Tips for Tinnitus

Programming Genesis AI for Tinnitus Patients

Keeley Layfield, Au.D. Education and Training Audiologist

Starkey

Hear better. Live better.

Tips for Tinnitus

Programming Genesis AI for Tinnitus Patients

Webinar FAQs

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Click Q & A, type your question, click Send

Where to get the Handout

A PDF handout for this presentation may be accessed through your Pending Courses on Audiology Online or by clicking on the link in Chat within the classroom

Tips for Tinnitus

Programming Genesis AI for Tinnitus Patients

Webinar FAQs

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Assistance or Tech Support

- Call Audiology Online at 800-753-2160
- customerexperience@continued.com
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Learner Outcomes

1. Identify possible risk factors of tinnitus
2. Discuss the three masking options for tinnitus within Pro Fit
3. Describe the tinnitus options within My Starkey

What's in a Word

Latin root:
tinnire — to ring

TINNITUS

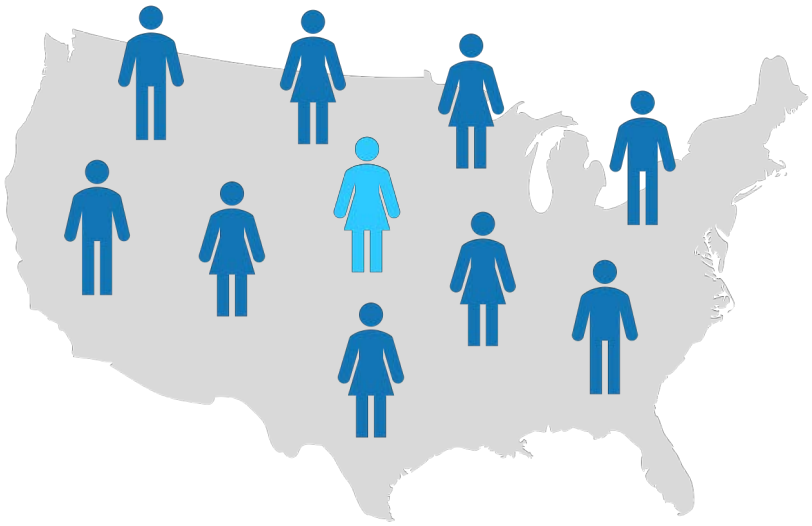
tin-nit-us

Emphasis on syllable 2 follows the grammatical rule of keeping vowels long in terminology of inflammation (i.e. the inflammation of ringing)

tin·ni·tus

[“TIN-it-us”, “tin-NITE-us”]

a symptom characterized by the perception of sound in the absence of an external stimulus.



Tinnitus

One of the
most common health conditions
in the United States

American Academy of Otolaryngology found that **one in ten Americans** experience some form of tinnitus.

The NIDCD estimates that approximately
two million Americans
experience debilitating tinnitus.

American Tinnitus Association

Classifying Tinnitus

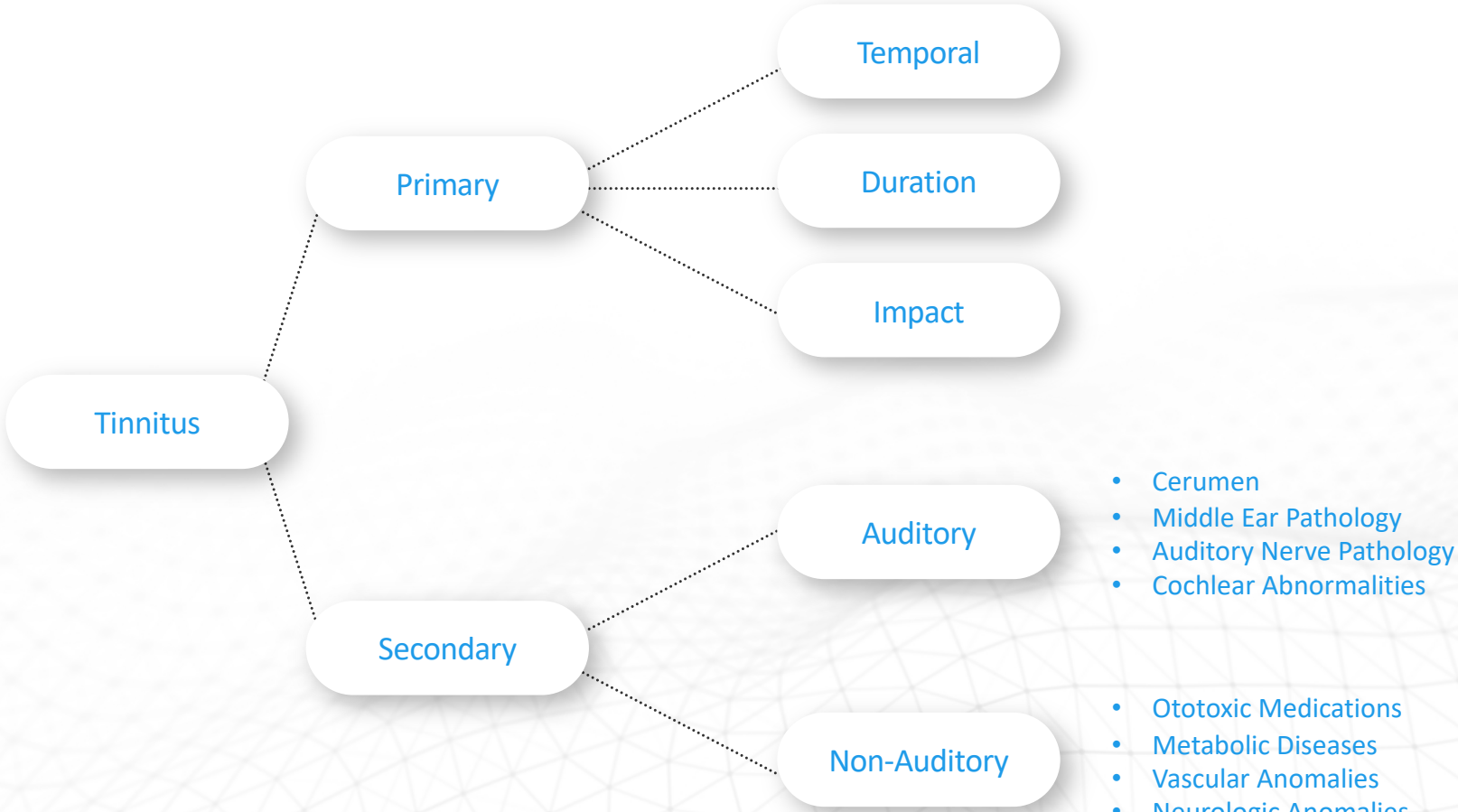
Traditionally classified by whether it could be heard by the clinician

Objective

- Audible to another person
- Internal acoustic source
  (Ex. muscle spasms or vascular tumor)
- Detected via human ear, stethoscope, or microphone
- Represents less than 1% of cases

Subjective

- Only heard by the patient
- May be idiopathic or caused by various disorders involving the head/neck or other systems
- 99% of all cases


Tinnitus
Primary
Temporal
Duration
Impact
Secondary
Auditory
Cerumen
Middle Ear Pathology
Auditory Nerve Pathology
Cochlear Abnormalities
Non-Auditory
Ototoxic Medications
Metabolic Diseases
Vascular Anomalies
Neurologic Anomalies

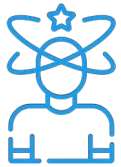
Primary Tinnitus

TEMPORAL CHARACTERISTICS	DURATION	IMPACT
Spontaneous	Recent	Non-Bothersome
Temporary	Persistent	Bothersome
Occasional		
Intermittent		
Constant		

Phantom Auditory Perceptions

Auditory Hallucinations

Musical Ear Syndrome

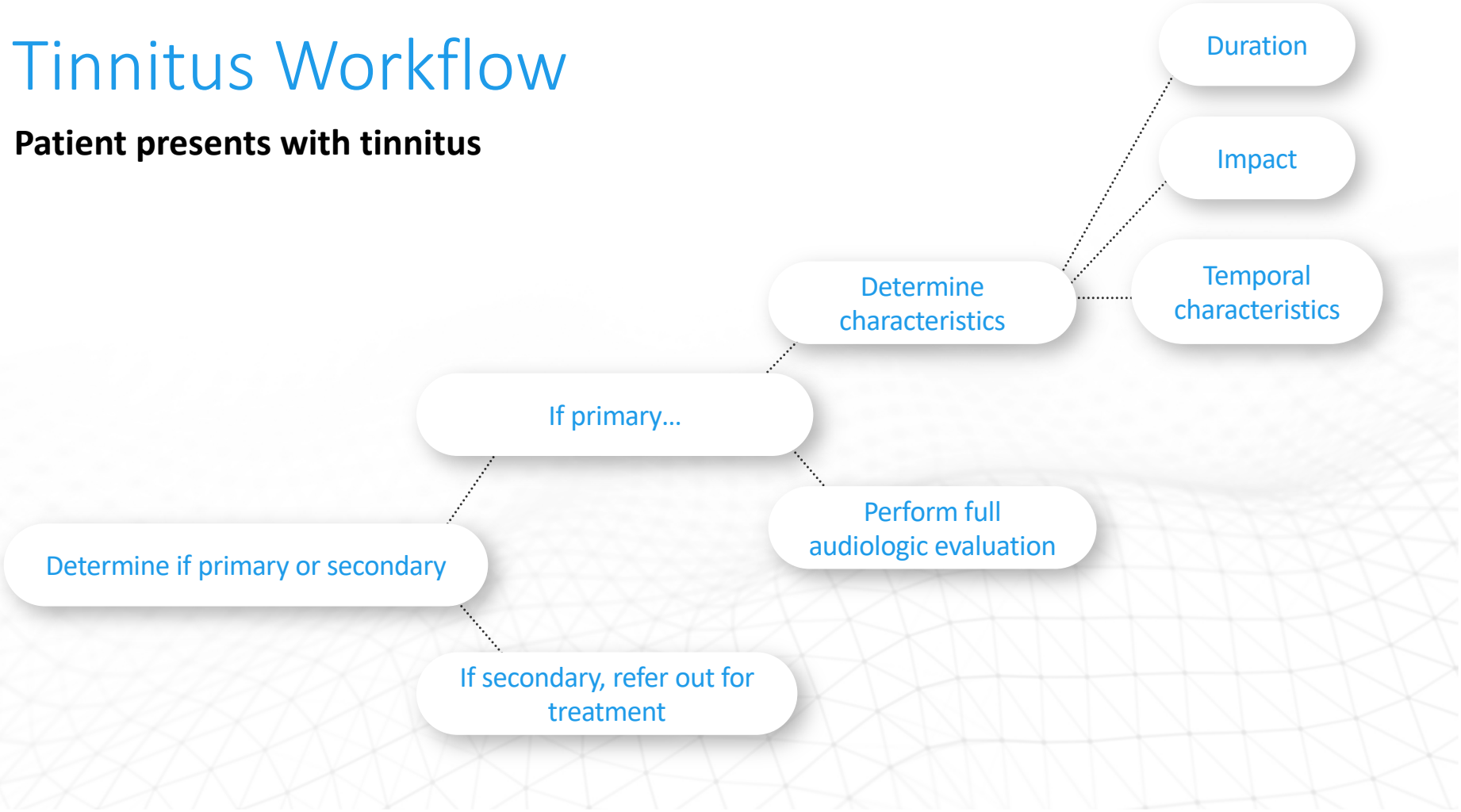


Auditory Imagination

Tinnitus

Tinnitus Workflow

Patient presents with tinnitus



Tinnitus Risk Factors

Risk Factors and Other Mechanisms of Tinnitus

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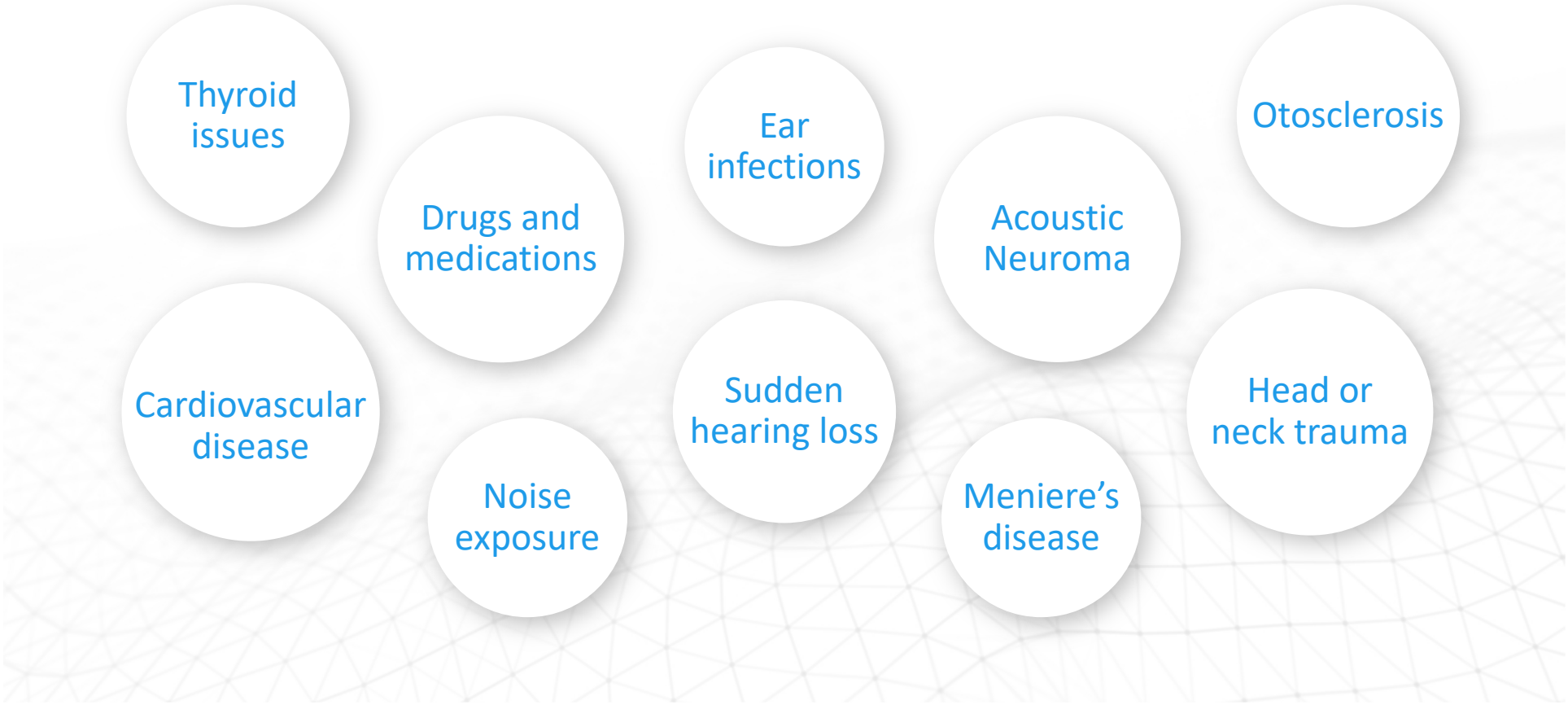
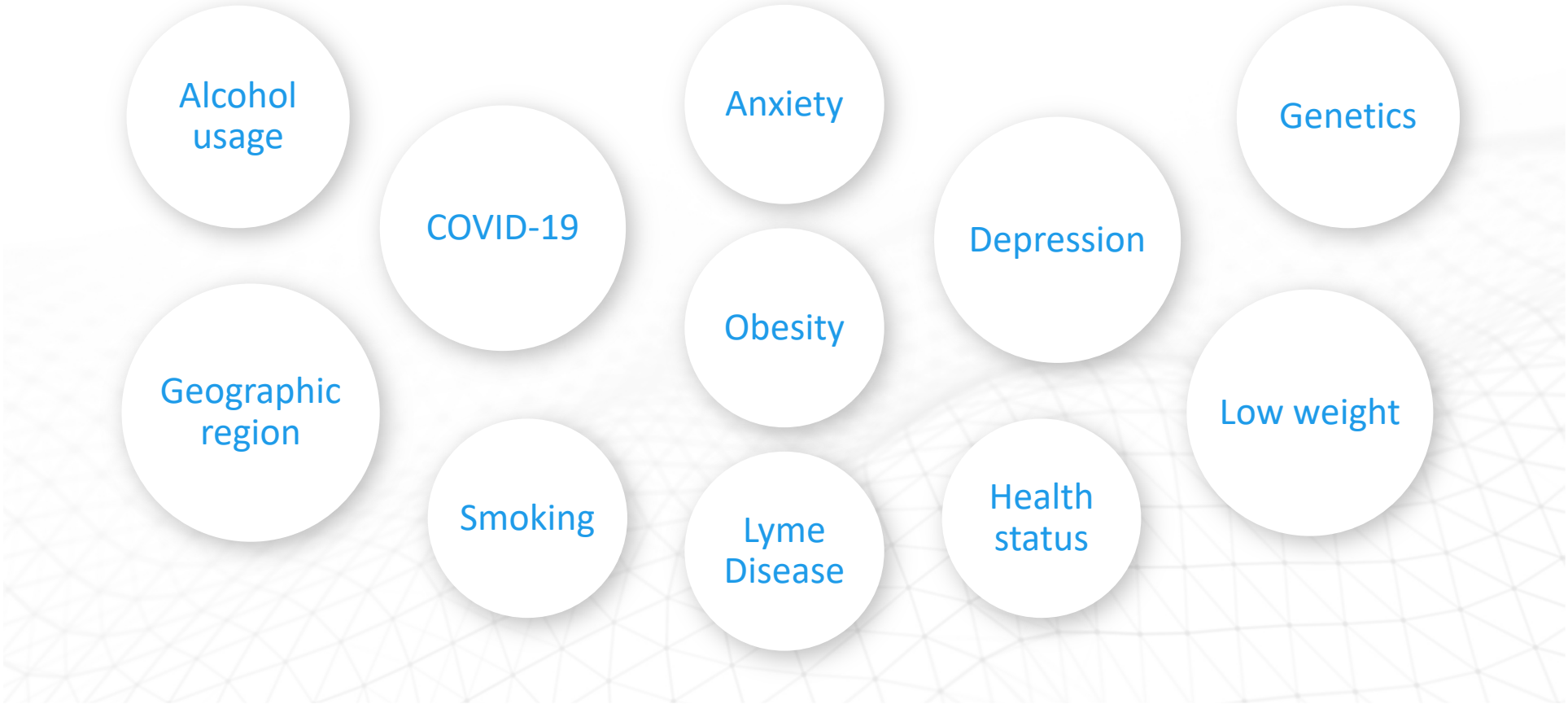
Risk Factors for Tinnitus



Possible Risk Factors for Tinnitus



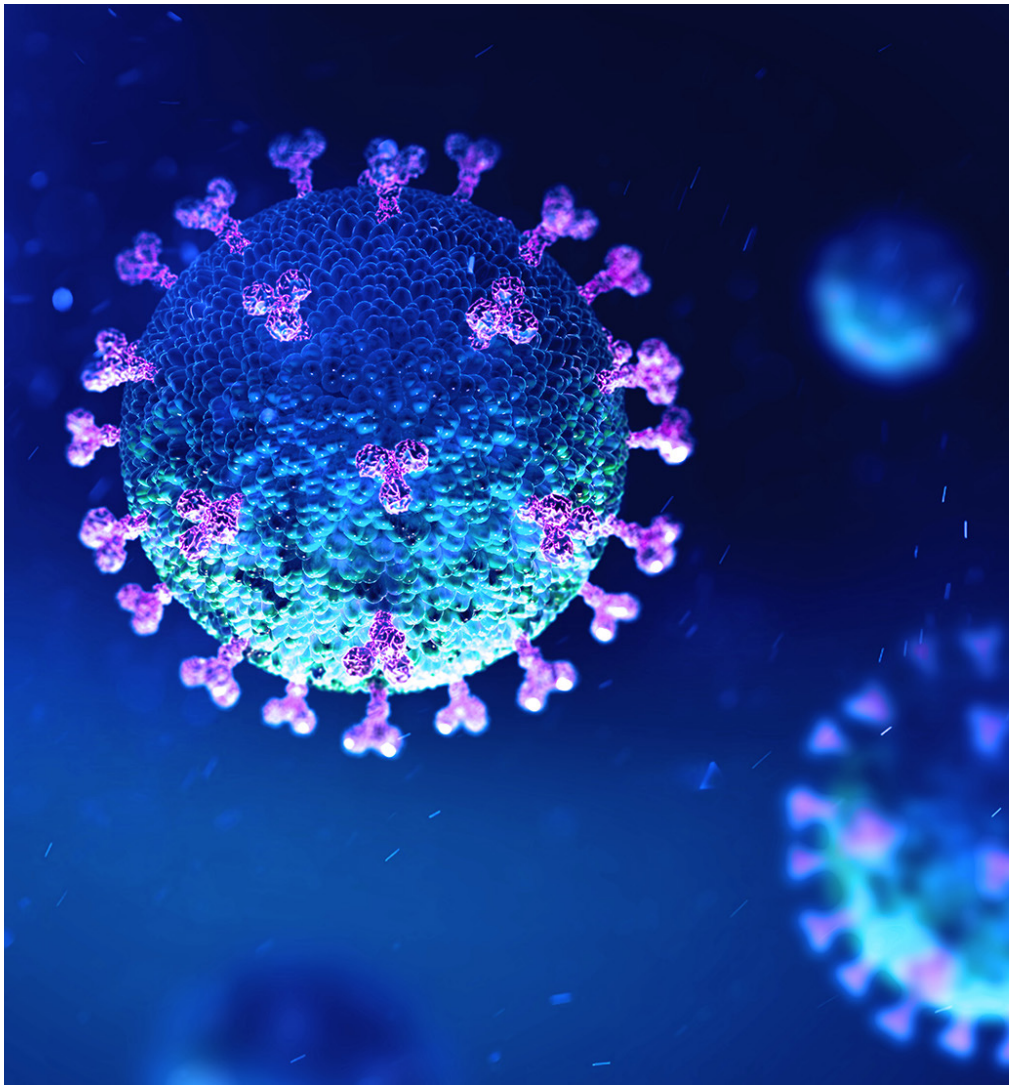
COVID-19

ESTIMATED

7.6%
of people who had covid experienced hearing loss

14.8%
suffered from tinnitus

7.2%
reported vertigo



COVID-19 Case Study

49-year-old male with new onset tinnitus following Covid-19 infection

Bilateral, constant, nonpulsatile tinnitus experienced

Audio eval revealed normal hearing through 8000 Hz

High frequency audio showed mild loss at 16k

At Risk Populations for Tinnitus

Veterans and Military Personnel

Over 2 million veterans receive compensation for tinnitus

Men

Senior Citizens

Caucasians

Other At Risk Populations

Workers in loud environments

- Autoworkers
- Firefighters/Police/EMT
- Manufacturing Jobs

Those who have had a traumatic brain injury

- May be caused by the injury
- May be caused by medications used to treat injuries

Recreational Noise Exposure

Musicians and Music Lovers

Motorsports and Hunting Enthusiasts

Gamers

iPod/Personal Listening Device Use

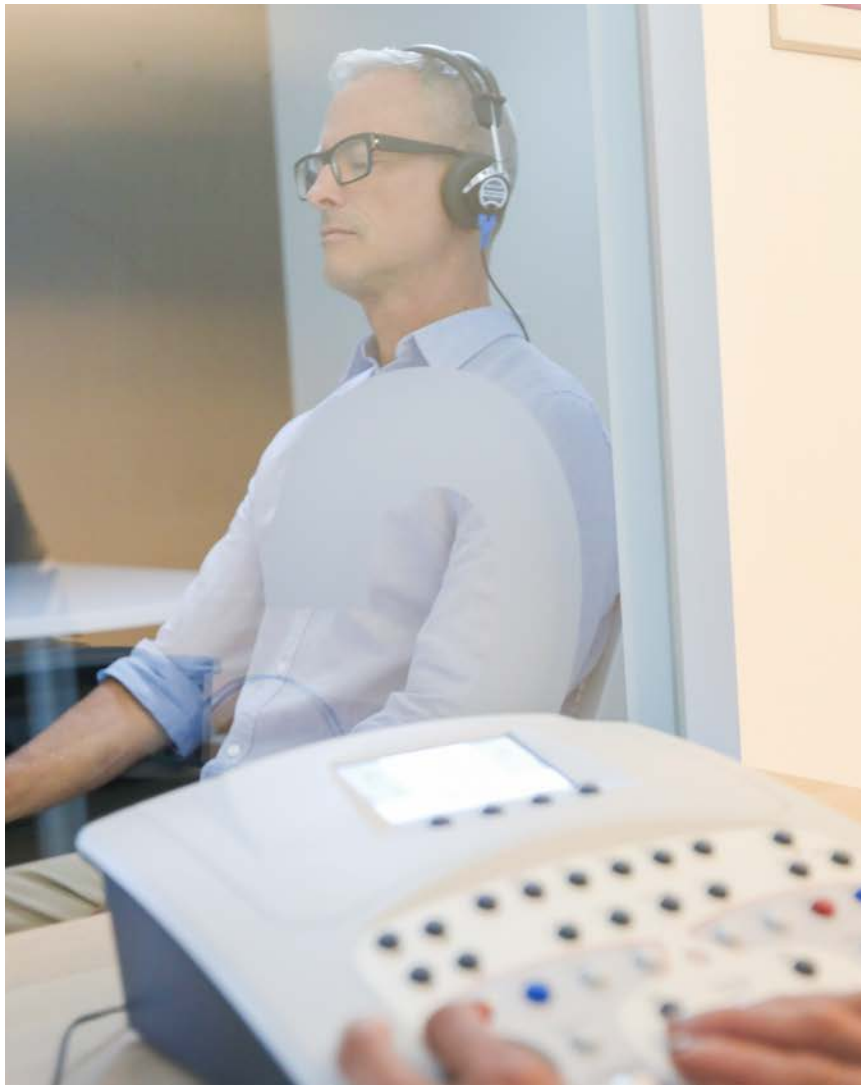
Tinnitus and Hearing Loss

Any degree of hearing loss

Any type of hearing loss

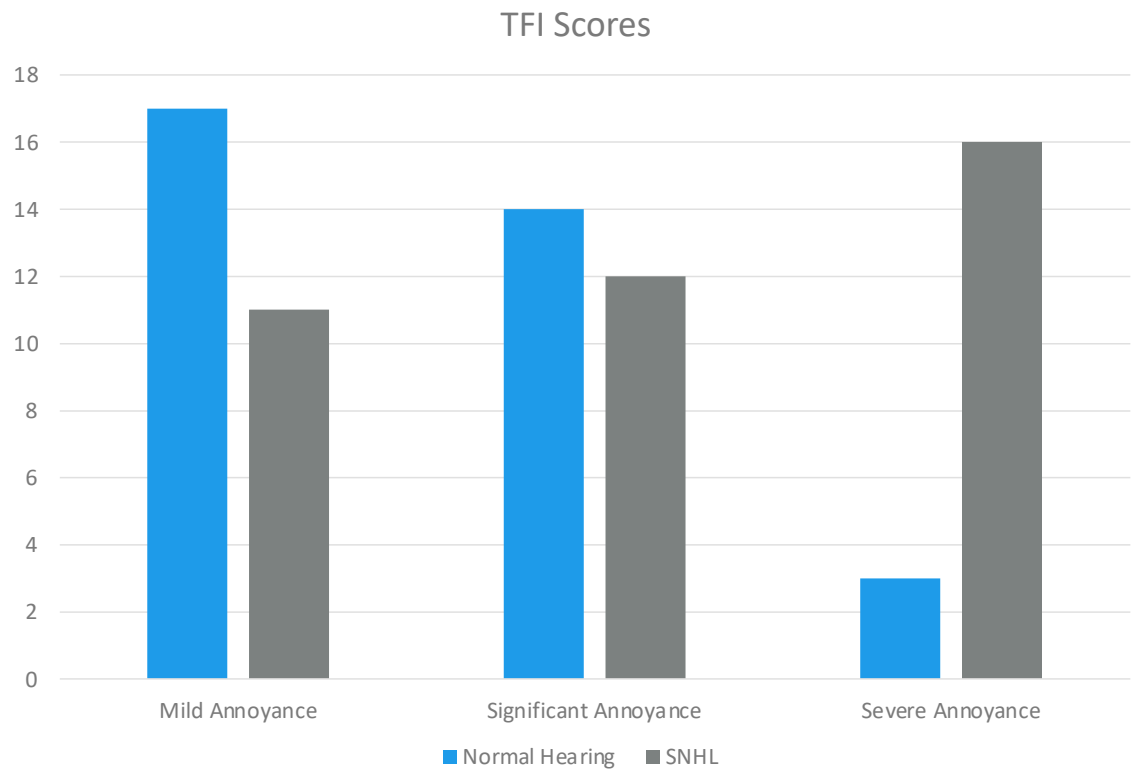
Any cause or type of onset

Changes in hearing loss and changes in tinnitus tend to occur independently of one another



Tinnitus and Hearing Loss

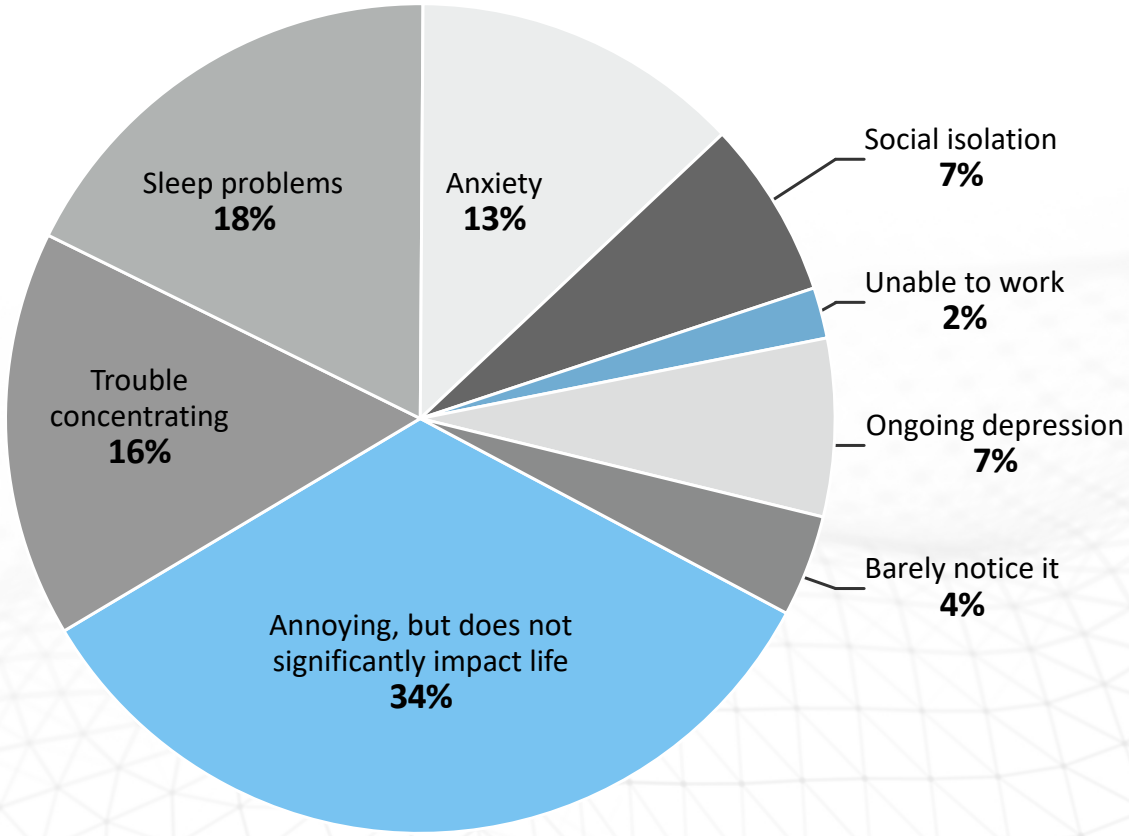
No correlation between tinnitus severity and hearing threshold, though those with hearing loss are found to have a higher tinnitus severity.

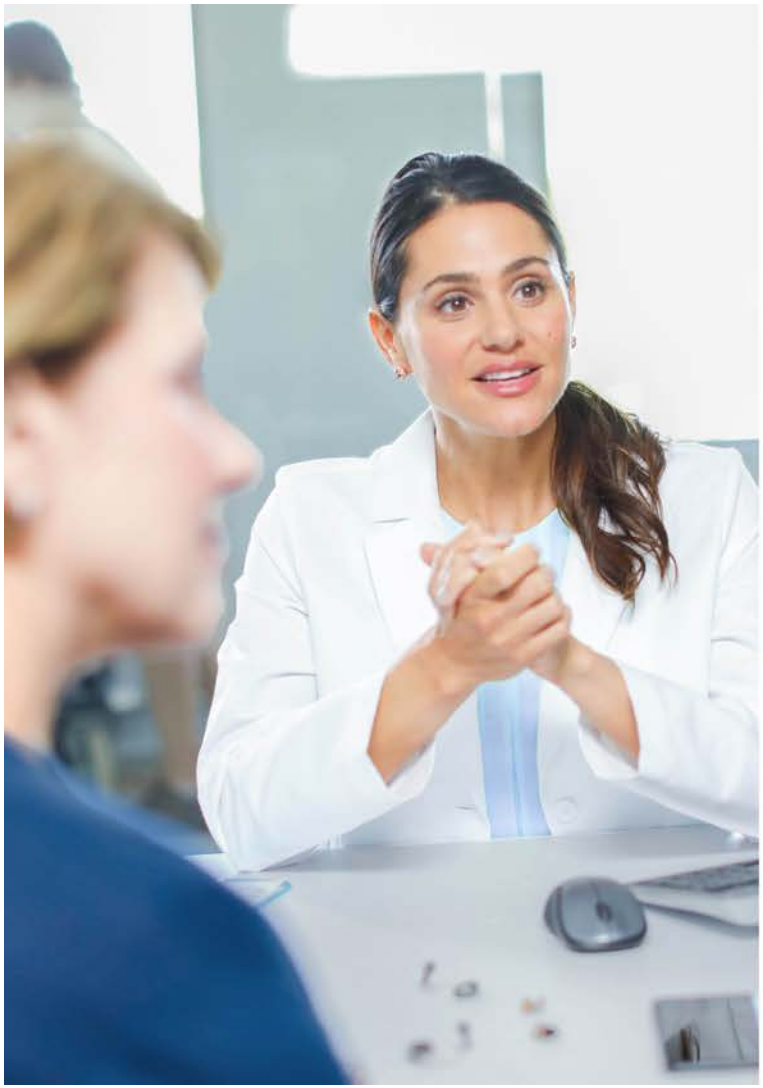


Mahafza N, Zhao F, El Refaie A, Chen F. A comparison of the severity of tinnitus in patients with and without hearing loss using the tinnitus functional index (TFI). Int J Audiol. 2021 Mar;60(3):220-226. doi: 10.1080/14992027.2020.1804081. Epub 2020 Aug 13. PMID: 32787604.

Quality of life impacts

- Thoughts and Emotions
- Sleep
- Concentration
- Socialization
- Physical Health
- Economic well-being





Evaluation and Treatment

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Evaluation

Self-Assessment

Case History

Audiological Assessment

Counsel/ Treatment

Treatment Options

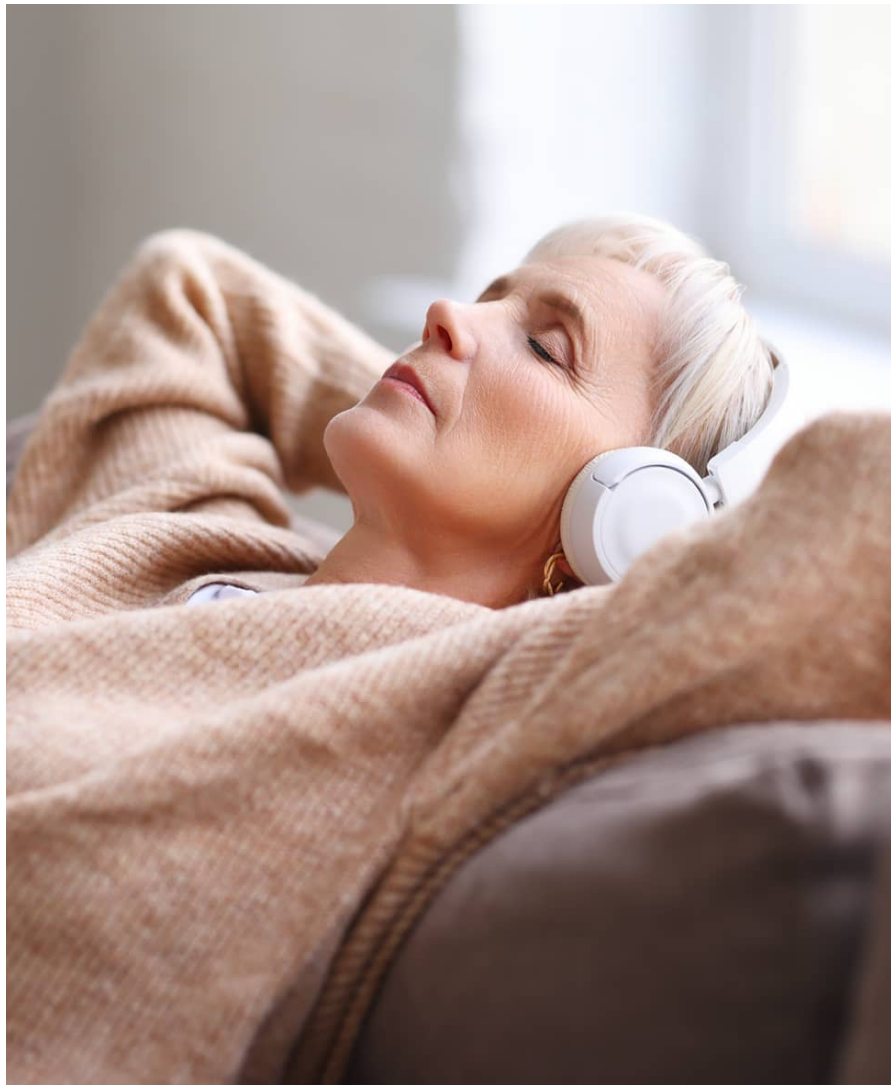
Provider Driven

Patient Driven

Referral

Sound Therapy

Tinnitus sound therapy uses a process known as **habituation** to retrain the way the brain interprets tinnitus.



Sound Therapy Options

- MASKING
- DISTRACTION
- HABITUATION
- NEUROMODULATION

Sound Masking Devices

Hearing Aids

Modified-Sound/
Notched-Music Devices

Sound and Sleep Apps

Sound Therapy Devices

Maskers in Hearing Aids

Acoustic Therapy is using sound stimulation either from amplification of external sounds or the generation of additional sounds.

Tinnitus maskers are additional sounds generated that are typically set at a level below a patient's tinnitus to potentially cover it up.

Maskers in Hearing Aids

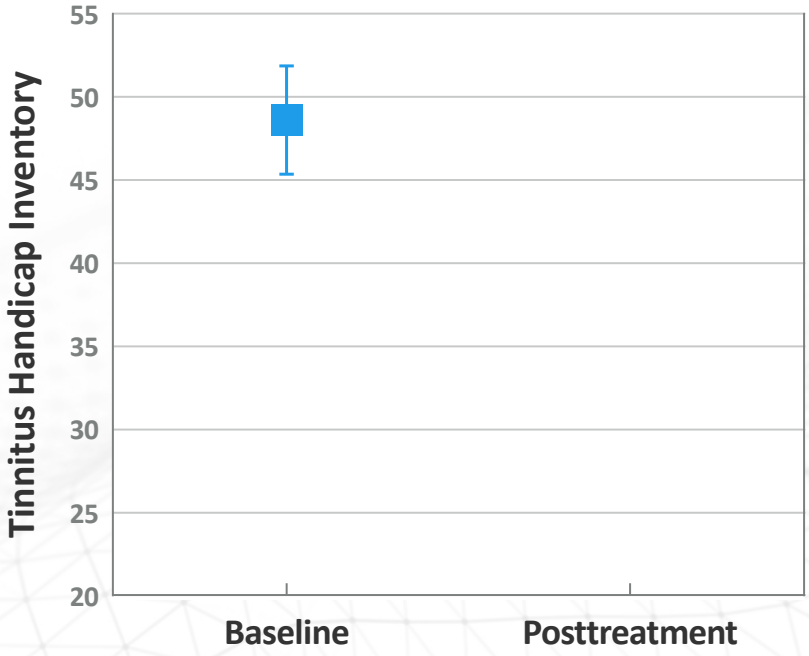
RESEARCH DATA

In this study, participants were provided multiple masker options to use at their discretion in order to achieve tinnitus relief.

Study was comprised of 26 individuals with hearing loss

Participants completed an 8-week field trial wearing hearing aids providing acoustic therapy via three tinnitus masker options set just below minimum masking level.

Tinnitus Handicap Inventory was used before starting acoustic therapy and posttreatment to measure the patients' tinnitus handicap.



Source: Journal of Speech, Language, and Hearing Research, Vol. 64, 1415, Figure 2, April 2021.

Maskers in Hearing Aids

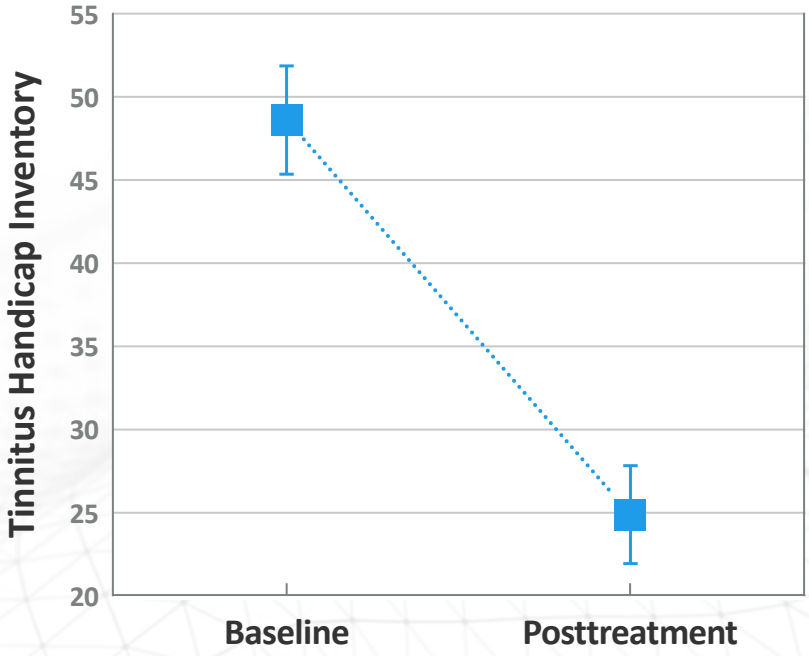
DATALOGGING RESULTS
Average hearing aid use was 9.4 hr (SD = 4.2 hr) during the field trial, and

Average of 34.4% of that time was spent utilizing a tinnitus masker

13.8% with white noise;

10.5% with audiogram-shaped noise;

10.0% with custom noise



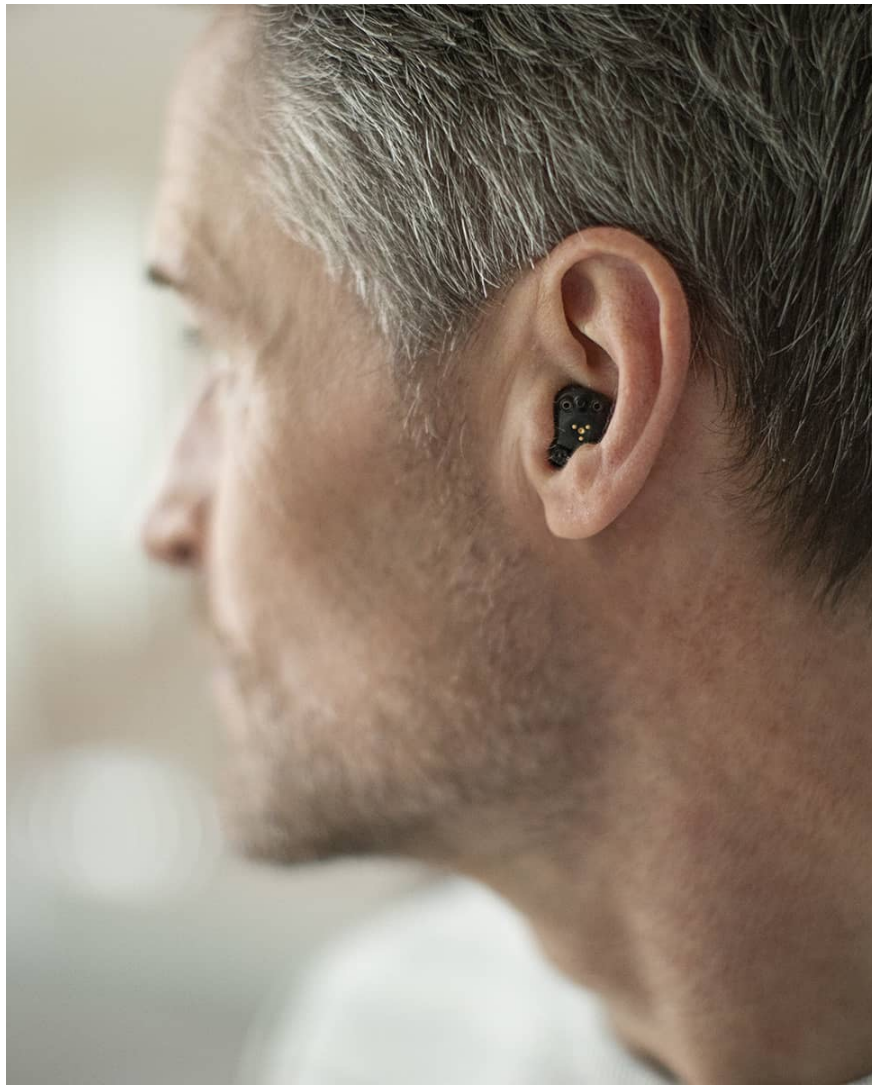
Source: Journal of Speech, Language, and Hearing Research, Vol. 64, 1415, Figure 2, April 2021.

Tinnitus Protocols

Tinnitus Retraining Therapy
Dr. Pawell Jastreboff

Progressive Tinnitus Management
National Center for Rehabilitative Auditory Research

Tinnitus Activities Treatment
Dr. Richard Tyler at the University of Iowa



Treatment Options

Provider Driven

Patient Driven

Referral

Lifestyle Management

Quit Smoking

Diet Change

Getting a better night's rest

Relaxation/Meditation

Exercise

Support Groups

Treatment Options

Provider Driven

Patient Driven

Referral

Cognitive Behavioral Therapy

Modify thoughts and beliefs to decrease negative behaviors

Cognitive Skills
Reduce negative thinking, develop a habituation perspective on tinnitus, and become an effective self-coach to guide yourself through the process

Mindfulness Skills
Calm down, promote tinnitus acceptance, and regain control of attention

Self-Guided Sound Enrichment
Soften your perception of tinnitus

Behavioral Skills
Take the courageous action needed to **fully** rejoin your life

Multiflex Tinnitus Pro

Next generation feature for sound therapy tinnitus management

Three stimulus options to effectively mask the user's tinnitus:

- White Noise
- Audiogram-shaped
- Custom

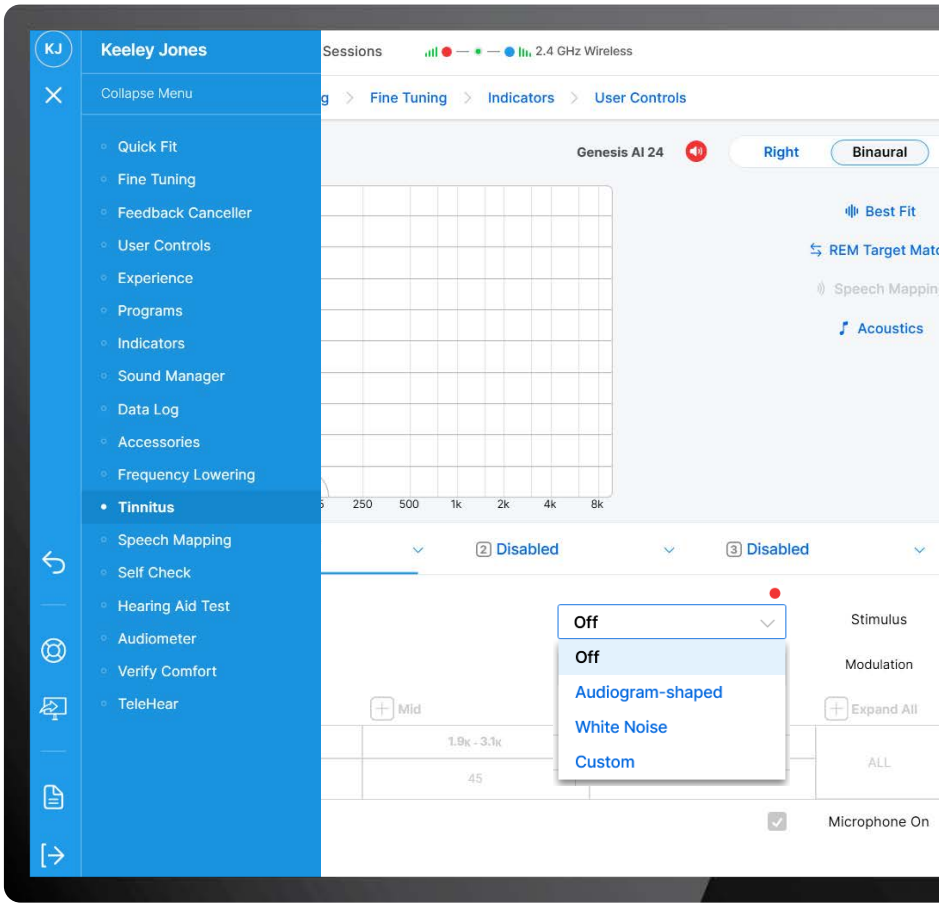
GENESIS AI

2400

AVAILABLE ON ALL STYLES

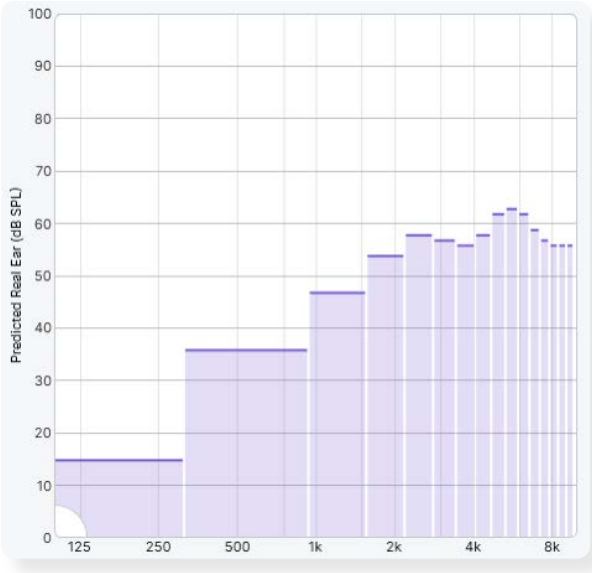
Multiflex Tinnitus Pro

- Accessed from the Fly Out Menu within Pro Fit
- Use the dropdown menu to select the stimulus type
- All options offer a 10,000 Hz bandwidth with 16 bands of adjustability

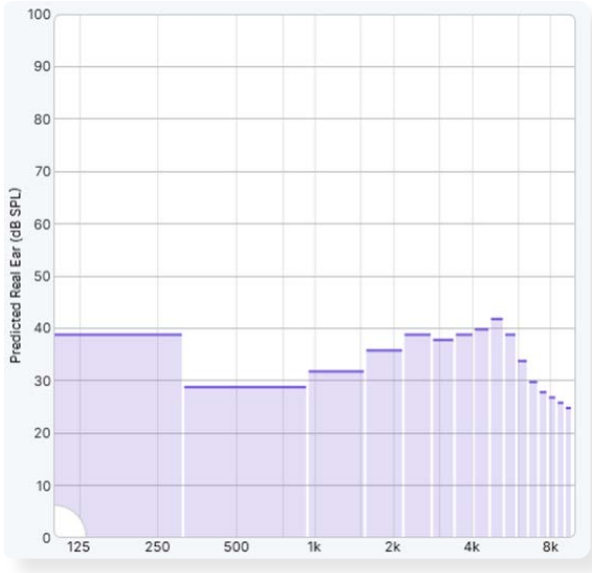


Starkey **Pro Fit**

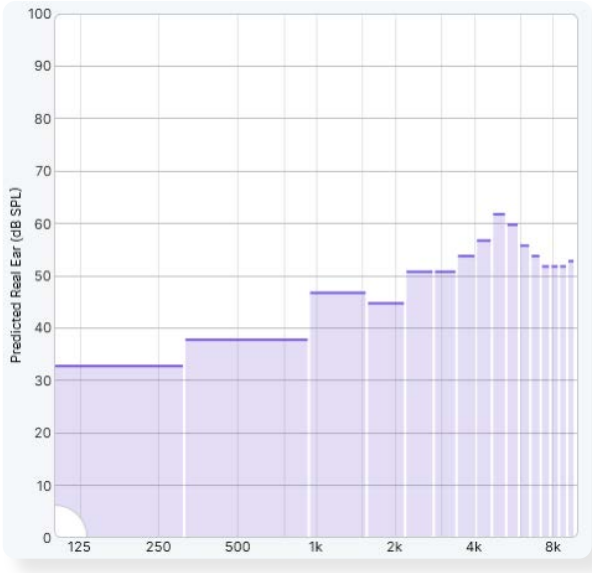
Tinnitus Stimuli



White Noise
Pure Tone Average
Genesis AI 24, 20, 16, and 12



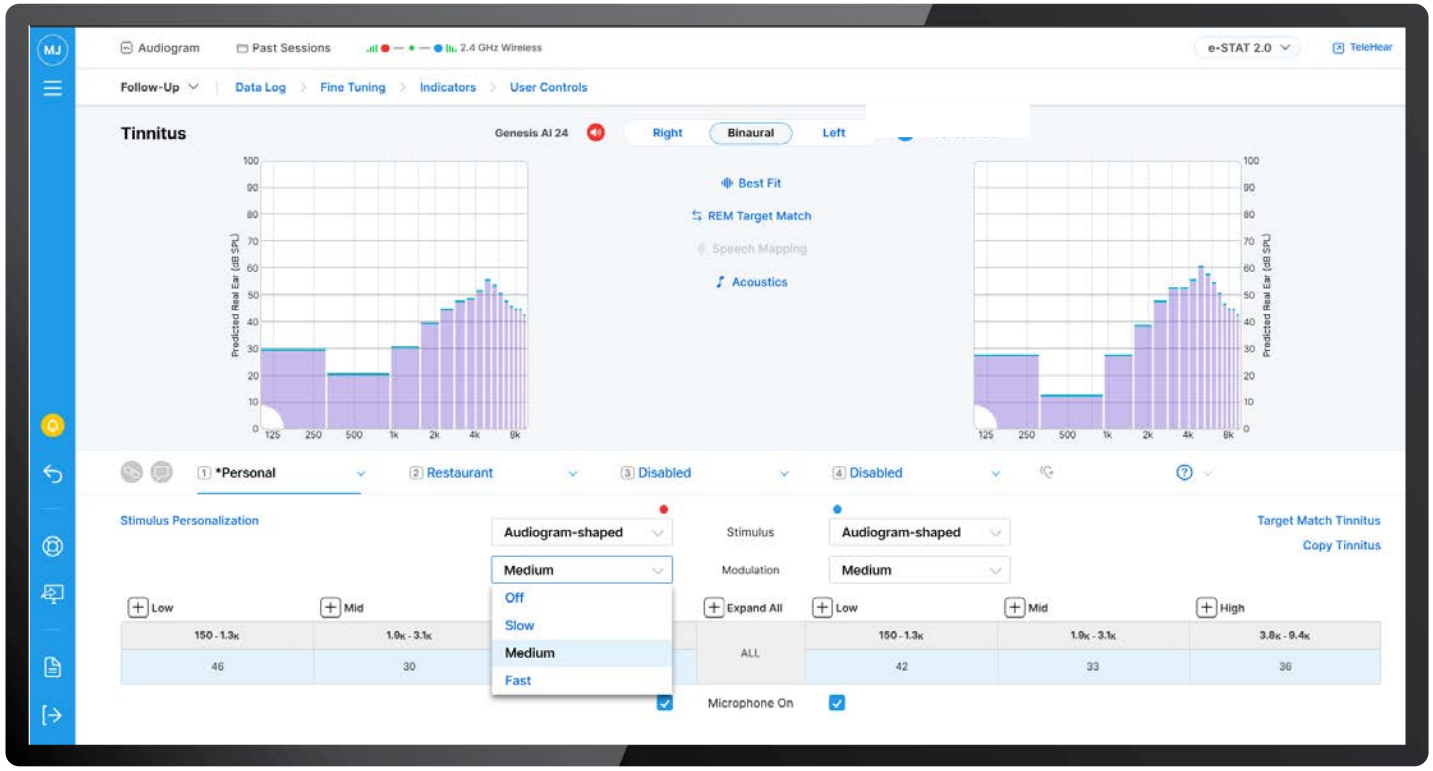
Audiogram Shaped
Hearing Loss
Genesis AI 24, 20, and 16



Custom
Custom Shaping
Genesis AI 24 and 20

Modulation

Modulation is available for all the Multiflex Tinnitus stimulus options



Patient Involvement

"People actively involved in their health and healthcare tend to have better outcomes."

("Health Policy Brief: Patient Engagement," Health Affairs, February 14, 2013)

Starkey **Pro Fit**

White Noise

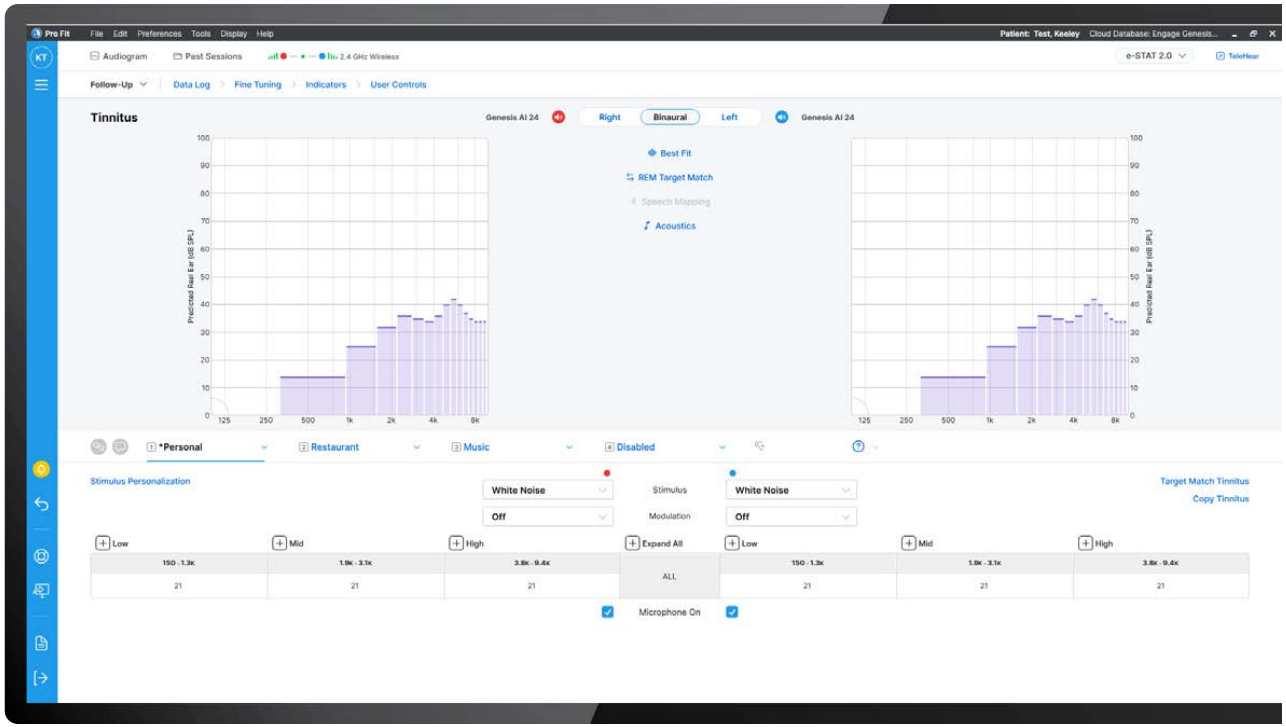
Tinnitus

Signal level based on the PTA and comprised of equal energy distribution across the frequencies.

Flat response may result in some segments of the stimulus being too loud or too soft

Vent interactions are accounted for

Stimulus is adjustable



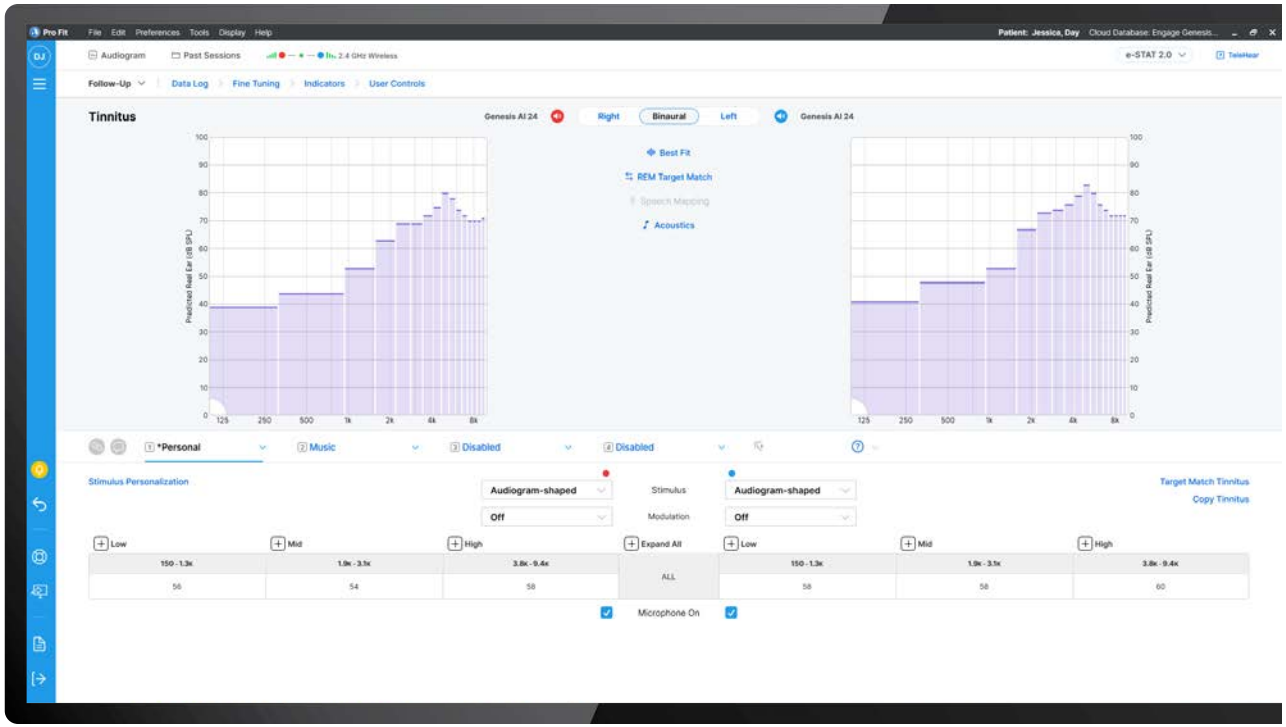
Starkey **Pro Fit**

Audiogram Shaped
Tinnitus

Automatic shaping of the stimulus based on the hearing loss provides a more tailored masking stimulus

Vent interactions are accounted for

Stimulus is adjustable



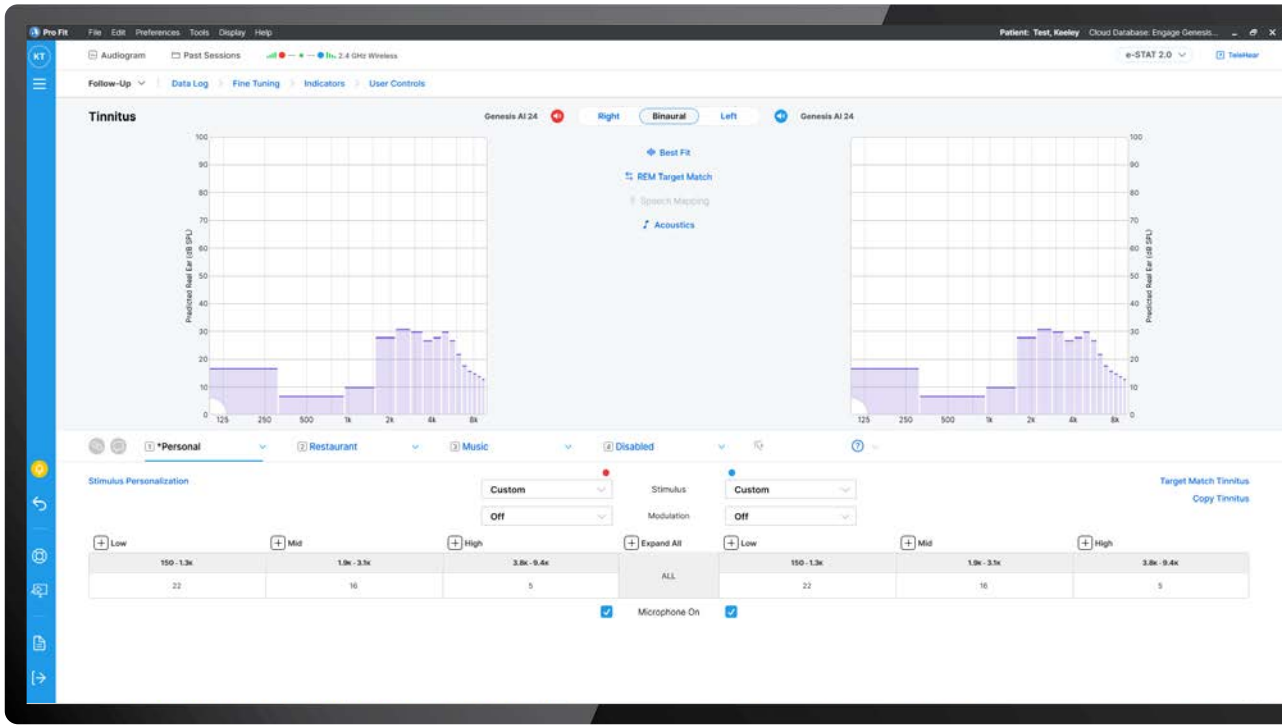
Starkey **Pro Fit**

Custom
Tinnitus

Custom shaping of the stimulus provides a personalized stimulus for a greater degree of masking precision

Vent interactions are accounted for

Stimulus is adjustable



Efficient and Effective Masking

Stimulus Personalization Testing in Inspire typically only takes a few minutes and is less time consuming than tinnitus measurements like pitch-matching

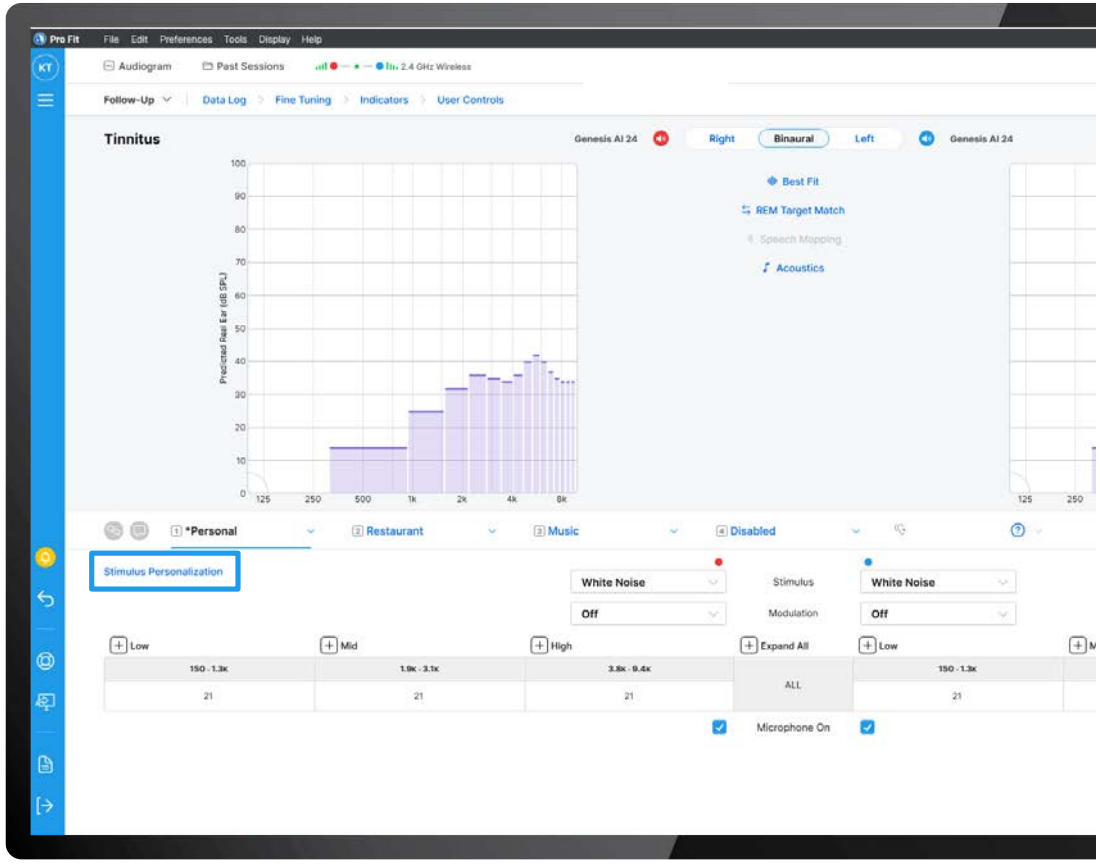
MDL and MML measurements can be used to rapidly design a stimulus that is both efficient and effective at masking tinnitus

To efficiently mask tinnitus, only those frequency bands that are effective at masking tinnitus should be included in the stimulus, and the level of the stimulus in these bands should be no greater than needed to achieve masking

Fournier et al., 2018

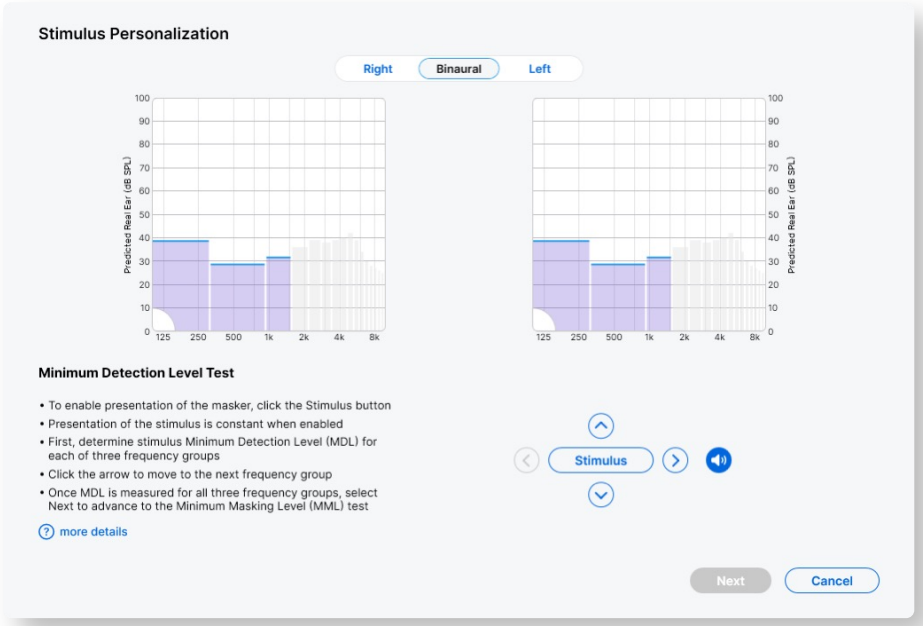
Multiflex Tinnitus Pro Tool

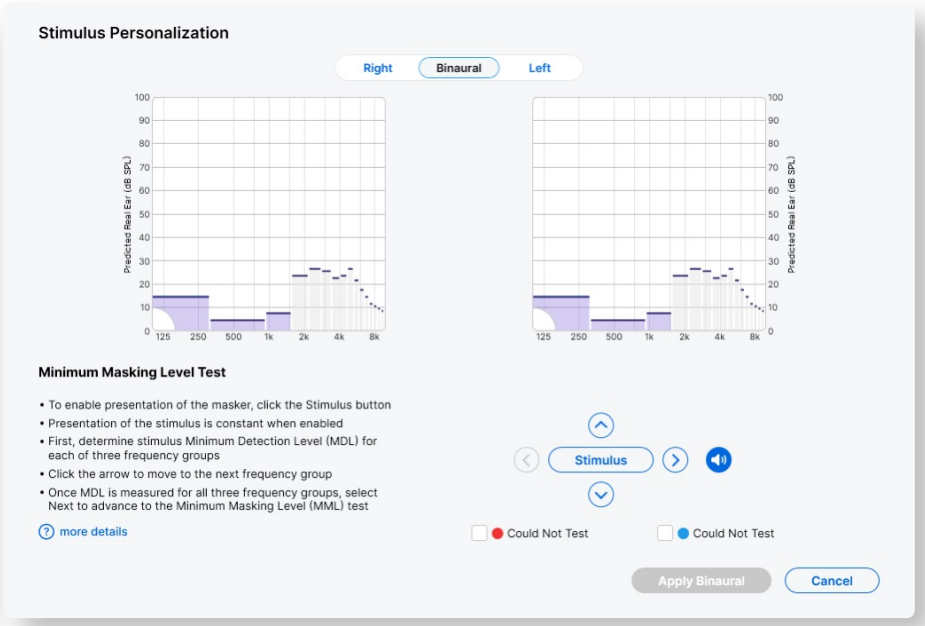
To create a Custom tinnitus stimulus, go to the Tinnitus screen in Inspire and click on **“Stimulus Personalization”**



Starkey **Pro Fit**

Custom
Tinnitus



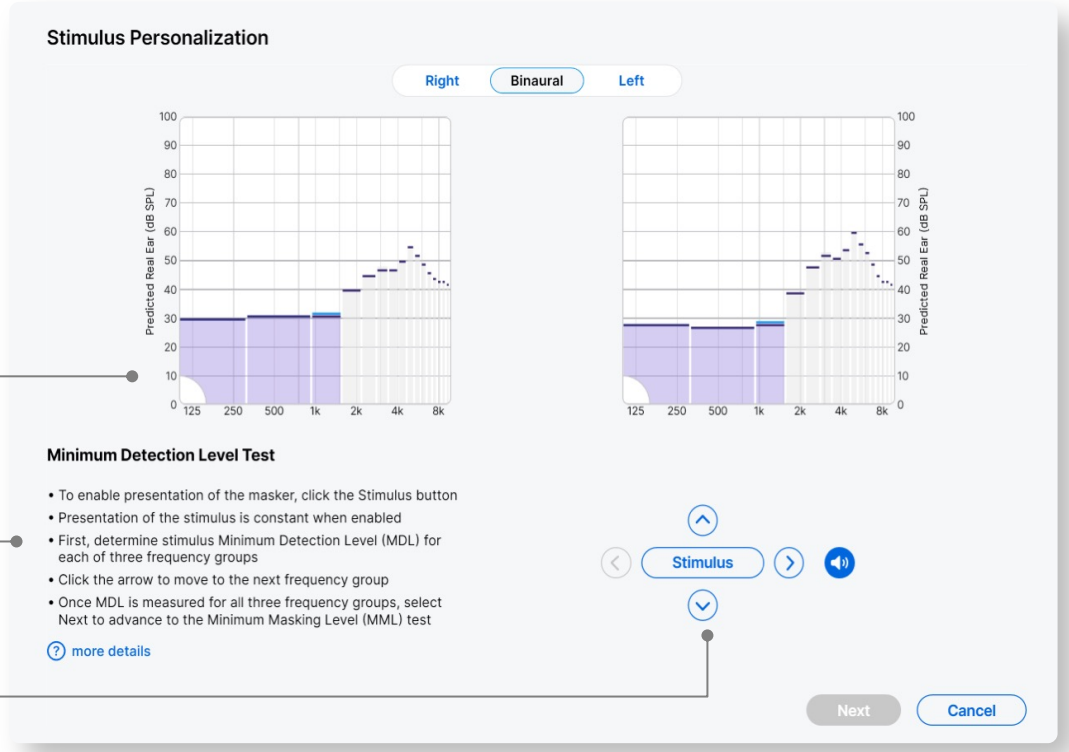


Multiflex Tinnitus Pro Tool Display

Active frequency region

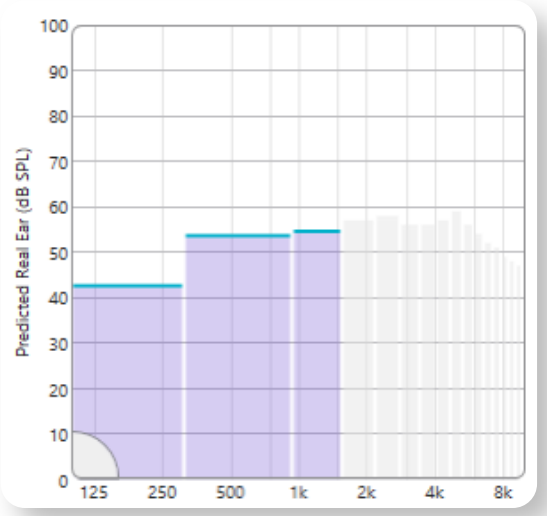
Instructions

Stimulus Controls



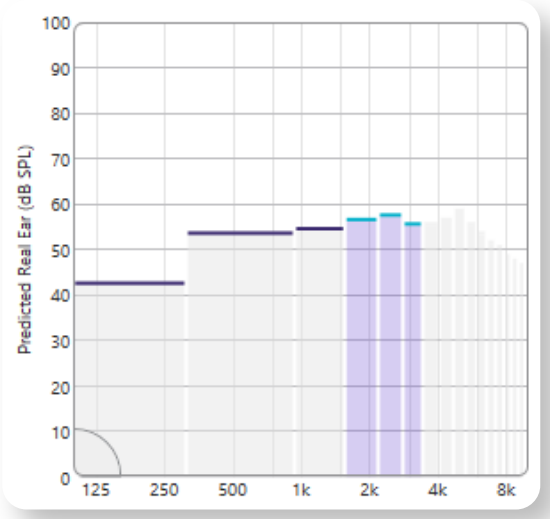
Frequency Groups

Frequency groupings are consistent with the low, mid and high band groupings in Inspire



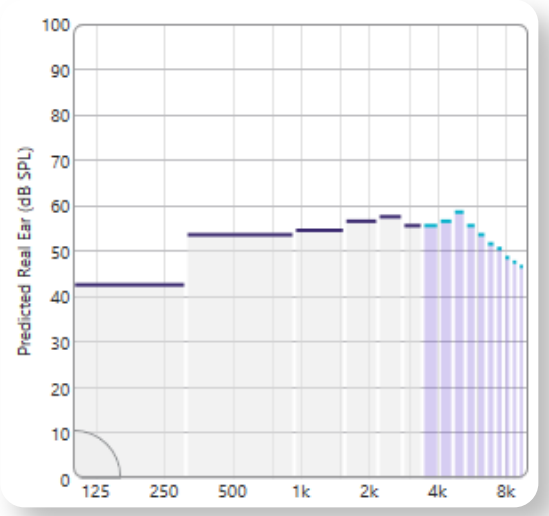
Low

150 Hz to 1.3 kHz



Mid

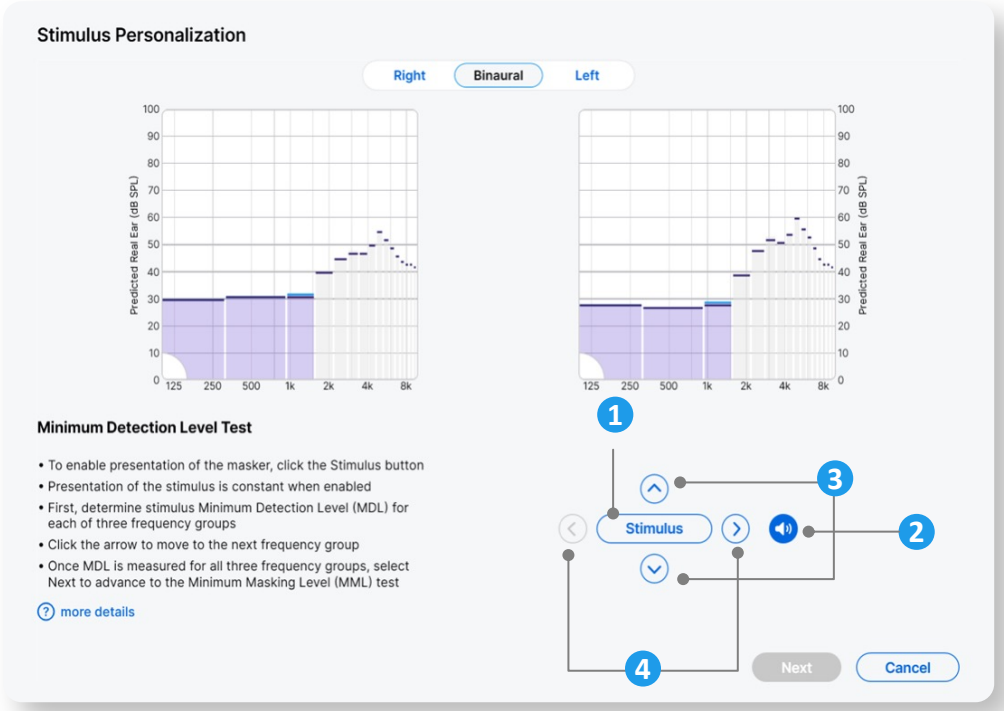
1.9 kHz to 3.1 kHz



High

3.8 kHz to 9.4 kHz

Minimum Detection Level (MDL) Test



GOAL To identify the softest detectable level of the Multiflex Tinnitus stimulus

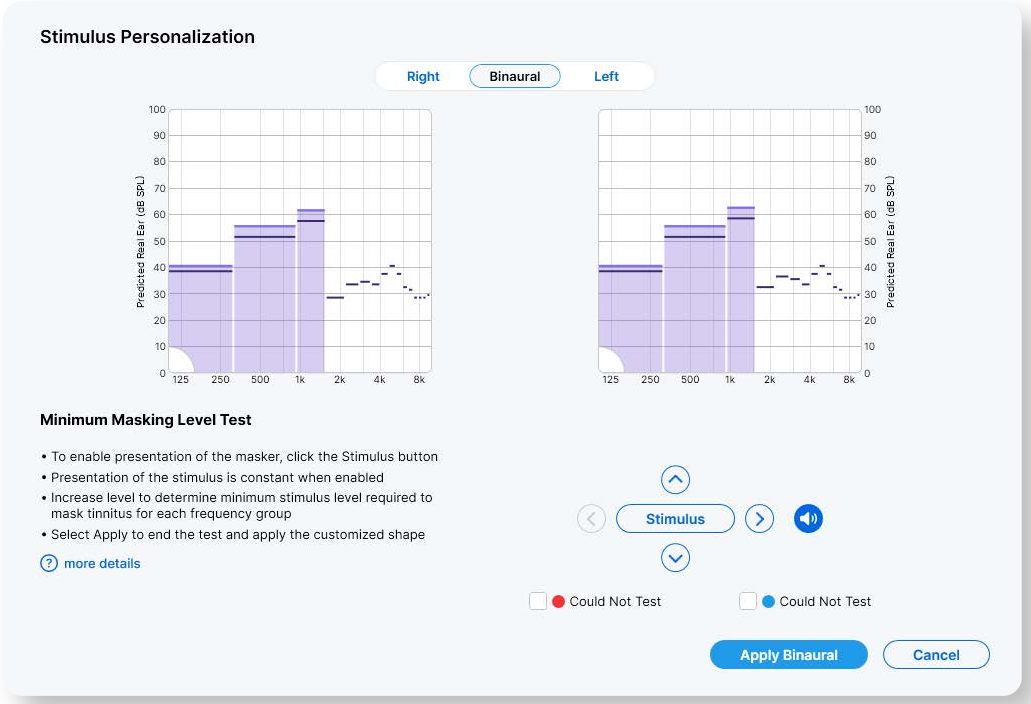
1. Click on the ‘Stimulus’ button to turn it ON
2. Hearing aid microphones will mute automatically when the stimulus is ON
3. Use the up and down arrows to increase or decrease the level of the stimulus in the frequency group displayed to ***identify when the stimulus is just detectable***
4. Use the right and left arrows to make measurements in the other frequency groups

Minimum Masking Level (MML) Test

GOAL

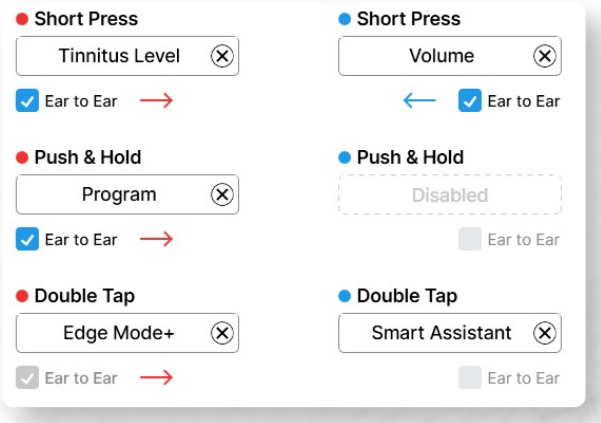
To identify the softest level of the Multiflex Tinnitus stimulus required to just notice or mask the tinnitus depending on the management approach of choice

- Display and controls are the same for this test
- Increase the stimulus level to determine ***the softest stimulus level required to just detect or mask the tinnitus*** for each of the three frequency groups

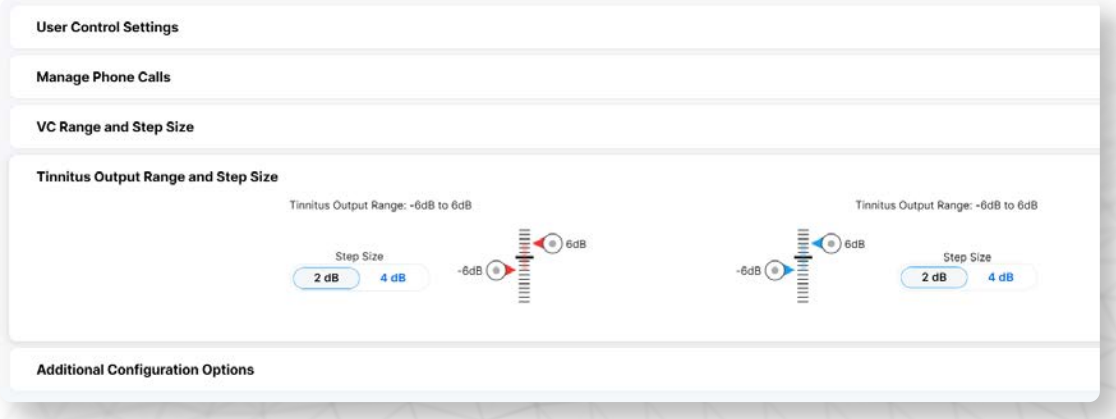


Tinnitus Stimulus

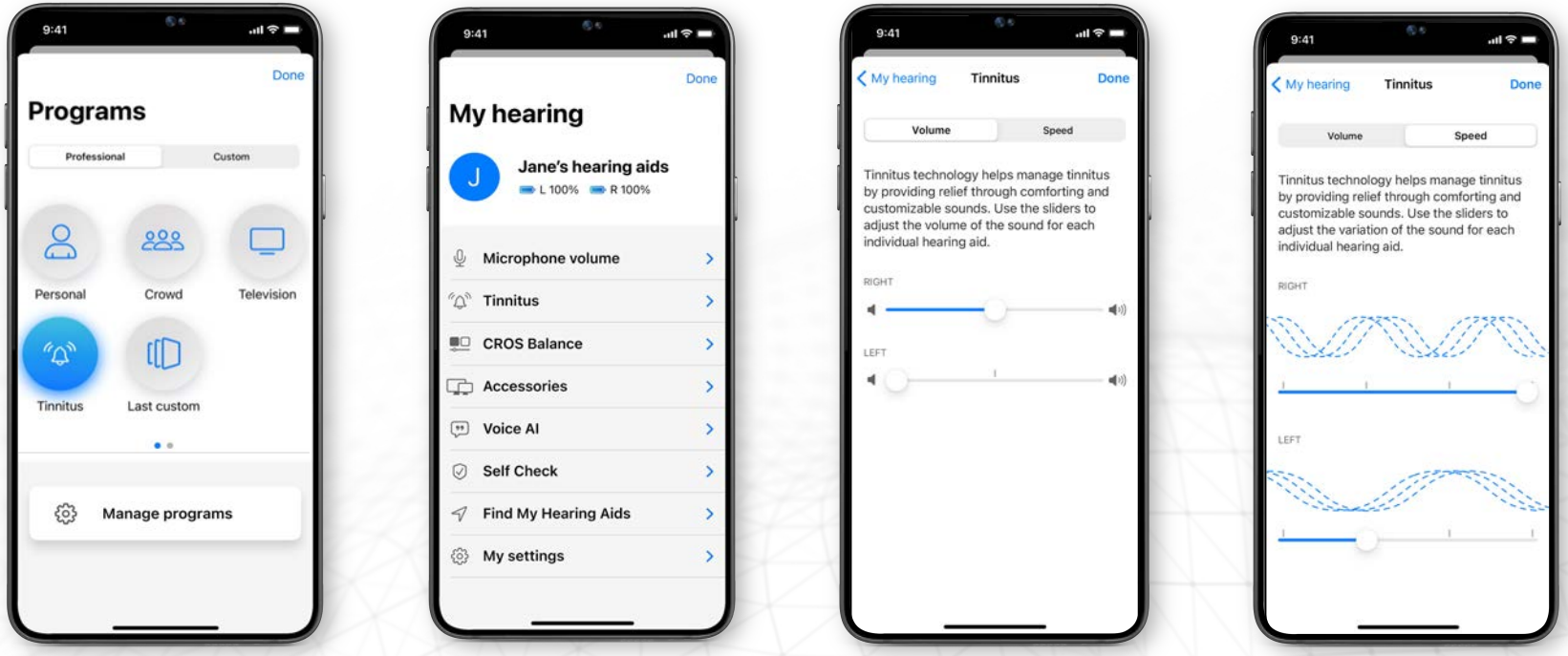
User Controls



Output Range and Step Size

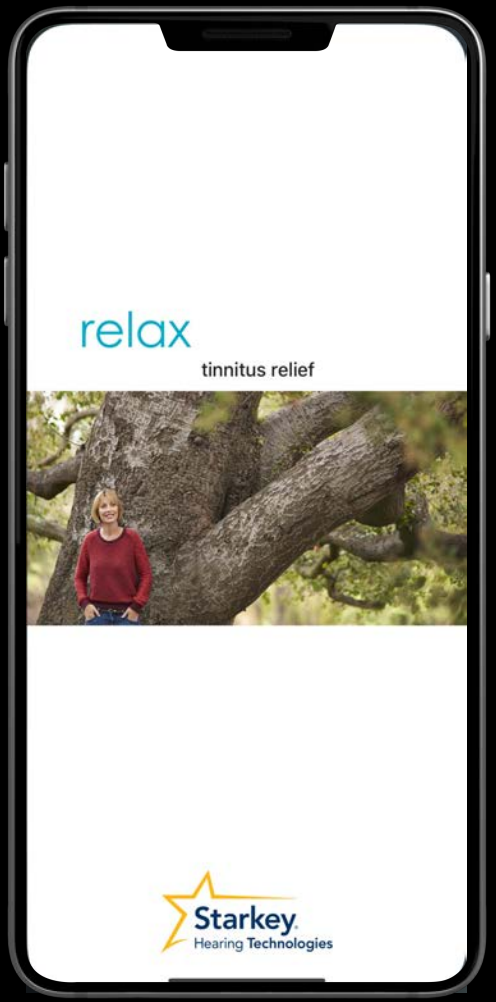


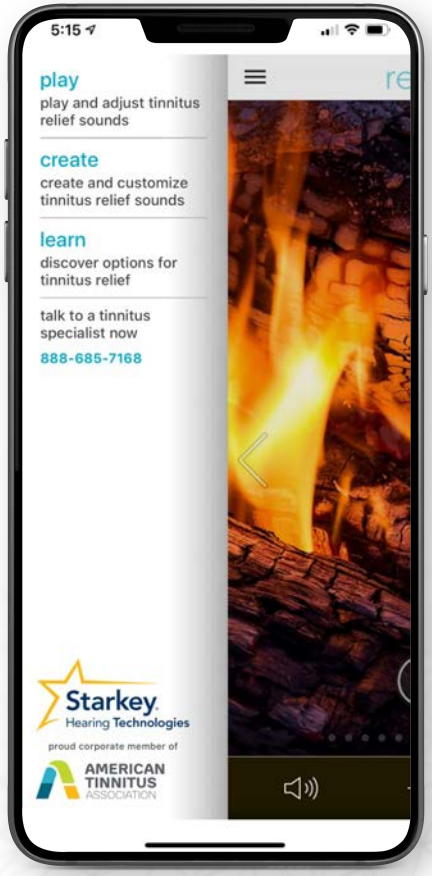
My Starkey Controls



relax

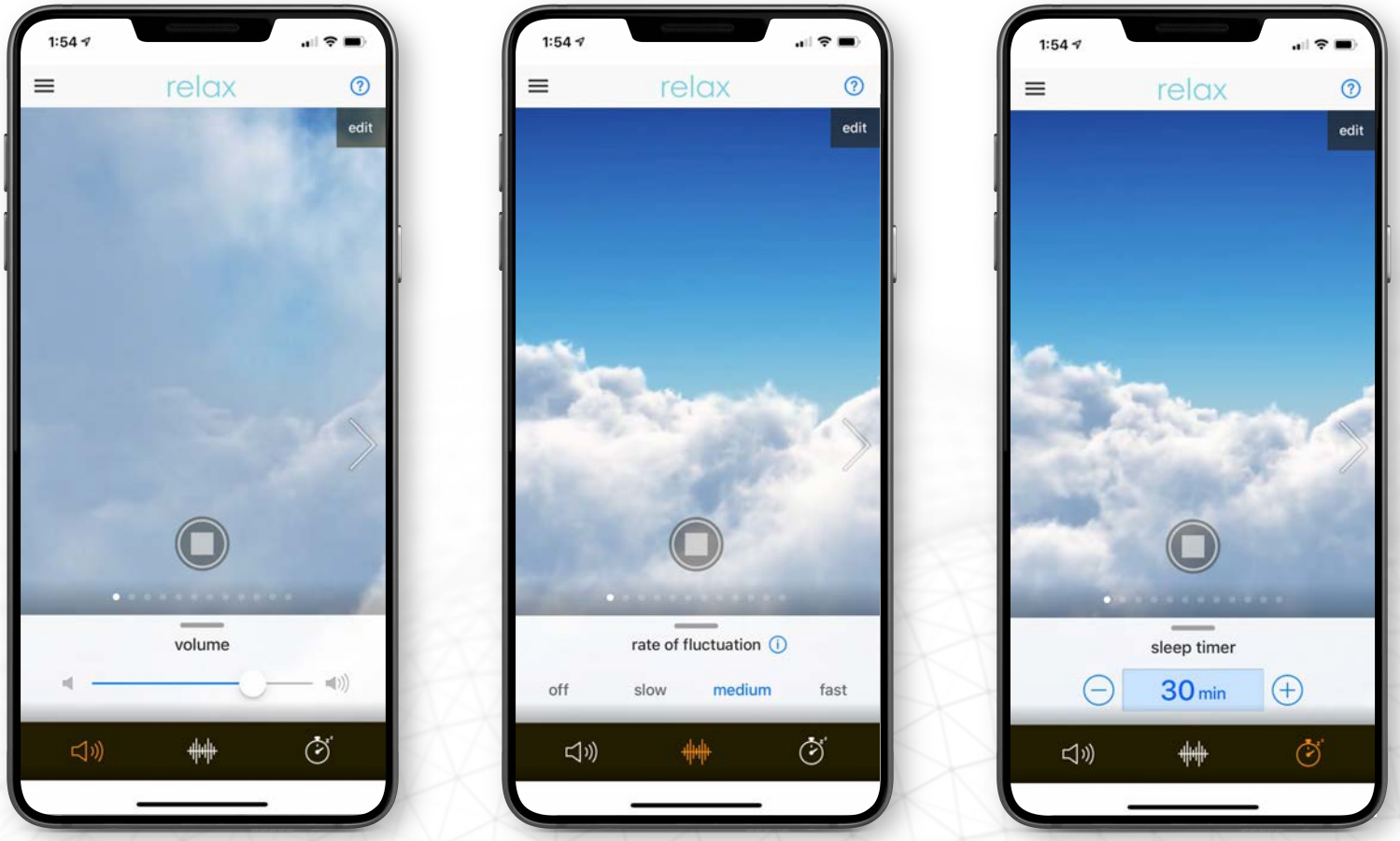
Relief sounds and education for patients who have tinnitus

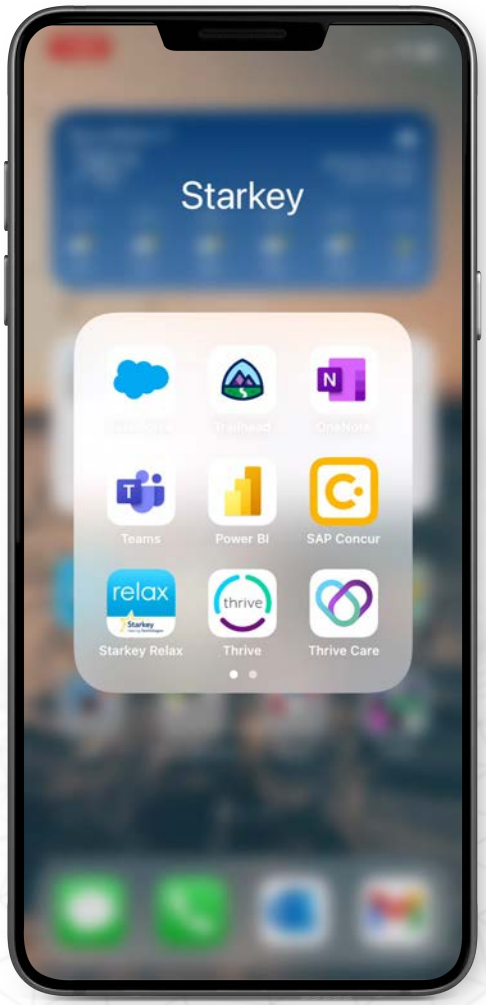




Easy to use app with a variety of sound stimuli and links to information from Starkey and American Tinnitus Association

12 different stimuli options


1:54
relax
edit
volume
1:54
relax
edit
rate of fluctuation
off
slow
medium
fast
1:54
relax
edit
sleep timer
30 min


Starkey
Teams
Power BI
SAP Concur
relax
Starkey Relax
thrive
Thrive
Thrive Care

Case Studies

Case Study 1

Daisy

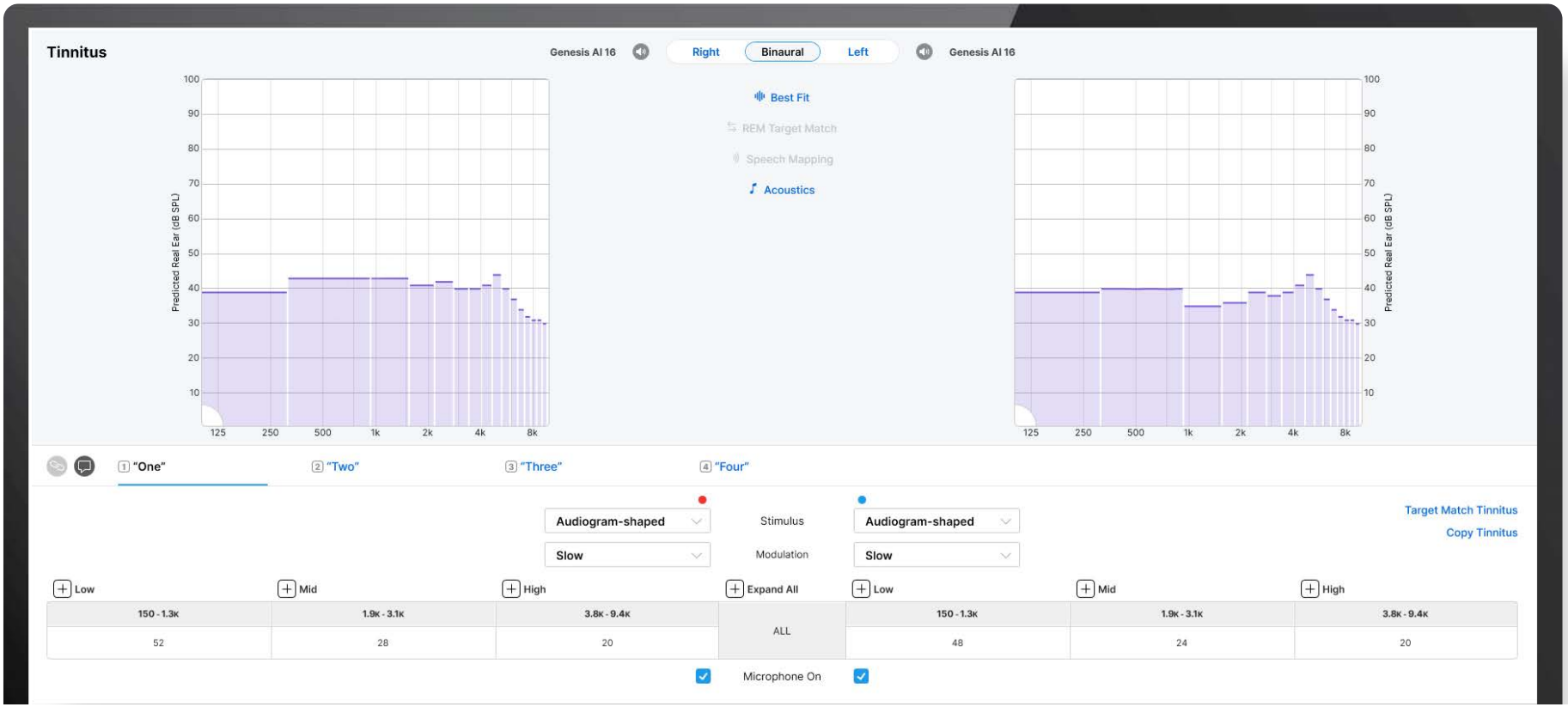
- 36 years old
- Nurse
- Mild SNHL
- Binaurally fit with Genesis AI mRIC 2400

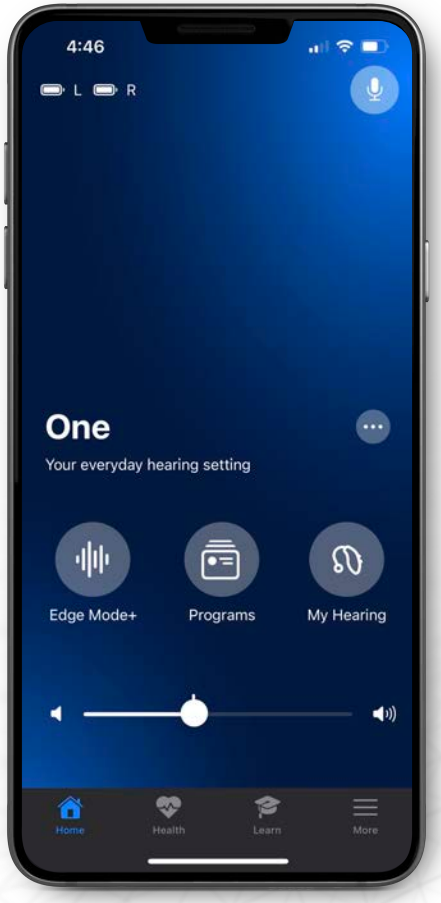
Daisy has binaural tinnitus and hearing loss from her Meniere's diagnosis that fluctuates in an unpredictable manner. She has not been successful with hearing aids alone in the past due to the rise in her tinnitus symptoms.

What tinnitus configuration would you recommend?

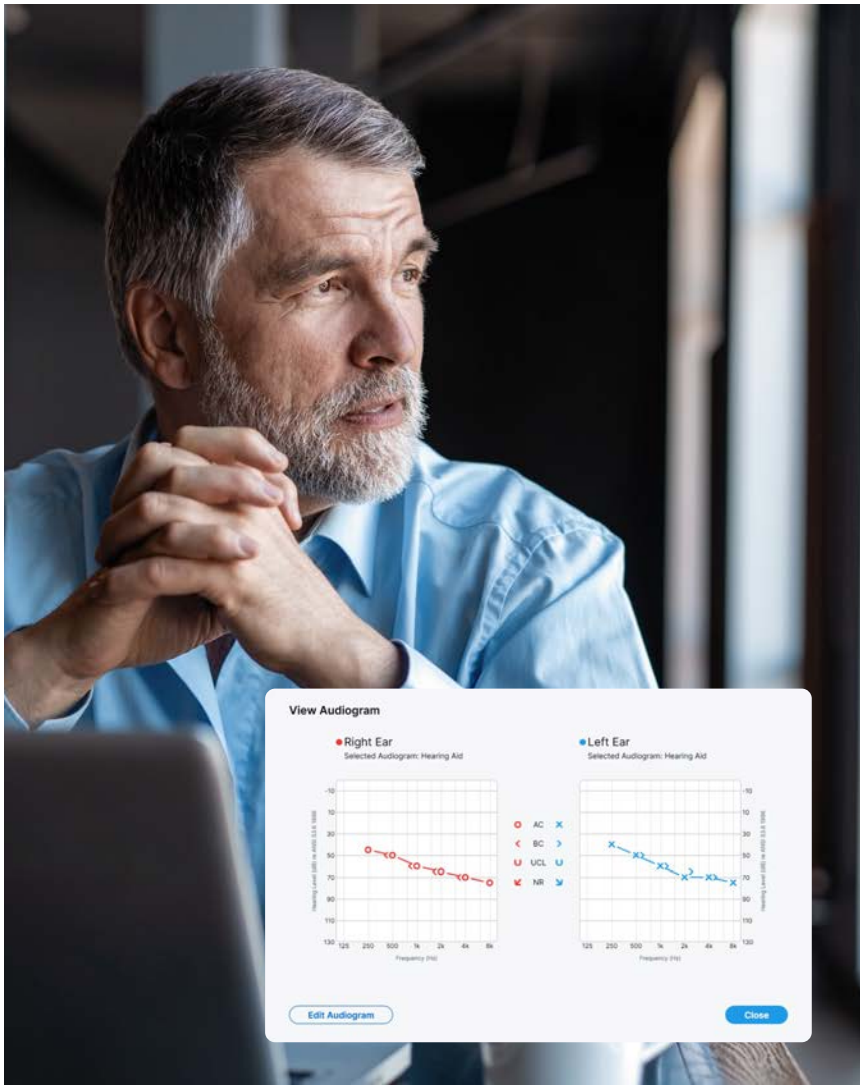
Pro Fit Configuration

Multicurve View:
Multiple “Personal” Programs
Varying amounts of gain for fluctuating hearing loss
Tinnitus Masker- Audiogram shaped with slow modulation for all four programs





My Starkey Options



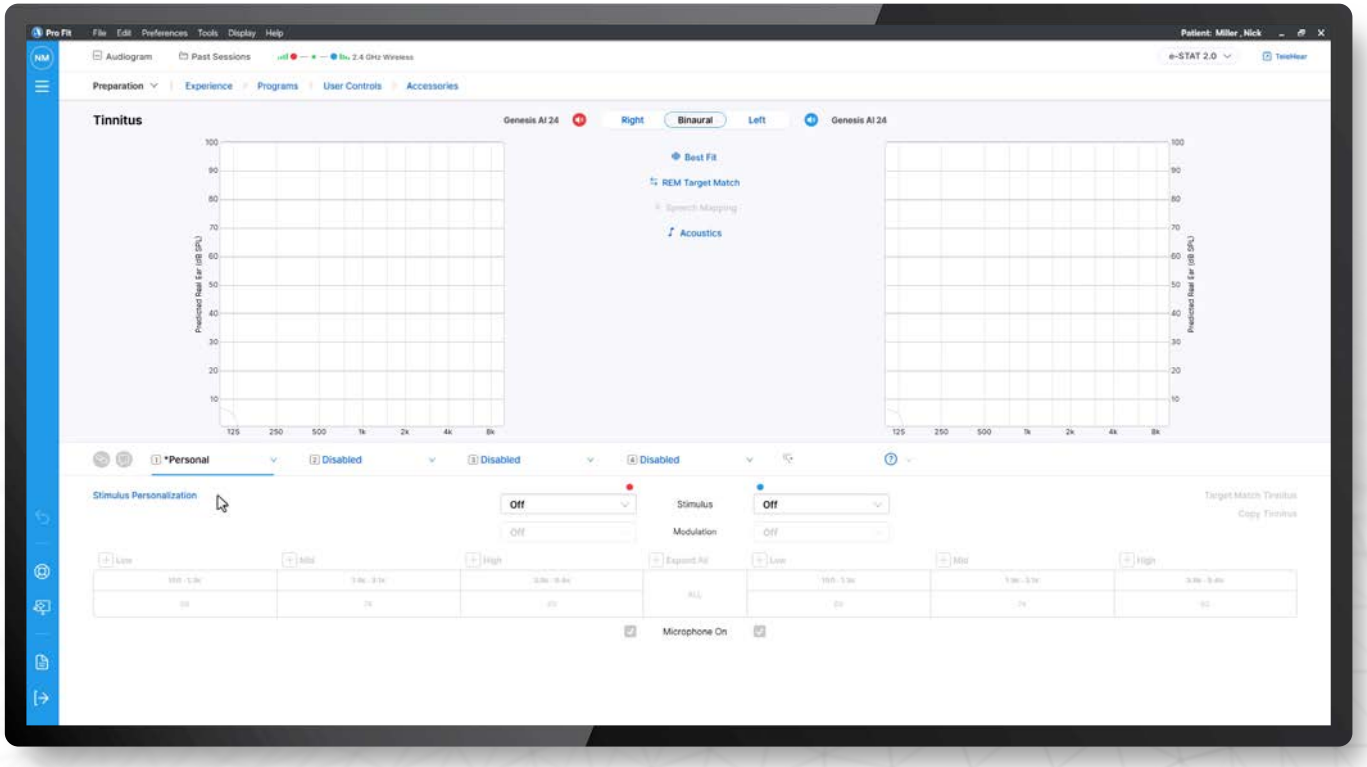
Case Study 2

Nick

- 52 years old
- Office Manager
- Moderate to Severe SNHL
- Binaurally Fit with Genesis AI 2000 CIC NW

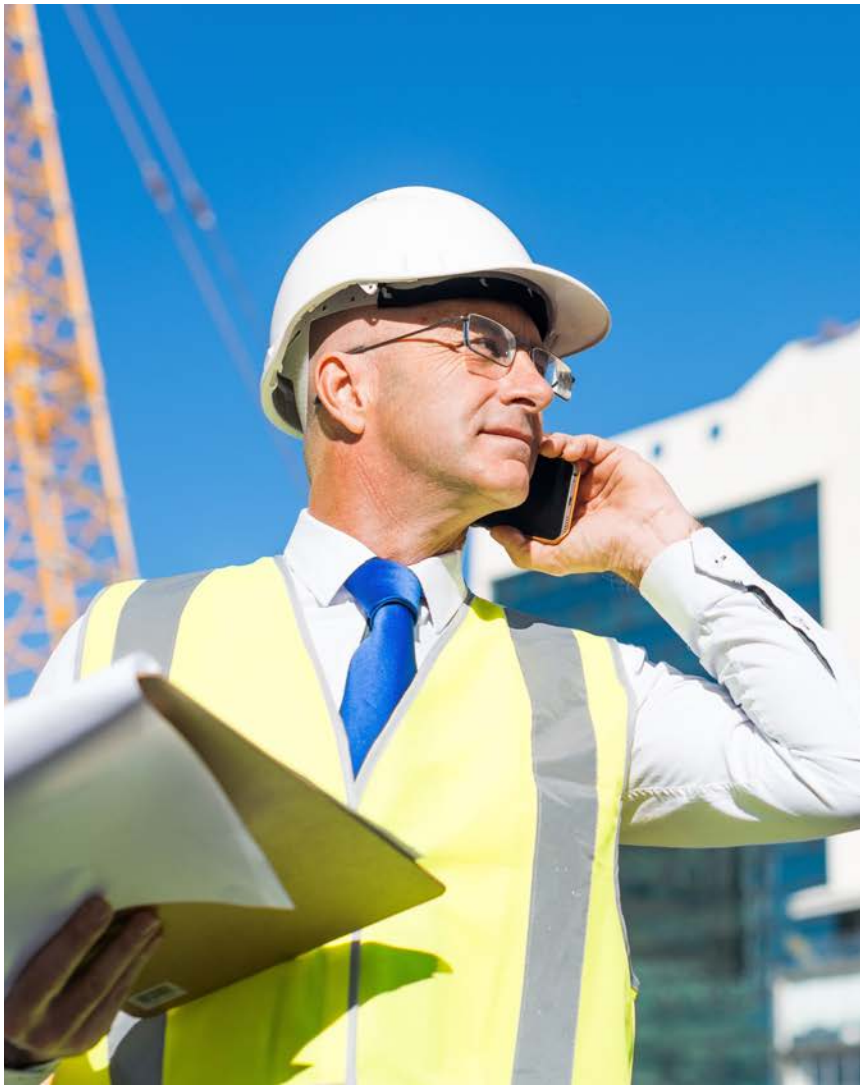
Nick suffers from misophonia and so when working in his office the flickering of the fluorescents in the office are a trigger.

What solution could be offered to Mark?



Solution

Use the Stimulus Personalization wizard to build a custom stimulus based on masking their misophonia triggers.



Case Study 3

John

- 48 years old
- Construction Manager
- Normal hearing
- No hearing aids fit at this time

John has been in the construction industry for 20 years. He reports constant, bilateral tinnitus which interferes with his sleep. He is extremely opposed to wearing hearing aids.

How can we help him?

Solution

Starkey Relax

Sound for Masking

Set Modulation, Volume, and Timer

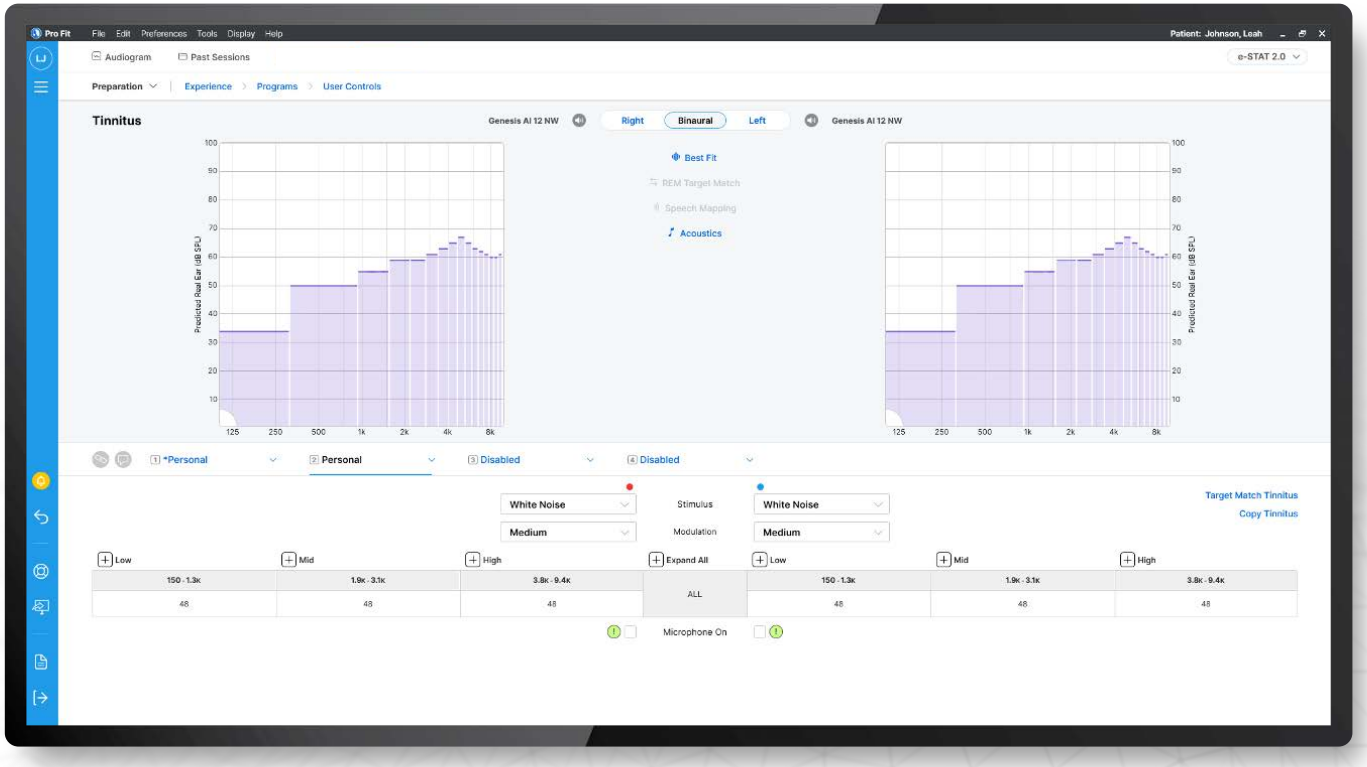
Case Study 4

Leah

- 66 years old
- Cancer survivor
- Small business owner
- Moderate SNHL
- Fit with Genesis AI 1200 CIC NW

Leah reports hearing loss and tinnitus due to her treatment regimen. She reports intermittent, bilateral tinnitus with various expression. It flares up and becomes more intense when she has higher levels of stress.

How can we help her?



Solution

Gave her a secondary program just for a tinnitus masker

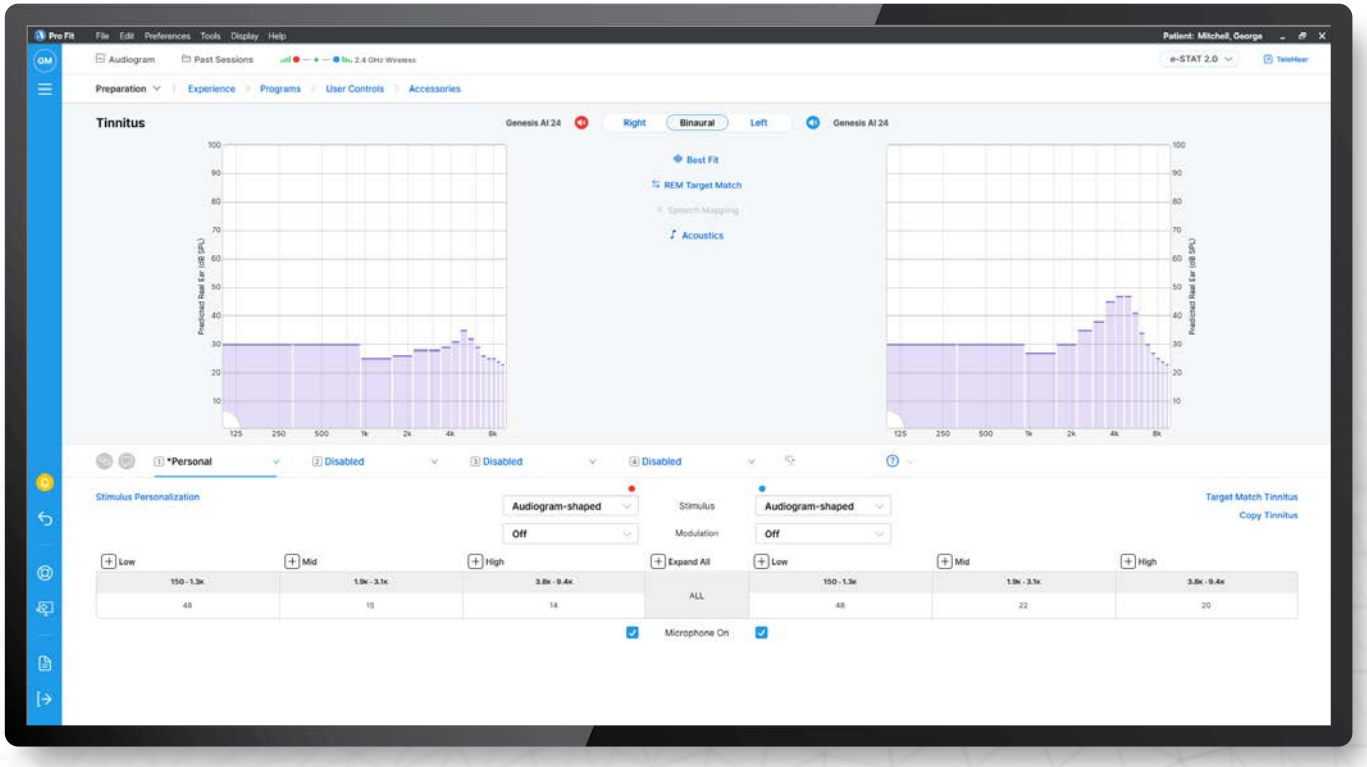
Case Study 5

George

- 28 years old
- Martial Arts Instructor
- Noise Notch at 4k left ear only
- Bilateral tinnitus
- Fit with Genesis AI 16 RIC RT

George is a martial arts instructor who has essentially normal hearing with the exception of a mild noise notch in the left ear. All other medical evaluation came back clear but George struggles with bilateral tinnitus.

He is here today to discuss options



Solution

Used the Audiogram Shaped stimuli to account for his noise notch.

The quickest way to ruin a customer experience in healthcare is to treat everyone the same.

Patients don't want to feel like just another number.

They crave personalized service that helps them find the right solutions.

Hyken, S.

Personalized Customer Experience Increases Revenue And Loyalty.

Tinnitus Resources

American Tinnitus Association
www.ata.org

Tinnitus Research Initiative
www.tinnitusresearch.net

National Center for Rehabilitative Auditory Research (NCRAR)
www.ncrar.research.va.gov/Education/Documents/TinnitusDocuments

American Academy of Audiology
www.audiology.org

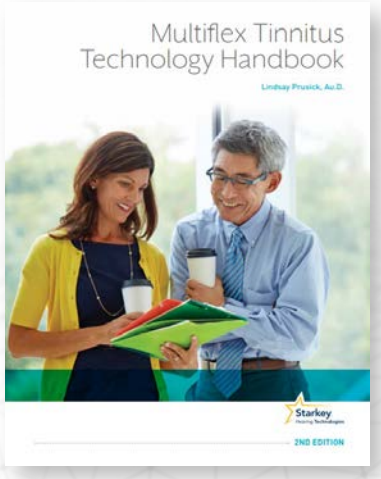
Tinnitus Retraining Therapy
www.tinnitus-pjj.com

University of Iowa Tinnitus & Hyperacusis Research
www.medicine.uiowa.edu/oto/research/tinnitus-and-hyperacusis

Resources

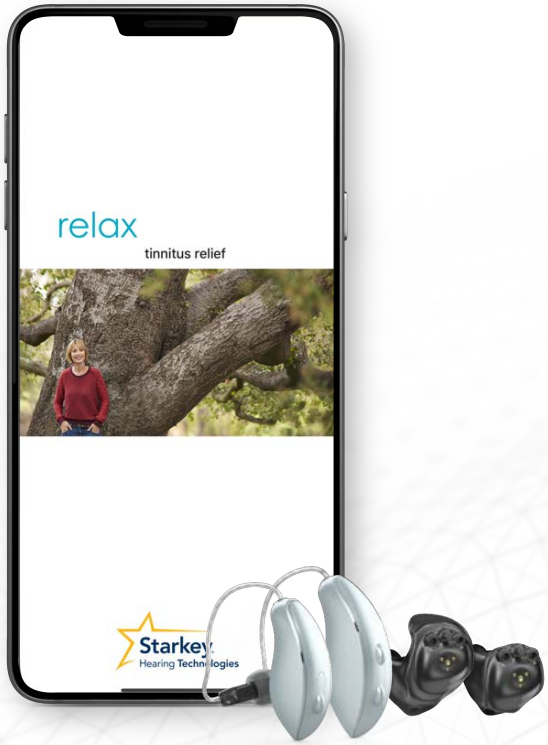
StarkeyPro.com

- Multiflex Tinnitus Pro QuickTIP
- Multiflex Tinnitus Technology Handbook
- Tinnitus Handicap Inventory Questionnaire
- Tinnitus Consumer In Office Poster
- Patient Education Brochure: Tinnitus
- Tinnitus Technology Options Brochure



Starkey Resources

StarkeyPro.com



JSLHR

Research Note

Changes in Heart Rate Variability Following Acoustic Therapy in Individuals With Tinnitus

Paul Reinhart,[a] Kendra Griffin,[b] and Christophe Michey[b]

Purpose: The aim of the study was to investigate changes in autonomic function, as measured by heart rate variability, in individuals with tinnitus following acoustic therapy implemented using tinnitus maskers presented via hearing aids.

Method: Twenty-six individuals with tinnitus and hearing impairment completed an 8-week field trial wearing hearing aids providing acoustic therapy via three tinnitus masker options set just below minimum masking level. Tinnitus handicap was measured using the Tinnitus Handicap Inventory at baseline (before starting acoustic therapy) and posttreatment (at end of 8-week trial). Resting heart rate and heart rate variability were measured using electrocardiography at baseline and posttreatment.

Results: There was a significant decrease in tinnitus handicap posttreatment compared to baseline. There was no change in heart rate, but there was a significant increase in heart rate variability posttreatment compared to baseline.

Conclusions: Acoustic therapy using tinnitus maskers delivered via hearing aids provided tinnitus relief and produced a concurrent increase in heart rate variability, suggesting a decrease in stress. Heart rate variability is a potential biomarker for tracking efficacy of acoustic therapy; however, further research is required.

Tinnitus refers to auditory perceptions that do not have a corresponding acoustic source in the external environment. Estimates of the prevalence of tinnitus vary widely, ranging from 5% to 45%, depending on the population sampled, and what type of tinnitus is considered (e.g., fleeting or chronic, bothersome or not, McCormack et al., 2016). Chronic tinnitus can interfere with the ability to fall asleep or concentrate, and often induces stress, anxiety, and depressive feelings, in turn reducing quality of life (Weidt et al., 2016). It has been hypothesized that tinnitus-related distress is related to an imbalance of sympathetic and parasympathetic branches of the autonomic nervous system, which modulate active and rest states, respectively (Jastreboff & Jastreboff, 2000). Consistent with this hypothesis, individuals with tinnitus exhibit decreased autonomic function (increased sympathetic activity and suppressed parasympathetic activity) indicative of being in a constant elevated stress state (Dietzen et al., 1999; van Der Loo et al., 2011; Vanneste & De Ridder, 2013; Vlikoski et al., 2017).

Heart rate variability (HRV) is a common, noninvasive measure reflecting sympathetic and parasympathetic branches of the autonomic nervous system (Betz et al., 2015; O'Brien et al., 1996; Task Force of the European Society..., 1996). The heart, which is regulated by the autonomic nervous system (Glück et al., 1965; Valenza et al., 2018), contracts with slight beat-to-beat irregularity; the quantification of this interbeat irregularity is referred to as HRV (Acharya et al., 2006). HRV is commonly used as an autonomic biomarker of stress and health, with lower HRV associated with increased stress and negative health outcomes (Kemp & Quintana, 2013; Thayer et al., 2012).

Acoustic therapy, also known as "sound stimulation" or "sound therapy," constitutes an important aspect of comprehensive tinnitus management strategies used in audiology today (Henry et al., 2018; Jastreboff & Jastreboff, 2000; Schall et al., 2018; Tunkel et al., 2014). Acoustic therapy involves sound stimulation (masking, either or both, from the amplification of external sounds, or the generation of additional sound, commonly referred to as a "tinnitus masker" or "tinnitus stimulus." Tinnitus maskers are commonly set to a level below their tinnitus, so that their tinnitus is partially covered up (Jastreboff & Jastreboff, 2000). Because hearing loss is a common comorbidity for tinnitus

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Thank you

Hear better. Live better.