Neurotone AI

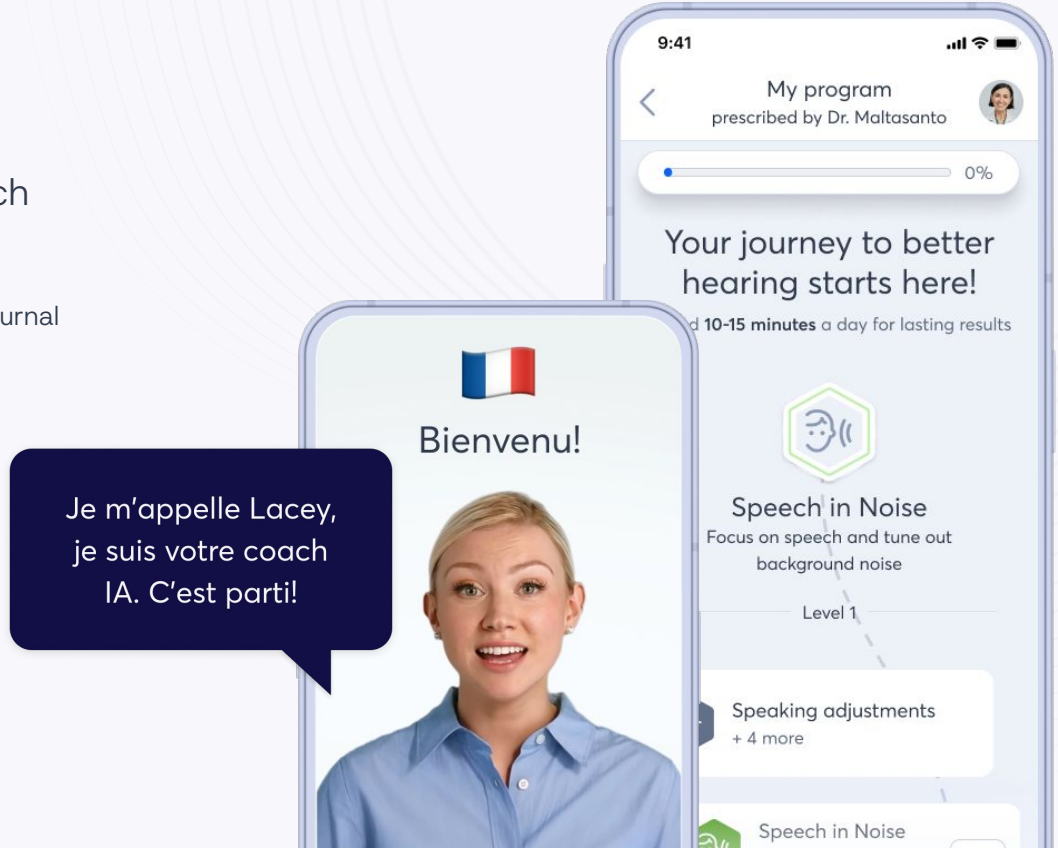
Integrating Sound Therapy and Cognitive Behavioral Intervention in Tinnitus Care

Rick Carlson, CEO

Dr. Miles Aron, COO

What's new with Lace

- 1k+ practice partners in 18 months
- Dr. Brian Taylor – VP of Clinical Research and Professional Relations
  - Editor of *Audiology Practices*, quarterly ADA journal
- Coming soon: Targeted Aural Rehab
- Now available:
  - Train in 10 languages
  - Provider Prescribed Programs



We're built on a foundation of science

Jennifer Henderson Sabes, AuD
Co-inventor & Scientific Advisor

Senior Research Audiologist @ UCSF
Audiology Professor @ Pacific
AAA fellow and ASHA CCC-A certified

Robert Sweetow, PhD
Co-Inventor & Scientific Advisor

Professor Emeritus of Otolaryngology @ UCSF
Former Chief of Audiology @ UCSF
AAA Distinguished Achievement Award

Miles Aron, PhD
Co-Founder & COO

PhD in Biomedical Acoustics @ Oxford
US Fulbright Scholar
BSE in Acoustical Engineering @ Hartford

Nancy Tye-Murray, PhD
Scientific Advisor

Professor of Otolaryngology
@ Washington University
School of Medicine

The Science

Habituation Therapy

Based on Tinnitus Retraining Therapy (TRT)

5 studies · 541 participants

KEY FINDING	STUDY	METHOD	N
+54% ↑ THI improvement at 6 mo.	Patient-Based Outcomes In Patients With Primary Tinnitus Undergoing TRT *Berry et al., JAMA Otolaryngology, 2002*	Prospective, nonrandomized; THI before & after TRT	n=32
82% ↓ Showed 20-point THI decrease	Implementing The Neurophysiological Model Of Tinnitus Retraining Therapy *Jastreboff & Hazell, 2004*	Counseling + sound therapy based on neurophysiological model	n=303
72% ↓ Significant decrease at 12 mo., Improvements over time support multiple practical delivery pathways	Open Ear Hearing Aids In Tinnitus Therapy Vs. Sound Generators *Parazzini et al., Int. J. Audiology, 2011*	Randomized prospective parallel-group study	n=91
TFI ↑ 33 pts TFI improvement (HA+), 21 pts with HA, 31 pts with extended-wear HA	Rct Comparing Extended-Wear, Conventional Has, And Combination Instruments *Henry et al., Journal of AAA, 2016*	RCT comparing 3 bilateral hearing device types	n=55
60 studies Tinnitus distress consistently associated with certain traits	Anxiety, Depression, And Personality Traits Relevant To Tinnitus *Durai & Searchfield, Frontiers of Neuroscience, 2017*	Scoping review of the literature	n=60

Publication range: 2002–2017

Adaptation Therapy

Notched audio designed to drive cortical rebalancing (lateral inhibition + plasticity)

4 studies · 174 participants

KEY FINDING	STUDY	METHOD	N
Tinnitus ↓↓ Tinnitus loudness and tinnitus-related auditory cortex activity after 12 mo.	Tailor-Made Notched Music Reduces Tinnitus Loudness and Auditory Cortex Activity *Okamoto et al., PNAS, 2010*	12-mo double-blind longitudinal study with target, placebo, and monitoring groups	n=23
At 3 months TMNMT appeared more effective than TRT	Efficacy of Tailor-Made Notched Music Training Vs. TRT in Adults With Chronic Subjective Tinnitus *Tong et al., Ear & Hearing, 2023*	Single-blind randomized controlled trial	n=112
Outcomes vary By stimulus and patient factors	Comparison of Acoustic Therapies for Tinnitus Suppression: A Preliminary Trial *Schad et al., Int. J. Audiology, 2017*	Evaluated notched noise against other sound controls	n=30
Tinnitus ↓↓ Reduced tinnitus loudness and tinnitus-related neural activity after 3 days, effects accumulated across sessions	Inhibition-Induced Plasticity in Tinnitus Patients After Repetitive Exposure to Notched Music *Pantev et al., BMC Neurology, 2016*	3-month protocol in chronic tonal tinnitus using tailor-made notched music (2 hrs/day)	n=9

Publication range: 2010–2023

Relief Mode

Short partial-masking sessions for spikes + residual inhibition potential

3 studies · 361 participants

KEY FINDING	STUDY	METHOD	N
TFI ↑↑ Significant improvement in tinnitus-related distress (TFI), supported residual inhibition technique feasibility	Evaluating a Residual Inhibition Technique in Hearing Aids for Tinnitus Suppression *Quinn et al., Am J Audiol, 2023*	Pilot hearing aid sound therapy with 2-month intervention and 1-month washout	n=20
20 points ↓ THI Improvement With Amplification + Masking	Tinnitus Sound Amplification and Masking Therapy: Outcomes at UNC Chapel Hill *Meade et al., Am J Otolaryngology, 2024*	Review of tinnitus patients treated over 12 months	n=141
~50% Experienced Residual Inhibition when using Masking	Management of Tinnitus: Discussion Paper *Hazell, Journal of the Royal Academy, 1985*	Discussion paper based on tinnitus clinic experience	n=200

Publication range: 1985–2024

Sleep Mode

Maximizes sound therapy time when patients' minds are most open to habituation

2 studies · 69 participants

KEY FINDING	STUDY	METHOD	N
Tinnitus ↓↓ Significant reduction in intensity & burden after 3 months	Impact of Reduction of Tinnitus Intensity on Patients' Quality of Life *Drexler et al., Int. J. Audiology, 2015*	Study of nightly customized sound stimulation during sleep	n=11
62% ↓ Average reduction in perceived tinnitus and 77% average improvement in TFI when using Personalized sound therapy vs. generic sounds	RCT of a Novel Device for Tinnitus Sound Therapy During Sleep *Theodoroff et al., Am J Audiology, 2017*	RCT of 3 sleep-based sound therapy approaches	n=58

Publication range: 2015–2017

CBT, Meditation and Mindfulness Tools

Helps patients identify and restructure unhelpful thoughts, build coping strategies, and improve function

3 studies · 170 participants

KEY FINDING	STUDY	METHOD	N
MBCT wins MBCT outperformed relaxation training in reducing tinnitus severity, with lasting benefit at 6 months	Mindfulness-Based Cognitive Therapy for Chronic Tinnitus: A Randomized Controlled Trial *McKenna, Marks & Schaette, Psychother Psychosom, 2017*	RCT comparing 8 weekly 120-min MBCT sessions with intensive relaxation training	n=75
Meditation wins Mindfulness meditation produced greater improvement than relaxation therapy, and a larger reduction in tinnitus distress	A Randomised Controlled Study of Mindfulness Meditation Vs. Relaxation Therapy in the Management of Tinnitus *Arif et al., Laryngol Otol, 2017*	RCT of 5-session mindfulness vs. relaxation treatment	n=86
Wellbeing ↑↑ MBCT shifted resistance to acceptance	I Wasn't at War With the Noise: How MBCT Changes Patients' Experiences of Tinnitus *Marks et al., Front Psychol, 2020*	Qualitative follow-up within RCT; 5-session MBCT vs. relaxation	n=9

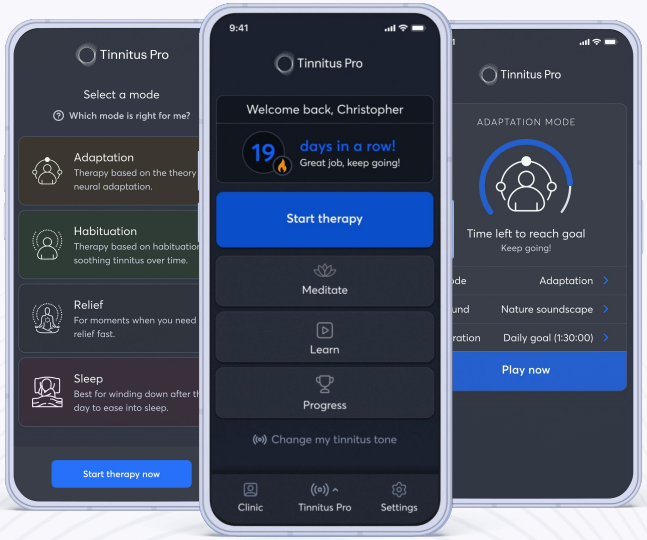
Publication range: 2017–2020

Introducing Tinnitus Pro

Introducing Tinnitus Pro

The common sense tinnitus solution for the 90% of people that want a serious, science-based treatment at an affordable price.

- Best-in-class tinnitus treatment
- Gamified and engaging
- Customized for your practice
- Pro Portal patient management
- Personalized tinnitus tone finder
- Lifetime patient licenses



Personalized Sound Therapy

Adaptation · Habituation · Sleep · Relief

Cognitive Behavioral Intervention

CBI · Meditation

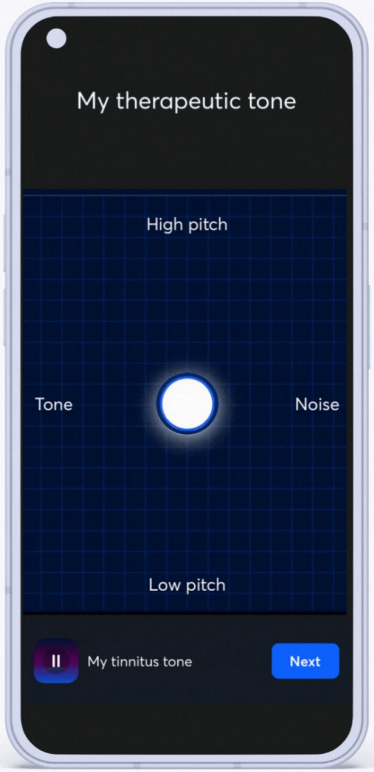
Available in 10+ languages

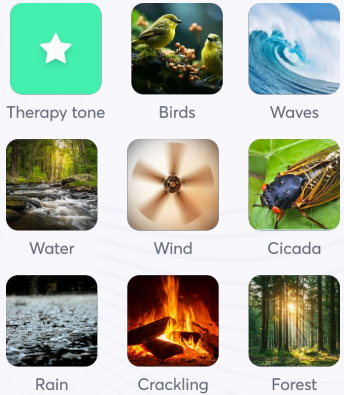
Personalized Sound Therapy

Therapeutic tone finder

First of its kind innovation in sound therapy

- Helps patients pinpoint their tinnitus tone with more precision for maximum benefit
- Personalized sound therapy is generated from the patient's unique tinnitus tone
- Patients experience pure tones, harmonics, and band noises all of which are captured here
  (Tinnitus: Theory and Management, Henry, 2004.)
- Powering the largest tinnitus study ever, advancing how we understand and treat tinnitus





Blend therapeutic tones with soundscapes

Personalized sound therapy

Advanced care based on patients' own tinnitus tone

The only tinnitus app to provide patients with the option to treat tinnitus using therapies developed on the theories of neural habituation, adaptation, and inhibition.

Why we've gone further

- Research suggests that different patients respond to different therapy modes
- Hearing care providers and their patients can find what works best

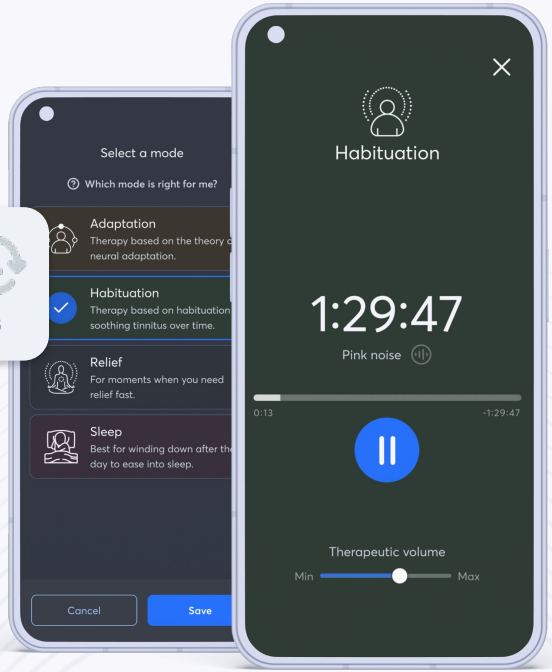
Habituation Therapy

Therapeutic sounds with blendable soundscapes below masking level leads to tinnitus fading

Daily cumulative goal:

1.5+ hours

More time can produce bigger gains



Neural habituation

- Reduction in perceived loudness
- 25 pt reduction (54% improvement) in THI scores
- Key ingredient in Tinnitus Retraining Therapy

Berry et al., JAMA Otolaryngology, 2002.
Jastreboff and Hazell, 2004.
Parazzini et al. International Journal of Audiology, 2011.
Henry et al. Journal of AAA 2016.
Durai & Searchfield, Frontiers of Neuroscience, 2017.

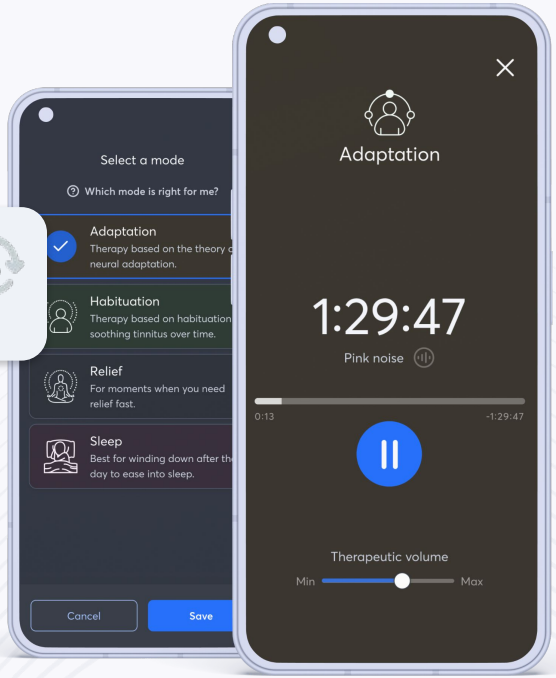
Adaptation Therapy

Adaptation therapy (aka “notched noise therapy”) removes your tinnitus frequency from therapeutic audio.

Daily goal:

1.5+ hours

More time can produce bigger gains



Why it works?

Neural adaptation

- Reduces hyperactivity through lateral inhibition and cortical plasticity (sound-excited neurons inhibit their overactive neighbors)
- 3-month RCT found greater improvements with adaptation vs. traditional sound therapy

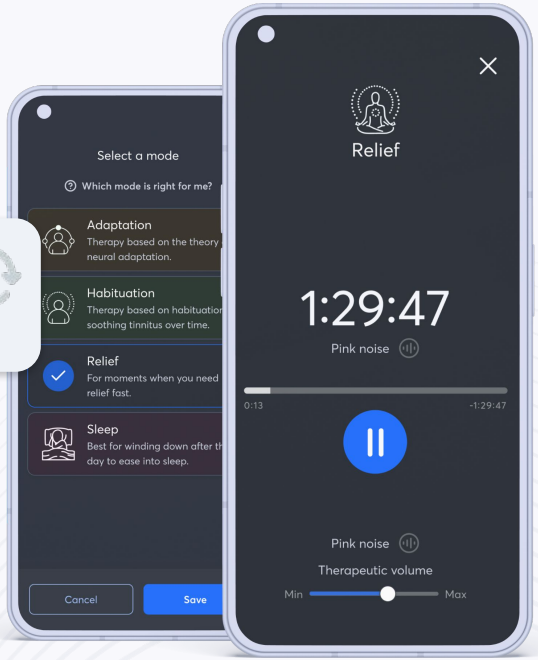
Okamoto et al., PNAS 2010.
Tong et al., Ear & Hearing 2023.
Schad et al., International Journal of Audiology 2017.
Pantev et al., BMC Neurology 2016.

Relief Mode

Short partial-masking sessions with sounds
based on the patient's unique tinnitus tone for instant relief

Daily goal:

2-15 min
During tinnitus spiking



Why it works?

- Puts patients in control, reduces contrast, attentional, and emotional factors
- 20 pt reduction in THI (52% improvement) in 2024 study
- ~50% of patients experience additional residual inhibition—a temporary post-sound quieting

Quinn et al., Am J Audiol 2023.
Meade at al., American Journal of Otolaryngology, 2024.
Hazell, Journal of the Royal Academy 1985.

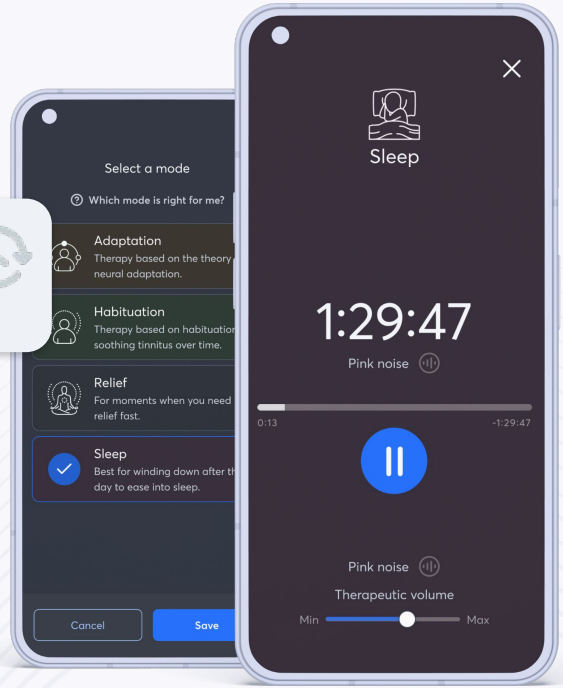
Sleep Mode

Maximizes time on sound therapy when patients' minds are most open to habituation

Daily goal:

5–8 hours

Start at bedtime



Why it works?

- Reduces tinnitus–silence contrast to ease sleep onset
- Personalized sound therapy outperforms generic sounds
- After 3 months: 62% average reduction in perceived tinnitus
- 77% average improvement in Tinnitus Functional Index (TFI)

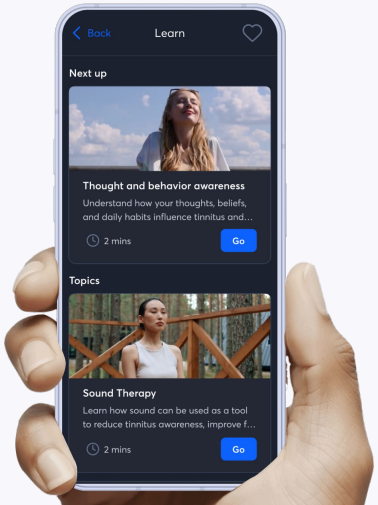
Drexler et al, 2015 International Journal of Audiology
Theodoroff et al., 2017 American Journal of Audiology

Cognitive Behavioral Intervention

Cognitive behavioral intervention

50+ lessons from the leading audiology researchers behind Lace

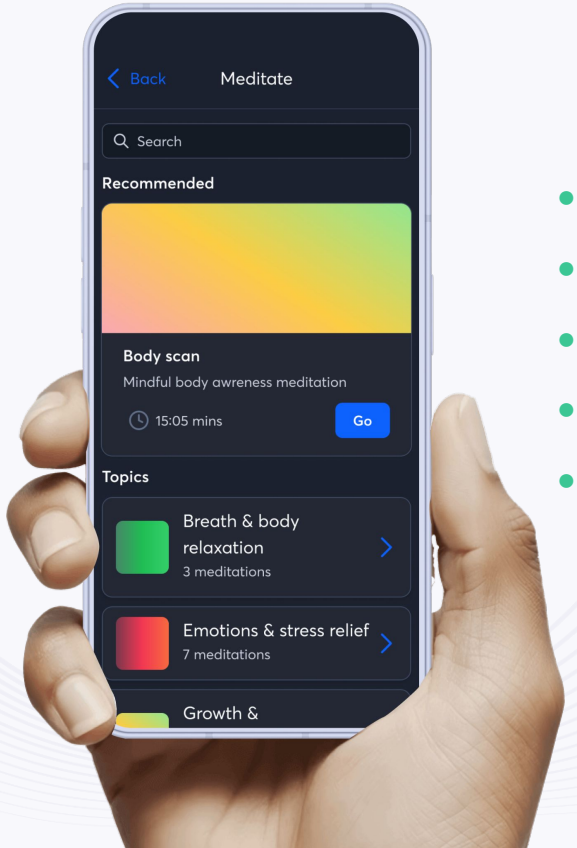
Learn to identify and restructure negative thoughts to better cope with tinnitus.



- Understanding Habituation
- Reframing Negative Thoughts
- Celebrate Small Wins
- Use Sound During Quiet Tasks
- Practice Self-Compassion
- Review Medications
- Reinforce Positive Moments
- Try Sound Therapy Before Bed
- Try a Mix of Tones and Noise
- Stick to a Sleep Schedule
- Use Sound Therapy at Night
- Don't Lie Awake for Too Long
- Be Curious, Not Critical
- Try Short, Frequent Breaks
- Try Deep Breathing

Meditation and mindfulness tools

Guided sessions layered with personalized therapeutic sounds to reduce reactivity to tinnitus.



- Reduces tinnitus severity and distress
- Increases acceptance
- Reduces catastrophizing
- Reorients attention to neutral anchors
- Provides benefits long after meditating

Psychother Psychosom. 2017 (McKenna/Marks/Schaette)
Laryngol Otol. 2017 (Arif et al.)
Front Psychol. 2020 (Marks et al.)

How we help patients succeed

Built for patient engagement

So that more patients stick with it and get results that last

Streaks help keep patients training their brain to tune out the tinnitus.

Avatar-based coaches keep patients engaged with CBI lessons.

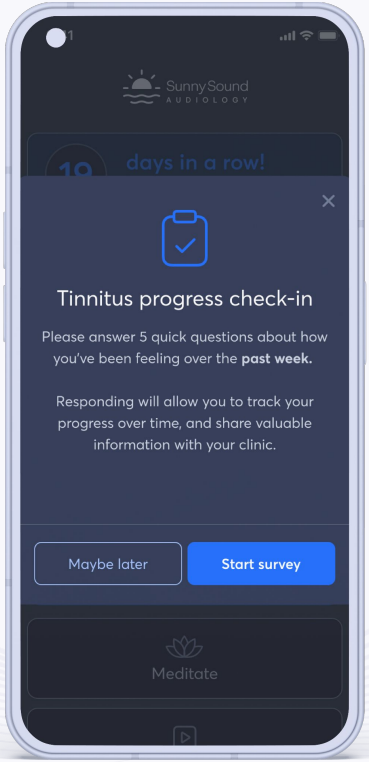
Progress tracking so patients can stay informed and motivated to make progress.

Automated encouragement nudges patients toward therapy when they need it most and dials back as the tinnitus fades.

Integrated surveys

Measure patient outcomes with more fidelity

- Tinnitus Handicap Inventory (THI)
- Tinnitus Functional Index (TFI)

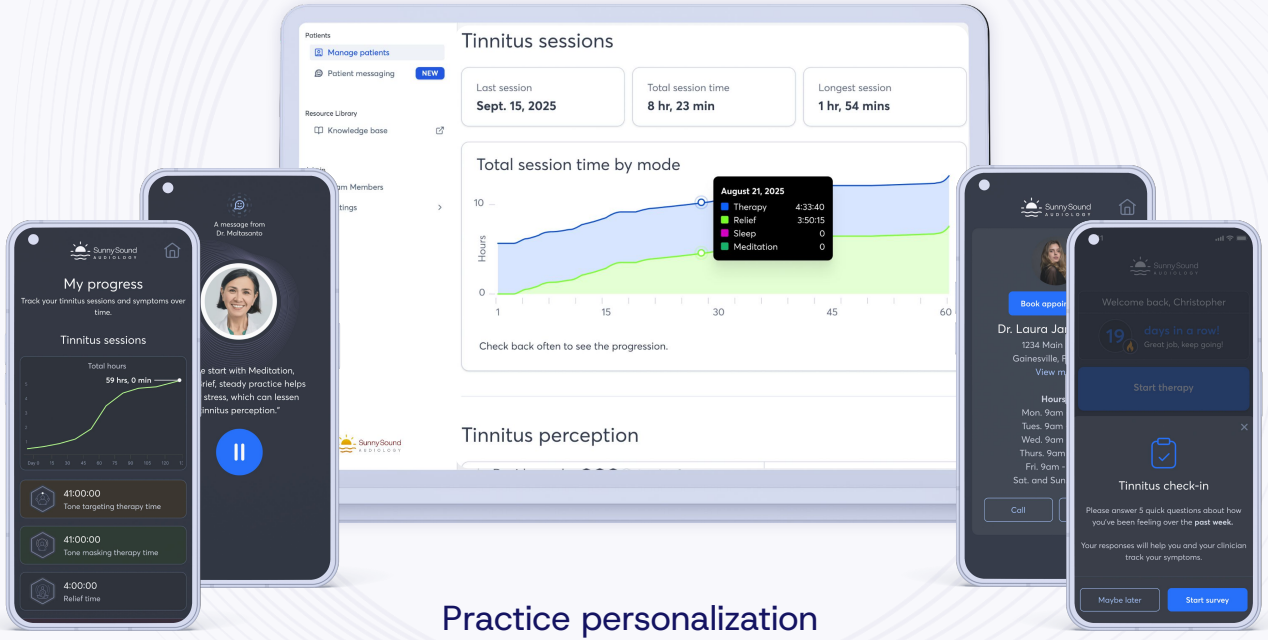


Identify, quantify, and evaluate the difficulties that patients may be experiencing, and how well they are functioning in their daily lives because of tinnitus

Pro-Portal: For professionals

Patient management

- Automated patient messaging
- New patient sign up



Patient monitoring

- Patient progress
- Patient achievements
- Survey results (THI, TFI, Check-ins)

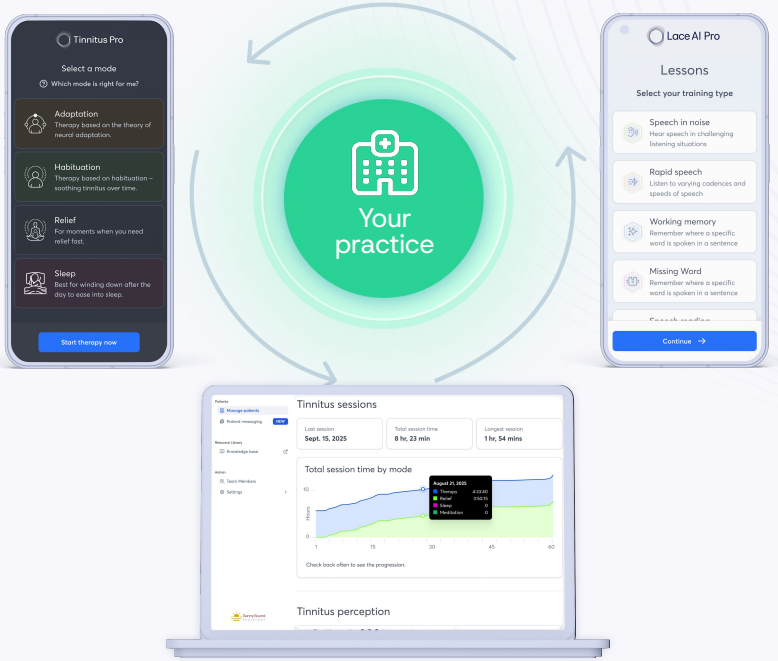
Practice personalization

Custom branding • Hours and location • Appointment scheduling

Lace AI Pro + Tinnitus Pro

Better together

Patient gets a unified experience



Providers can prescribe one app or both

Provider gets all patient data in Pro Portal

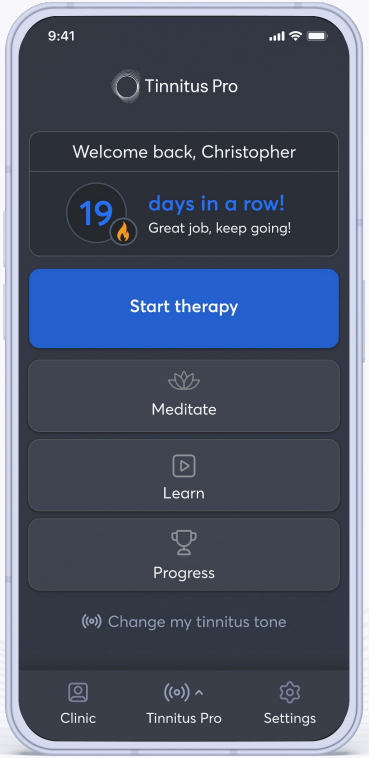
Lifetime licenses

Provide lifelong care for your patients

Tinnitus patients will unfortunately experience spikes over the course of months or years.

Why?

- Medications
- Lifestyle changes
- Deterioration, etc.



Our price
TO PATIENTS MSRP $499
Partners set the price

All plans come with unlimited licenses.

Patient Outcomes: First Look

Early outcomes for bothersome tinnitus with Tinnitus Pro

April 2026 | 5 months post-launch | 25 patient subgroup focus

40% ↑

Clinically meaningful gains
(>7pt THI reduction; Zeman 2011)

13 pts ↓

Median THI change among improved patients

19h

Avg sound therapy per patient

SAMPLE SIZE

100

Patients who used the app and completed at least 2 surveys — the basis for this analysis

About 50% of patients with an incoming THI of 22+ improve

Patient Spotlights

De-identified patients with clinically meaningful THI improvement

5 patients

PATIENT	THI CHANGE		PRIMARY MODE	FREQ
Patient A		66 (Severe) → 32 (Mild) −34 pts	Habituation Therapy · 0 CBT videos	9,694 Hz
Patient B		40 (Moderate) → 14 (Slight) −26 pts	Relief Mode · 23 CBT videos	4,677 Hz
Patient C		50 (Moderate) → 30 (Mild) −20 pts	Relief Mode · 15 CBT videos	4,877 Hz
Patient D		56 (Moderate) → 42 (Moderate) −14 pts	Habituation Therapy · 21 CBT videos	5,256 Hz

THI: Tinnitus Handicap Inventory · Lower score = less tinnitus impact


Audito
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Let’s recap

The common sense tinnitus solution for the 90% of people that want a serious, science-based treatment at an affordable price.

- Best-in-class tinnitus treatment
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Personalized Sound Therapy

Adaptation Habituation Sleep Relief

Cognitive Behavioral Intervention

CBI Meditation