Freequency's underlying principles of care

Document for healthcare professionals in the tinnitus field

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Abstract

This document gives insight in the underlying principles of care of Freequency, an immersive, augmented reality based app for tinnitus management. Frequency translates the therapeutic principles from exposure based tinnitus therapy, Cognitive Behavioral Therapy, and Acceptance and Commitment Therapy (ACT) into interactive sessions. This document is primarily intended for healthcare professionals in the field of tinnitus.

Background: Escalation of tinnitus complaints is often caused by delayed intervention, increased attention, and avoidance behavior, which raises the risk of anxiety conditioning and chronicity.

Objective: To describe Freequency, a low-threshold digital intervention for adults with subjective tinnitus who experience distress, unrest, or heightened attention and wish to actively work on habituation and self-management.

Method: Freequency is based on exposure as the primary mechanism of action and integrates psychoeducation, cognitive behavioral therapy (CBT), Acceptance and Commitment Therapy (ACT), and mindfulness. The intervention consists of short educational modules and experiential exercises embedded in daily functioning.

Application: The intervention is particularly suitable in the early phase after tinnitus onset, during increasing symptoms, or while awaiting regular care, but can also be used independently.

Mechanisms of action: Freequency focuses on reducing perceived threat value, extinguishing anxiety-conditioned responses, and facilitating habituation.

Conclusion: Freequency is not a replacement for medical or psychological treatment but supports habituation through an accessible, behavior-oriented approach aligned with modern blended care models.

1. Introduction

Freequency was developed from a fundamental observation within tinnitus care: escalation of symptoms rarely results from a lack of knowledge, but rather from a lack of timely intervention, autonomy, and accessible guidance. Waiting times, fragmentation of care, and the absence of early actionable perspectives lead many patients toward anxiety, avoidance behavior, and chronicity.

Freequency explicitly positions itself before and alongside regular treatment. It is not a replacement for audiological or psychological care, but a science-based healthcare innovation that actively utilizes the period after tinnitus onset and before intensive treatment.

This document describes the clinical principles underlying Freequency, elements of which form the foundation of the app. The app includes a structured 100-day program for people with tinnitus, consisting of five phases leading from acute symptoms to self-reliance.

Core principles:

- Exposure as the leading mechanism in tinnitus[3]
- Psychoeducation[4]
- Cognitive behavioral therapy (CBT)[1]
- Acceptance and Commitment Therapy (ACT) and mindfulness principles[2]

2. Exposure as the Leading Mechanism

2.1 Rationale

Exposure is the central mechanism within Freequency[3]. Tinnitus can become a conditioned stimulus that automatically triggers helplessness, anxiety, and heightened attention.

Goals:

- Systematically reduce perceived threat value
- Extinguish anxiety conditioning
- Facilitate habituation

2.2 Principles

- No avoidance of tinnitus or environmental sound
- Gradual and repeated exposure
- Safe context without control or neutralization behaviors
- Variation and generalization to daily situations

3. Psychoeducation

3.1 Content and Goals

Psychoeducational content is delivered through short, carefully structured informational videos provided by various tinnitus experts. These videos address auditory processing, tinnitus mechanisms, and relevant audiological insights. Using video allows complex information to remain accessible without sacrificing depth.

Within Freequency, psychoeducation is not merely supportive but a central intervention. The content is developed from audiological and psychological expertise and focuses on modifying unhelpful thoughts and cognitions that maintain tinnitus complaints, while promoting strategies that support habituation[4].

Core topics:

- Auditory processing: tinnitus as a perceptual phenomenon, not an indicator of damage[5]
- Neuroplasticity: how the brain assigns meaning and threat to sound and how this can be reversed[6]
- Attention and expectation: the role of selective attention and hypervigilance[7]
- Stress and arousal: influence of the autonomic nervous system on tinnitus perception[8]
- Anxiety conditioning: how tinnitus can become a conditioned threat[9]

Goals of psychoeducation:

- Normalize the tinnitus experience
- Reduce catastrophic interpretations
- Create a rational and reassuring framework within which exposure becomes possible[10]

4. Cognitive Behavioral Therapy as an Underlying Framework

4.1 CBT Principles within Freequency

Freequency is grounded in cognitive behavioral therapy, emphasizing the interaction between:

- Thoughts (interpretations of tinnitus)
- Emotions (anxiety, frustration, helplessness)
- Behavior (monitoring, avoidance, control), and
- Physiological arousal[11]

The intervention does not primarily aim to change the sound itself, but to break the vicious cycle that maintains tinnitus complaints[12].

4.2 Cognitive Restructuring

- Explicit dismantling of unhelpful assumptions ("this sound indicates damage", "cannot get used to this")[13]
- Experiential correction through exposure[3]
- Shift from control toward acceptance and functional behavior[2]

5. ACT and Mindfulness in Tinnitus

5.1 Acceptance & Commitment Therapy (ACT)

ACT-based exercises enhance psychological flexibility and translate ACT principles into practical tools[2].

Key components:

- Acceptance: making space for tinnitus without struggle or avoidance
- Cognitive defusion: distancing from thoughts about tinnitus
- Values: focusing on meaningful functioning despite tinnitus
- Self-as-context: tinnitus as an experience, not an identity

5.2 Mindfulness

Mindfulness exercises focus on:

- Open and non-judgmental awareness[2]
- Observing tinnitus without evaluation[2]
- Regulation of arousal[2]

6. Technology in Service of Behavior

Freequency is designed for maximum accessibility: no clinical interface, no complex equipment, and minimal cognitive load. Required: a smartphone and earbuds.

Where Virtual Reality often creates a separate therapeutic environment, Freequency deliberately chooses Augmented Reality (AR). By integrating new learning experiences directly into daily functioning, AR enables therapy to be seamlessly woven into real life[12].

6.1 Applied Gamification and Serious Game Principles

Freequency deliberately uses gamification to promote treatment adherence: repeated practice is made accessible and sustainable within an exposure-oriented approach. Tinnitus is localized in the user's own environment through AR/spatial audio, turning sound exposure into a concrete gameplay task. Following serious game principles—clear goals, immediate feedback, and an appropriate level of challenge—this strengthens intrinsic motivation while maintaining the clinical focus.

Out-of-game mechanisms such as streaks, progress monitoring, and daily feedback support routine formation, positive reinforcement, and a sense of progress. In this way, practice becomes structurally embedded in everyday life, which is crucial for long-term adherence and therapeutic effectiveness.

7. Positioning Within the Care Pathway

7.1 Careful Onboarding and Suitability Screening

Users undergo a structured onboarding process in which questions are asked to assess the suitability of the intervention. These questions include screening for psychological comorbidities, hearing loss, and the severity of tinnitus symptoms. Where necessary, users are advised to coordinate with a healthcare professional.

7.2 Freequency as an Extension of the Care Pathway

Freequency supports self-management. It can prevent stagnation after diagnosis, support self-management, and reduce pressure on scarce healthcare capacity[11].

8. Clinimetrics

The effectiveness of Freequency is measured using the Tinnitus Functional Index (TFI)[12]. Users complete the TFI at baseline and on days 30, 60, and 100, allowing progress to be tracked and enabling healthcare professionals to make informed decisions.

9. Conclusion

Freequency combines evidence-based psychological principles with thoughtful interactive design. Through early intervention, accurate information, and contextual exposure, it provides a scalable intervention aligned with modern healthcare models.

Core principles:

- Content before technology
- User autonomy
- Action instead of waiting

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For more information on Freequency please visit https://freequency.app/.
We appreciate any feedback on this document and/or Freequency you like to share with us via info@freequency.app.