identified using Schröder's diagnostic criteria (2014)
- Severity assessed using AMISOS-R

FFR Recording

- Equipment: IHS SmartEP
- Stimulus: 40 ms /da/
- Intensity: 70 dB SPL
- Repetition rate: 4.1/s
- Presentation: Binaural via ER-3 insert earphone

Data Analysis

- Offline peak identification
- Latency and amplitude extraction
- Independent samples t-test used for group comparison

Figure 1. Grand Average FFR Waveform

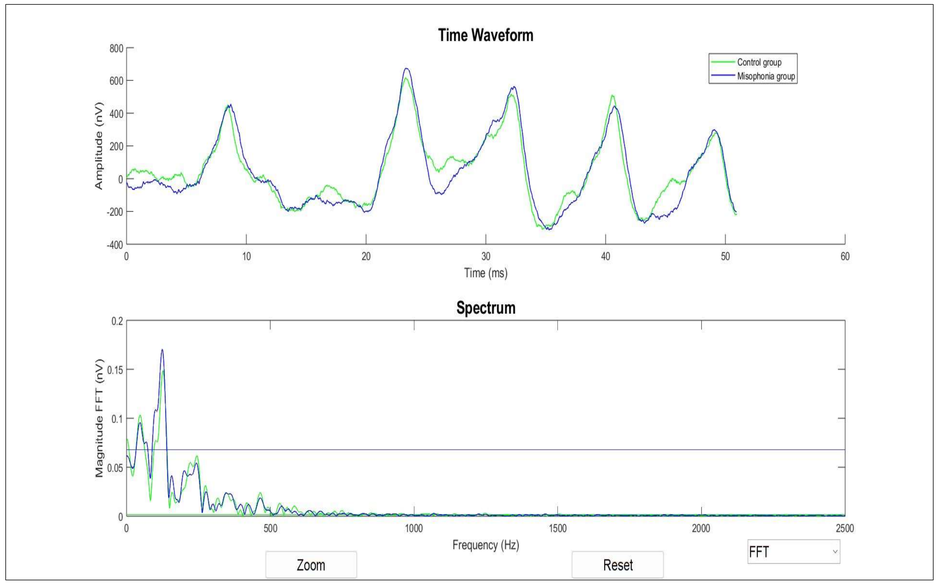

Table 1. Mean Peak Latencies

Peak Measure	Control Mean ± SD (ms)	Misophonia Mean ± SD (ms)	*p*-value (2-tailed)*
V_LAT	7.66 ± 0.33	7.70 ± 0.47	.822
A_LAT	9.70 ± 0.75	9.99 ± 1.00	.387
C_LAT	13.48 ± 0.97	13.66 ± 1.27	.671
D_LAT	19.36 ± 0.87	19.14 ± 0.56	.409
E_LAT	27.06 ± 1.69	26.14 ± 1.54	.130
F_LAT	35.15 ± 1.62	34.45 ± 0.78	.142
O_LAT	**42.14 ± 0.66**	**43.48 ± 1.27**	**.001***

Conclusions

- Individuals with misophonia demonstrated significantly delayed FFR Peak O latency.
- Findings suggest delayed subcortical auditory encoding of speech.
- Aberrant neural timing at the brainstem level may contribute to the heightened emotional responses characteristic of misophonia.
- FFR may serve as a useful objective tool for investigating auditory processing abnormalities in misophonia.

Results

Figure 1. Grand Average FFR Waveform

- Comparable morphology observed across groups.
- Delayed offset response noted in individuals with misophonia.

Table 1. Mean Peak Latencies

- Significant difference observed only for Peak O latency.
- Peak O latency was significantly prolonged in the misophonia group (p = 0.001).
- No significant differences observed for peaks V, A, C, D, E and F.

Discussion

- Individuals with misophonia demonstrated significantly delayed FFR offset peak latency.
- Delayed Peak O suggests abnormal neural encoding of speech at the brainstem level.
- Findings are consistent with Kim et al. (2023), who reported delayed ABR Wave V latency in individuals with misophonia.
- Results indicate altered temporal processing rather than peripheral hearing deficits.
- Abnormal subcortical encoding may contribute to heightened sensitivity toward trigger sounds.

References

1.Schröder, A., Vulink, N., & Denys, D. (2013). Misophonia: diagnostic criteria for a new psychiatric disorder. *PLoS ONE*, *8*(1), e54706. https://doi.org/10.1371/journal.pone.0054706