Tinnitus Assessment and Management is Primary Care Audiology

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Progressive Tinnitus Management (PTM):
VA National Center for Rehabilitative Audiology Research (NCRAR)
James A. Henry and Colleagues

James Henry

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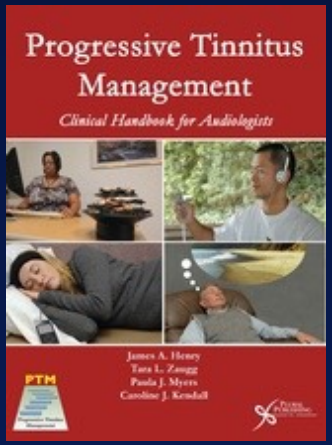

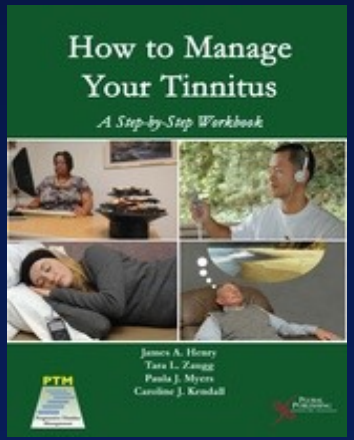

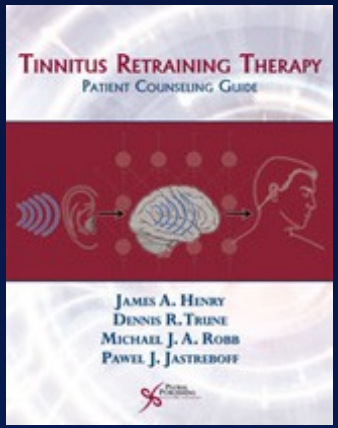

Progressive Tinnitus Management:
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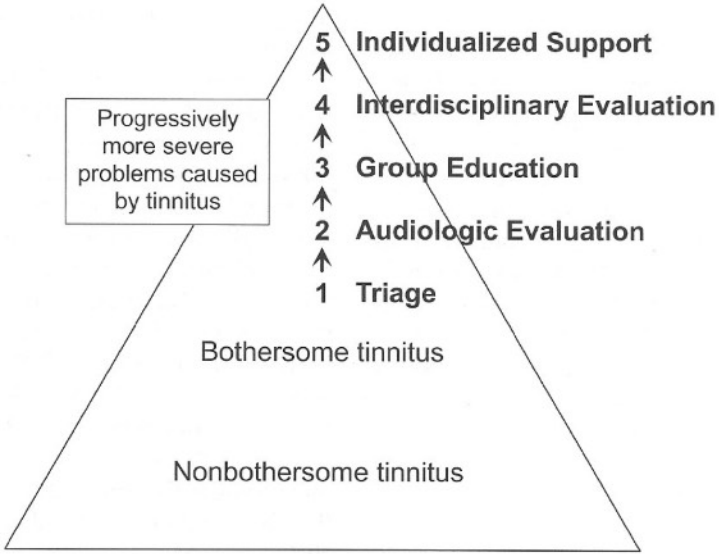


Figure 3–2. Five levels of progressive tinnitus management (PTM) superimposed on the Tinnitus Pyramid (see Figure 3–1). Each higher level reflects a greater intensity of clinical services, and patients progress only to the level needed.

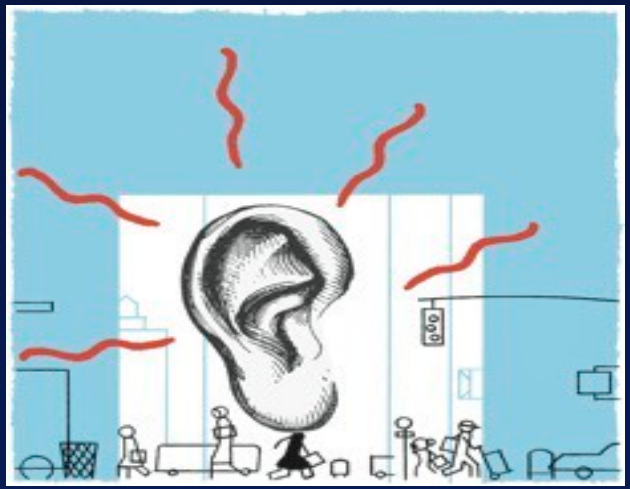
Tinnitus Assessment and Management is Primary Care Audiology

- Introduction to Tinnitus
- Tinnitus Assessment
- Tinnitus Management: Level 1. Counseling and General Recommendations
- Tinnitus Management: Level 2. Evidence-Based Effective Treatment Options
- The Bottom line … There is Hope for Every Person with Bothersome Tinnitus.

David M. Baguley, PhD

Tinnitus Assessment and Management is Primary Care Audiology
Definition of Tinnitus

- Tinnitus is a phantom auditory perception i.e., the perception of a sound in the absence of an external sound signal.
- Tinnitus is real! It's not imagined or "just in your head".
- Tinnitus is a *symptom* … not a disease.
- Bothersome tinnitus is a disorder that can be successfully managed



Preventing Bothersome Tinnitus
Tinnitus Sound Has No Diagnostic Importance

Description of types of tinnitus for >100 patients

ringing = 47
crickets = 21
high-pitch tone = 17
hissing = 13
humming =13
roaring = 6
static noise = 5
buzzing = 4
pulsing = 4

clicking = 2
frying sound = 2
mid-pitch tone = 1
screeching = 1
whizzing = 1
fizzing = 1
siren = 1
crackling = 1
running water = 1

Preventing Bothersome Tinnitus
Common Patient Complaints and Characteristics

- Very tired, slowed down, fatigue
- Patient does not enjoy things the way he/she used to
- Restless or irritable
- Difficulty concentrating
- Sleeping problems
- Persistent headaches, stomach aches, or chronic pain
- Nervousness
- Excessive crying
- Persistently sad mood … absence of pleasures or joys
- Depression
- Hopelessness, e.g., “life is not worth living”
- Reduced quality of life

Preventing Bothersome Tinnitus
Prevalence of Permanent Tinnitus in the World

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Tinnitus Epidemiology: Prevalence, Severity, Exposures And Treatment Patterns In The United States:

Bhatt JM: Tinnitus in the United States

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Preventing Bothersome Tinnitus
Prevalence of Tinnitus in the USA
(Bhatt et al, 2016)

- N = 75,764
- Estimated 21.4 million of 222.1 million American adults experienced tinnitus in past 12 months
- Prevalence of tinnitus is approximately 1/10 adults
- 27% with symptoms for > 15 years
- 36% with nearly constant symptoms
- *7.2% (1.54 million people) report tinnitus as "big" or "very big" problem*
- Less than 50% of people had discussed tinnitus with their physicians
  - Medication management discussed most often (45.5%)
  - Cognitive behavioral therapy (CBT) discussed for 0.2%

Prevalence of Permanent Tinnitus in the World
(Baguley D & Hall D. Lancet, 382, 2013)
Prevalence of ~ 10% Worldwide

Tinnitus

David Baguley, Don McFerran, Deborah Hall

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Tinnitus is a common medical symptom that can be debilitating. Risk factors include hearing loss, ototoxic medication, head injury, and depression. At presentation, the possibilities of otological disease, anxiety, and depression should be considered. No effective drug treatments are available, although much research is underway into mechanisms and possible treatments. Surgical intervention for any otological pathology associated with tinnitus might be effective for that condition, but the tinnitus can persist. Available treatments include hearing aids when hearing loss is identified (even mild or unilateral), wide-band sound therapy, and counselling. Cognitive behavioural therapy (CBT) is indicated for some patients, but availability of tinnitus-specific CBT in the UK is poor. The evidence base is strongest for a combination of sound therapy and CBT-based counselling, although clinical trials are constrained by the heterogeneity of patients with tinnitus.

Introduction

Although much progress has been made, tinnitus remains a scientific and clinical enigma. The condition is very common, and, although many patients are not unduly troubled, others find the disorder life-changing. In this Seminar we outline current knowledge of tinnitus, and critically assess established and emerging treatment approaches.

Derived from the Latin verb *tinnire* (to ring), the term tinnitus describes the conscious perception of an auditory sensation in the absence of a corresponding external

although some patients describe an external point of origin. The onset of tinnitus can be abrupt, but it is insidious in most cases. The perceived intensity can vary; for some people, exacerbation alongside stress arousal is clear. The heterogeneity of tinnitus experience is substantial and has hampered both basic science and treatment research.

Epidemiology

Prevalence studies of tinnitus have mostly been done in western Europe or the USA, and have methodological drawbacks, especially with production of an unambiguous

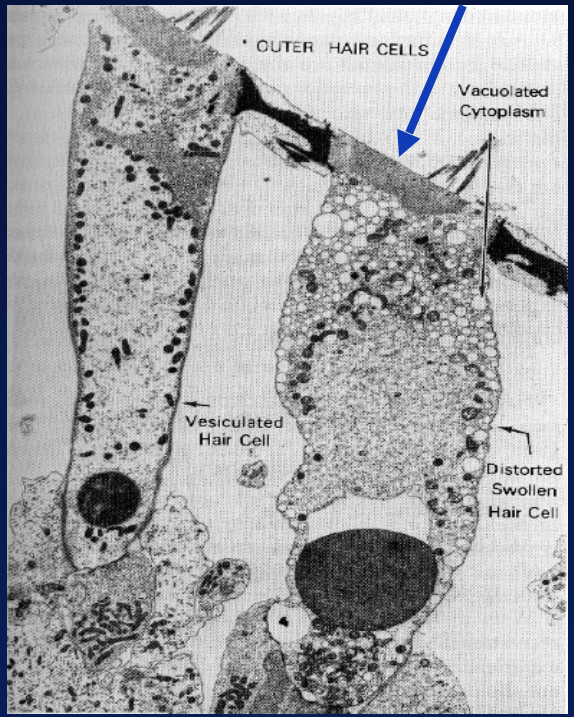
Preventing Bothersome Tinnitus
What Primary Care Physicians (Incorrectly) Tell Their Patients About Tinnitus

- ❑ There's nothing wrong with you
- ❑ You have normal hearing
- ❑ There's nothing we can do for you
- ❑ Avoid being around noises
- ❑ "You'll just have to live with it"

Lesson? Audiologists and otolaryngologists need to continue efforts to education physicians about tinnitus

Overview of Tinnitus Mechanisms

- Cochlear origin
- Representation (excessive excitatory neurotransmitters) in neural pathways
- Reorganization in central nervous system (brainstem and cortex)
- Involvement of limbic system and autonomic nervous system in patients with bothersome tinnitus



Tinnitus Assessment and Management is Primary Care Audiology

- Introduction to Tinnitus
- **Tinnitus Assessment**
- Tinnitus Management: Level 1. Counseling and General Recommendations
- Tinnitus Management: Level 2. Evidence-Based Effective Treatment Options
- The Bottom line … There is Hope for Every Person with Bothersome Tinnitus.

Assessment and Management of Tinnitus
American Academy of Audiology (AAA) Clinical Practice Guidelines (www.audiology.org)

Audiologic Guidelines for the Diagnosis & Management of Tinnitus Patients

Audiologic Guidelines for the Diagnosis & Management of Tinnitus Patients

Revised October 18, 2000

Tinnitus refers to an auditory perception not produced by an external sound. It is commonly described as a "hissing, roaring, or ringing" and can range from high pitch to low pitch, consist of multiple tones, or sound like noise (having no tonal quality at all). It most often is constant, but can also be perceived as pulsed, or intermittent, and may begin suddenly, or may come on gradually. It can be sensed in one ear, both ears, or in the head. It has been estimated that as many as 40-50 million U.S. residents have experienced more than momentary tinnitus with as many as 2.5 million reporting feeling debilitated by the symptom. As many as 10-12 million individuals have sought help for the condition. Tinnitus may cause or be associated with a wide range of problems including sleep difficulties, fatigue, stress, trouble relaxing, difficulty concentrating, depression, and irritability. As a result it can affect one's quality of life including social interactions and work.

Scope of Practice

Audiologists are qualified to evaluate, diagnose, develop management strategies, and provide treatment and rehabilitation for tinnitus patients. In evaluating and managing tinnitus, it is helpful and worthwhile for audiologists to work with a multidisciplinary team approach.

Suggested Evaluation Guidelines

Prior to recommending or beginning any treatment for tinnitus, it is essential that a differential diagnosis be attempted. It is important to consider the entire person, not merely the audiogram and/or the characteristics of the tinnitus. There are many factors that can cause and affect tinnitus and its perception that will influence the management plan and outcome of any treatment.

The basic tinnitus evaluation (beyond the audiologic examination) should consist of the following measures:

Comprehensive case history including, but not limited to, questions regarding time of onset, course of progression, description, location, perceived cause, extent to which the patient is bothered, exacerbating factors (such as food, stress, lack of sleep, etc.), history of noise exposure, medications, familial history of hearing loss or tinnitus, effect on sleep, and effect on personal/social/occupational relationships.

- Loudness discomfort levels;
- Tinnitus pitch matching;
- Tinnitus loudness matching;
- Minimal masking level;
- Subjective questionnaires; There are several valid and reliable surveys designed to measure the disability and handicap associated with tinnitus.
- Professionals that specialize in the assessment and treatment of tinnitus also may find additional audiologic procedures useful for diagnosis and counseling.

Tinnitus Patient Management Procedures

Similar to the evaluation process, the treatment of patients with tinnitus is most likely to succeed when a multidisciplinary approach is employed. While it is true that at this time there is no cure for most cases of tinnitus, it is not true that "there is nothing that can be done about it". A number of treatment approaches that can be performed by audiologists have been described with various degrees of reported success. They are listed below (in alphabetical order) along with a brief description:

- **Counseling**
  A trained professional counselor can be very helpful whenever the tinnitus becomes problematic. Counseling should be considered both as a primary approach, when appropriate, and as an adjunctive approach, to all treatment strategies. Counseling consists of gathering data through careful listening, making adjustments in one's strategies based on that knowledge, and conveying information. Thus, it serves both a diagnostic and therapeutic function.
- **Cognitive Behavioral Therapy**
  One type of counseling that may be successful in helping people cope with tinnitus is cognitive behavioral modification therapy. This approach can help persons identify the way they react to their tinnitus and learn new responses, thereby minimizing the negative thoughts and behavior patterns that are associated with tinnitus.
- **Habituation & Tinnitus Retraining Therapy**
  Tinnitus Retraining Therapy is a method developed to facilitate habituation to tinnitus. It combines sound enrichment therapy with directive counseling. Sound is employed to reduce the contrast between silence or ambient noise and the perception of the tinnitus. It may be in the form of environmental sounds, amplification, or broadband sound generating devices. A reduction of the perception of the tinnitus (but not complete obliteration of it) is considered essential to the process of habituation. Counseling and education serve to demystify tinnitus, providing the patient with an intellectual and emotional framework in which habituation can occur.
- **Hearing Aids & Tinnitus Instruments**
  For individuals with hearing loss, environmental sounds may be inadequate in themselves to afford relief.

Assessment and Management of Bothersome Tinnitus

American Academy of Otolaryngology-Head & Neck Surgery Clinical Practice Guidelines

Guideline

AMERICAN ACADEMY OF OTOLARYNGOLOGY HEAD AND NECK SURGERY FOUNDATION

Otolaryngology–Head and Neck Surgery
2014, Vol. 151(2S) S1–S40
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SAGE

Clinical Practice Guideline: Tinnitus

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Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

Abstract

Objective. Tinnitus is the perception of sound without an external source. More than 50 million people in the United States have reported experiencing tinnitus, resulting in an estimated prevalence of 10% to 15% in adults. Despite the high prevalence of tinnitus and its potential significant effect on quality of life, there are no evidence-based, multidisciplinary clinical practice guidelines to assist clinicians with management. The focus of this guideline is on tinnitus that is both bothersome and persistent (lasting 6 months or longer), which often negatively affects the patient's quality of life. The target audience for the guideline is any clinician, including nonphysicians, involved in managing patients with tinnitus. The target patient population is limited to adults (18 years and older) with primary tinnitus that is persistent and bothersome.

Action Statements. The development group made a *strong recommendation* that clinicians distinguish patients with bothersome tinnitus from patients with nonbothersome tinnitus. The development group made a *strong recommendation against* obtaining imaging studies of the head and neck in patients with tinnitus, specifically to evaluate tinnitus that does not localize to 1 ear, is nonpulsatile, and is not associated with focal neurologic abnormalities or an asymmetric hearing loss. The panel made the following *recommendations*: Clinicians should (a) perform a targeted history and physical examination at the initial evaluation of a patient with presumed primary tinnitus to identify conditions that if promptly identified and managed may relieve tinnitus; (b) obtain a prompt, comprehensive audiologic examination in patients with tinnitus that is unilateral, persistent (≥ 6 months), or associated with hearing difficulties; (c) distinguish patients with bothersome tinnitus of recent onset from those with persistent symptoms (≥ 6 months) to prioritize intervention and facilitate discussions about natural history and follow-up care; (d) educate patients with persistent, bothersome tinnitus about manage-

Table 5. Summary of Guideline Action Statements.

Statement	Action	Strength
1. History and physical exam	Clinicians should perform a targeted history and physical examination at the initial evaluation of a patient with presumed primary tinnitus to identify conditions that if promptly identified and managed may relieve tinnitus.	Recommendation
2A. Prompt audiologic examination	Clinicians should obtain a prompt, comprehensive audiologic examination in patients with tinnitus that is unilateral, persistent (≥ 6 months), or associated with hearing difficulties.	Recommendation
2B. Routine audiologic examination	Clinicians may obtain an initial comprehensive audiologic examination in patients who present with tinnitus (regardless of laterality, duration, or perceived hearing status).	Option
3. Imaging studies	Clinicians should not obtain imaging studies of the head and neck in patients with tinnitus, specifically to evaluate the tinnitus, unless they have 1 or more of the following: tinnitus that localizes to 1 ear, pulsatile tinnitus, focal neurological abnormalities, or asymmetric hearing loss.	Strong recommendation against
4. Bothersome tinnitus	Clinicians must distinguish patients with bothersome tinnitus from patients with nonbothersome tinnitus.	Strong recommendation
5. Persistent tinnitus	Clinicians should distinguish patients with bothersome tinnitus of recent onset from those with persistent symptoms (≥ 6 months) to prioritize intervention and facilitate discussions about natural history and follow-up care.	Recommendation
6. Education and counseling	Clinicians should educate patients with persistent, bothersome tinnitus about management strategies.	Recommendation
7. Hearing aid evaluation	Clinicians should recommend a hearing aid evaluation for patients with hearing loss and persistent, bothersome tinnitus.	Recommendation
8. Sound therapy	Clinicians may recommend sound therapy to patients with persistent, bothersome tinnitus.	Option
9. Cognitive behavioral therapy	Clinicians should recommend cognitive behavioral therapy to patients with persistent, bothersome tinnitus.	Recommendation
10. Medical therapy	Clinicians should not routinely[a] recommend antidepressants, anticonvulsants, anxiolytics, or intratympanic medications for a primary indication of treating persistent, bothersome tinnitus.	Recommendation against
11. Dietary supplements	Clinicians should not recommend Ginkgo biloba, melatonin, zinc, or other dietary supplements for treating patients with persistent, bothersome tinnitus.	Recommendation against
12. Acupuncture	No recommendation can be made regarding the effect of acupuncture in patients with persistent bothersome tinnitus.	No recommendation
13. Transcranial magnetic stimulation	Clinicians should not recommend transcranial magnetic stimulation for the routine[a] treatment of patients with persistent, bothersome tinnitus.	Recommendation against

Assessment and Management of Bothersome Tinnitus
Tinnitus History Form or Questionnaire (1)

- **Patient** completes before tinnitus consultation
- Total of 27 questions with space for patient comments
- Questions facilitate probing of important information, e.g.,
  - Onset of tinnitus
  - Nature of tinnitus
    - ✓ Type of sound
    - ✓ Laterality
    - ✓ Volume (loudness)
    - ✓ Constancy
  - Prior health care consultation and treatment
  - Other medical diseases and disorders (including otologic)
  - Percentage of waking hours aware of tinnitus

Assessment and Management of Bothersome Tinnitus
Tinnitus History Form or Questionnaire (2)

- Tinnitus interference or prevention of daily activities, e.g.,
  - Concentration
  - Falling and staying asleep
  - Social events
  - Quiet activities like reading
- Depression
- Medications
- Pending legal action?
- Rank concern about
  - Tinnitus
  - Decreased tolerance to loud sounds
  - Hearing loss

Assessment and Management of Bothersome Tinnitus

A *Validated Inventory is Essential to Quantify Impact of Tinnitus on Quality of Life*

Table 9. Comparison of Self-report Tinnitus Questionnaires.[a]

Questionnaire (Author, Year)	Content	Interpretation
Tinnitus Questionnaire and Tinnitus Effects Questionnaire (Hallam et al, 1988)[105]	52 items • sleep disturbance • emotional distress • auditory perceptual difficulties • inappropriate or lack of coping skills	3 level category scale • true • partly true • not true
Tinnitus Handicap Questionnaire (Kuk et al, 1990)[101]	27 items • physical, emotional, social consequence (factor 1) • effects on hearing (factor 2)	0 (strongly disagrees) to 100 (strongly agrees)
Tinnitus Reaction Questionnaire (Wilson et al, 1991)[100]	26 items: distress consequences including: • anger • confusion • annoyance • helplessness • activity avoidance • panic	5-point scale (0 = not at all; 4 = almost all of the time)
Tinnitus Handicap Inventory (Newman et al, 1996)[99]	25 items • role limitations in mental, social/occupational, physical functioning • anger, frustration • irritability • depression • catastrophic subscale: desperation, loss of control, inability to cope and escape, fear of grave disease	3 level category scale • yes • sometimes • no
Tinnitus Functional Index (Meikle et al, 2012)[102]	30 items with 8 subscales (subscales not validated) • intrusive • feeling • thinking • hearing • relaxing • sleeping • managing • quality of life	11-point scale (0 to 10)

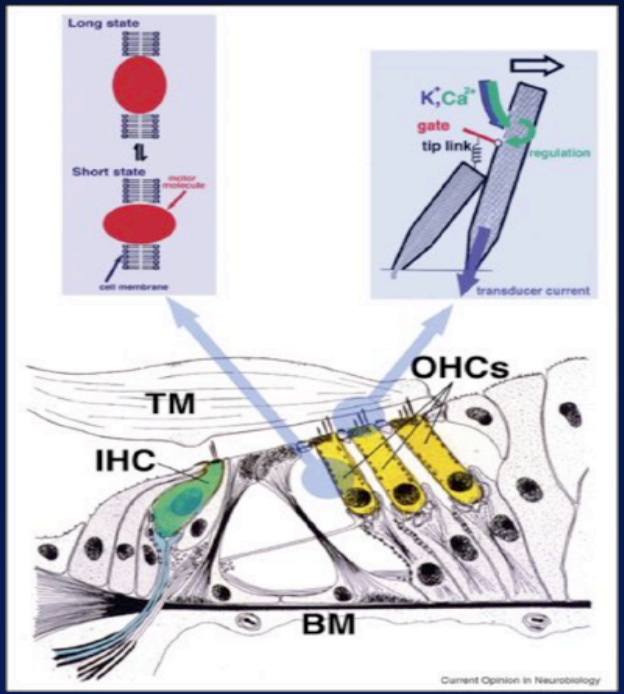
From AAOHNS Guidelines)

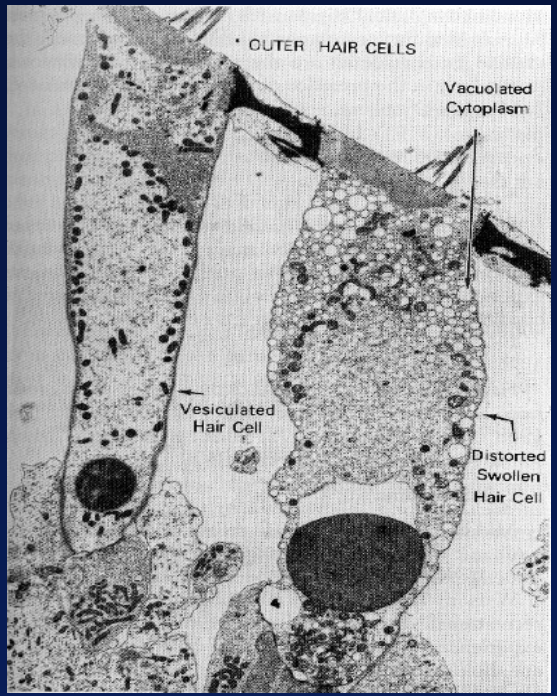
Tinnitus Handicap Inventory (THI)

Assessment and Management of Bothersome Tinnitus
Diagnostic Hearing Assessment (≤ 30 minutes)

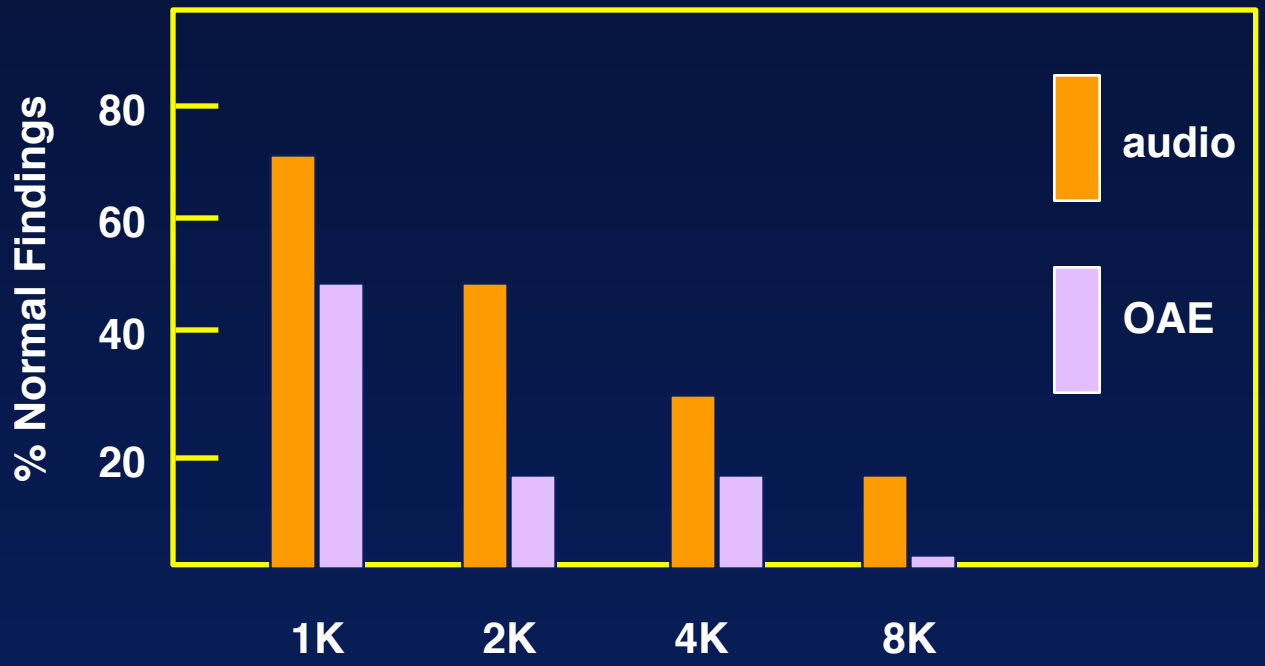
- Otoscopy
- Immittance measurement
  - Tympanometry
  - No acoustic reflexes … decreased sound tolerance
- Distortion product otoacoustic emissions (DPOAEs)
  - ≥ 5 frequencies/octave
  - 500 to ≥ 8000 Hz
  - Analyze amplitudes relative normal normal region
- Pure tone audiometry
  - > 8000 Hz as indicated
- Speech audiometry

DPOAEs are Invaluable in the Assessment and Management of Tinnitus and Hyperacusis





Tinnitus Assessment of Cochlear Function: *DPOAEs versus Audiogram*



Indispensable Source of Information About DPOAEs in Bothersome Tinnitus!

Otoacoustic Emissions: Principles, Procedures, and Protocols, Second Edition is a readable yet comprehensive source of information on otoacoustic emissions (OAEs). OAEs now play an important role in hearing screening and the clinical assessment of children and adults. The text begins with a succinct overview of OAEs and a historical description of their discovery and emergence as a clinical tool.

Otoacoustic Emissions distills in 10 chapters the latest information on OAEs from basic research to clinical applications. The book is concise, but comprehensive, and covers the essentials of the subject from innovative and up-to-date perspectives. The second edition features updates across all chapters, including current research findings and changing perspectives on OAE taxonomy. Important information is highlighted with new and updated illustrations throughout the book.

The material covered in the book is appropriate for intermediate and advanced students, and ideal for practicing audiologists. With a focus on practical information needed by the clinical audiologist and an eye to technological developments, authors Dhar and Hall provide an up-to-date, straightforward, and clinically focused source of information on OAEs.

Sumitrajit Dhar, PhD, is Professor of Audiology and Hearing Science and Chair of the Roxelyn and Richard Pepper Department of Communication Sciences and Disorders at Northwestern University in Evanston, Illinois. Sumit studied at the University of Mumbai, Utah State University, and Purdue University. At Northwestern University, Sumit teaches courses in the science and practice of audiology. His laboratory works on the origin and propagation of otoacoustic emissions, their clinical applications, and their modulation by the efferent neural network. More recently, his laboratory has also started working on hearing health care design and delivery. Work in Sumit's laboratory has been funded continuously by the National Institutes of Health since 2003. He has also received funding from various foundations and private agencies such as the Knowles Hearing Center, Starkey, American Hearing Research Foundation, American Speech-Language-Hearing Foundation, and Deafness Research Foundation.

James W. Hall III, PhD, is an internationally recognized audiologist with 40 years of clinical, teaching, research, and administrative experience. He received a bachelor's degree in biology from American International College, a master's degree in speech pathology from Northwestern University, and his PhD in audiology from Baylor College of Medicine under the direction of James Jerger. During his career, Dr. Hall has held clinical and academic audiology positions at major medical centers. He is the recipient of numerous professional awards, including the American Academy of Audiology Career Development Award and the AAA Presidential Award. Dr. Hall now holds academic appointments as professor (part-time) at Salus University and the University of Hawaii, numerous adjunct and visiting professor positions, and also Extraordinary Professor at the University of Pretoria in South Africa. He's also president of James W. Hall III Audiology Consulting LLC.

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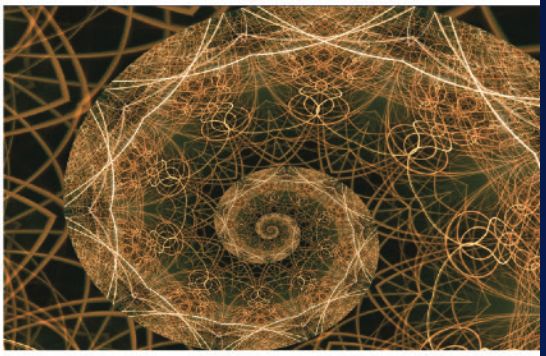
OTOACOUSTIC EMISSIONS

PRINCIPLES, PROCEDURES, AND PROTOCOLS

Second Edition



OTOACOUSTIC EMISSIONS
PRINCIPLES, PROCEDURES, AND PROTOCOLS

Second Edition

SUMITRAJIT DHAR
JAMES W. HALL III

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A Volume in the Core Clinical Concepts in Audiology Series

Assessment and Management of Bothersome Tinnitus
Tinnitus Psychoacoustic Assessment (≤ 30 minutes)

- Threshold for white noise (broad band noise)
  - To determine minimal detection level of background sound
  - Useful in counseling patient regarding sound enrichment
  - Threshold agrees with best pure tone hearing at any frequency (not necessary an audiometric frequency)
- Estimate tinnitus pitch
  - Only approximation with audiometer frequencies
  - More precise estimation with DPOAE frequencies
  - May require high frequency audiometer and earphones
  - Creative combination of pure tone + narrow band noise may simulate “cricket” type tinnitus

Assessment and Management of Bothersome Tinnitus
Tinnitus Psychoacoustic Assessment (≤ 30 minutes)

- Estimate tinnitus "loudness"
  - Begin at threshold for tinnitus pitch and ascend in 1 or 2 dB steps
  - Almost always at < +10 dB SL (RE: threshold of hearing)
  - Sometimes as low as 0 or 1 dB SL
- Determine minimum masking level for tinnitus
  - Level at which BBN "covers up" patient's tinnitus
  - Often less than 30 dB
  - Assess "residual inhibition" following masking
  - Finding useful in counseling patient about sound enrichment
- Measure loudness discomfort levels (LDLs)
  - Only if patient haa hyperacusis
  - For tones and speech sounds

A Form for Recording Results of the Tinnitus Assessment

TINNITUS EVALUATION FORM

Clinic Name Here

Patient Name: _____ Age: _____ Gender: _____

Date: _____ Audiologist: _____

Tinnitus Today? Right Left Head Hyperacusis? Yes No

	Right Ear	Left Ear
Threshold for White Noise	_____ dB HL	_____ dB HL
Pitch Match (in tinnitus ear)	_____ Hz/NBN	_____ Hz/NBN
Loudness Match (2 dB steps in tinnitus ear)	_____ dB HL	_____ dB HL

Minimum Masking Level (white noise) (NBN = Narrow Band Noise)

	Tinnitus Ear		
Presentation Ear	**Right Ear**	**Left Ear**	**Both Ears**
Right	_____ dB HL	_____ dB HL	_____ dB HL
Left	_____ dB HL	_____ dB HL	_____ dB HL
Both	_____ dB HL	_____ dB HL	_____ dB HL

Loudness Discomfort Level *(hyperacusis only)*	**Right Ear**	**Left Ear**
1000 Hz	_____ dB HL	_____ dB HL
2000 Hz	_____ dB HL	_____ dB HL
3000 Hz	_____ dB HL	_____ dB HL
4000 Hz	_____ dB HL	_____ dB HL
8000 Hz	_____ dB HL	_____ dB HL
Speech	_____ dB HL	_____ dB HL

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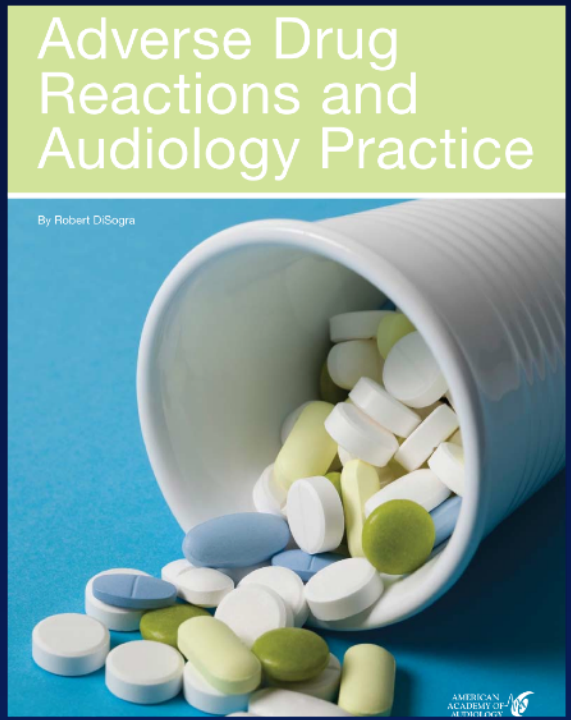
- Introduction to Tinnitus
- Tinnitus Assessment
- **Tinnitus Management: Level 1. Counseling and General Recommendations**
- Tinnitus Management: Level 2. Evidence-Based Effective Treatment Options
- The Bottom line … There is Hope for Every Person with Bothersome Tinnitus.

Tinnitus is A Symptom of Various Diseases And Pathologies: *Refer Out to Eliminate Doubt!*

- Otologic disorders such as:
  - Noise-induced cochlear dysfunction
  - Presbycusis
  - Temporal mandibular joint (TMJ) disorders
  - Meniere's disease
  - Otosclerosis
  - Vestibular schwannoma, e.g., eighth nerve tumor
- Other disorders such as:
  - Head injury Lightning injury
  - Inflammatory disorders, e.g., arthritis
  - Metabolic disorders, e.g., hyperlipidemia
  - Neurologic disorders, e.g., multiple sclerosis

Hundreds of Drugs or Over-The-Counter Substances May Enhance or Produce Tinnitus for Some Patients

None "Cure" Tinnitus and Some are Harmful



- Hundreds of over the Counter (OTC) substances
- No evidence of benefit greater than a placebo effect
- Comprehensive review available through Oak Tree Products (Robert DiSogra)
- http://www.audiologyfreehold.com/ingredients-in-otc-tinnitus-relief-products

Tinnitus Assessment and Management
General Management Approaches Successful in Management of > 80% of Patients

- In depth "directive" counseling by audiologist experienced with tinnitus *… demystify patient's tinnitus*
- Written accurate information for patient and significant others
- Melatonin (in the evening before going to bed)
- Sound enrichment
  - Environmental sound device
  - www.soundtherapy.com
  - Sound pillow
- Amplification if patient has any hearing loss
  - Natural sound therapy
  - Open fit hearing aids are especially useful)
  - Combination hearing aid/sound generators are optimal

Tinnitus Patient/Family Counseling and Education
Counseling IS Intervention for Tinnitus

"Knowledge is power."

(Nam et ipsa scientia potestas est.)

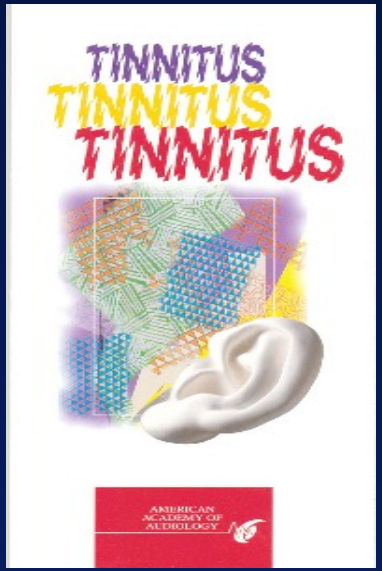
Francis Bacon

(1561-1626)

Meditationes Sacrae [1597]

Tinnitus Patient/Family Counseling and Education

American Academy of Audiology
www.audiology.org



American Academy Otolaryngology-HNS
www.entnet.org


AMERICAN ACADEMY OF OTOLARYNGOLOGY–HEAD AND NECK SURGERY FOUNDATION

CLINICAL PRACTICE GUIDELINES

PLAIN LANGUAGE SUMMARY:
Tinnitus

BACKGROUND
This plain language summary serves as an overview in explaining tinnitus and managing its symptoms. Tinnitus is a sensation of noise or ringing in the ears or head, when there is no real sound. Tinnitus (pronounced ten / ih / tus) affects 10-15% of adults in the United States. Some people experience tinnitus that goes away on its own. Other people have symptoms that last 6 months or longer and interfere with their life. The information in this summary is based on the 2014 Clinical Practice Guideline: Tinnitus. The guideline includes evidence-based research to support more effective diagnosis and treatment of tinnitus.

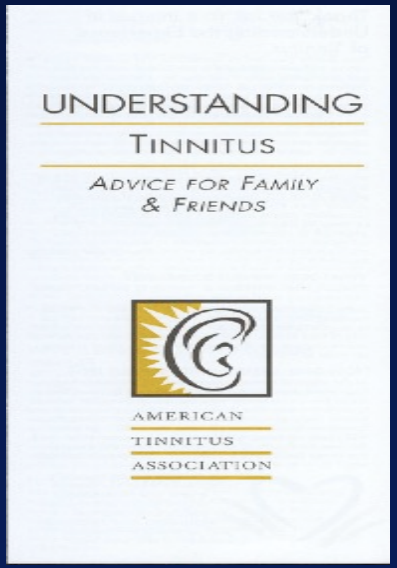
WHAT IS TINNITUS?
Tinnitus can be heard in one or both sides of the head. The noises can sound like they are either from within or outside the head. Tinnitus sounds can include ringing, roaring, buzzing, clicking, beating, whooshing, whistling, humming, or other noises. The person may 'hear' their tinnitus all the time, or only in certain situations. Tinnitus can hurt a person's quality of life. Patients may experience symptoms at different levels of severity. Common patient complaints include difficulty sleeping, struggling to understand other's speech, depression, and problems focusing. These experiences could lead to problems with both work and family life.

WHAT CAUSES TINNITUS? ARE THERE RISK FACTORS?
There are two types of tinnitus: Primary and Secondary. Primary tinnitus has an unknown cause. It may or may not be linked with hearing loss. Secondary tinnitus has a specific known cause. It may be such things like impacted earwax, or diseases or pressure behind the eardrum. Secondary tinnitus can also be related to Meniere's disease or ear nerve conditions. Tinnitus can be caused by more unusual or serious conditions. Some of these rare conditions include tumors, heart problems, or blood vessel problems.

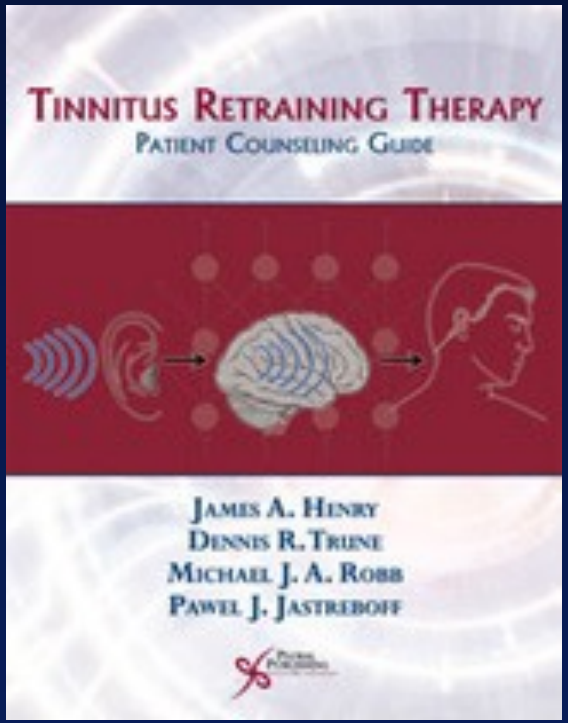
Tinnitus can be seen at any age, in males or females, and in all ethnic groups. Tinnitus occurs more frequently in males, the elderly and non-Hispanic whites. There is a higher rate of tinnitus among military veterans. Tinnitus is also more likely to occur in people who are overweight, obese, or who have high blood pressure. Other risk factors include diabetes, high cholesterol, or anxiety disorder. Tinnitus is believed to be linked to long-term noise exposure. Exposure to noise, such as firearms or loud music, is also a risk factor.

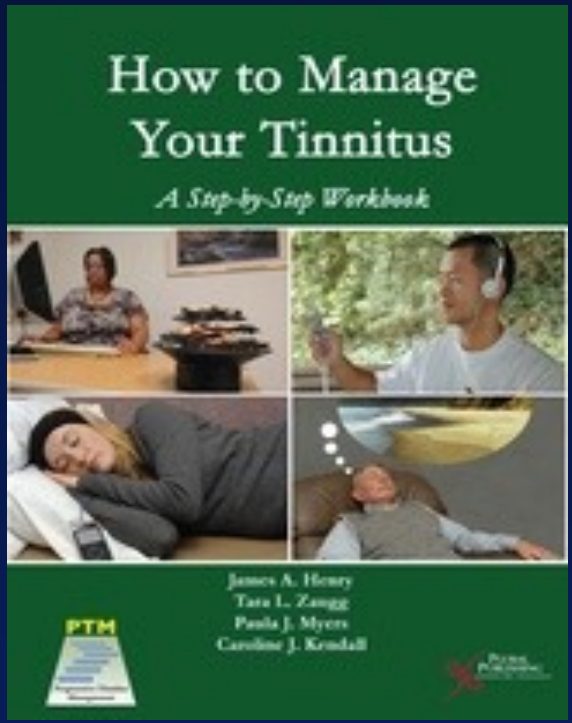
WHAT CAN YOU DO?
You should seek medical care after you notice symptoms which may help avoid misdiagnosis or delayed diagnosis. Tinnitus can be very upsetting, and it can even be associated with depression and anxiety. Tell your doctor if you are having a strong emotional response to your tinnitus. Tinnitus patients commonly have trouble sleeping (insomnia). Lack of sleep can reduce the ability to pay attention. It can also lead to anger, frustration, and other negative emotions. Some patients develop a fear of being in noisy places. It is important to tell your doctor if symptoms are affecting your daily life.

American Tinnitus Association
www.ata.org



Progressive Tinnitus Management (PTM) Books:
A Practical and Comprehensive Source of Information Counseling Patients and Family Members About Bothersome Tinnitus





Progressive Tinnitus Management (PTM): *Evidence in Support of Remote Tele-PTM via Telephone (Ear & Hearing, 2018)*

Telephone-Based Progressive Tinnitus Management for Persons With and Without Traumatic Brain Injury: A Randomized Controlled Trial

James A. Henry,[1,2] Emily J. Thielman,[1] Tara L. Zaugg,[1] Christine Kaelin,[1] Garnett P. McMillan,[1] Caroline J. Schmidt,[3,4] Paula J. Myers,[5] and Kathleen F. Carlson[1,6,7]

Objectives: This randomized controlled trial evaluated the efficacy of delivering coping skills education from Progressive Tinnitus Management (PTM) by telephone (Tele-PTM). The trial followed a previous pilot study that showed positive results for Tele-PTM.

Design: Participants included individuals with bothersome tinnitus (N = 205) located anywhere within the United States. A special emphasis was given to including individuals who had experienced one or more traumatic brain injuries (TBIs). Participants were randomized to either Tele-PTM intervention or 6-month wait-list control (WLC). The Tele-PTM intervention involved five telephone appointments—two led by an audiologist (teaching how to use therapeutic sound) and three by a psychologist (teaching coping skills derived from cognitive-behavioral therapy). It was hypothesized that Tele-PTM would be more effective than WLC in reducing functional effects of tinnitus as measured with the Tinnitus Functional Index. Additional outcome measures included the Self-Efficacy for Managing Reactions to Tinnitus questionnaire and the Hospital Anxiety and Depression Scale. The effect of Tele-PTM on outcomes was estimated using linear mixed models.

Results: Overall results showed convincingly that the Tele-PTM group had significantly better outcomes than the WLC group. These results were consistent across all outcome measures, indicating not only a reduction of tinnitus functional distress but also increased self-efficacy. Improvements in measures of anxiety and depression were also observed. Tele-PTM participants in all TBI categories showed significant improvement.

INTRODUCTION

Traumatic brain injury (TBI) is a priority research and clinical area for the US Department of Defense and Department of Veterans Affairs (VA) (Dillahunt-Aspillaga & Powell-Cope 2018). Approximately 80 to 85% of Veterans' and Service Members' TBI events can be classified as "mild" in severity (mTBI; Hoge et al. 2008). Despite this classification, however, mTBI can be associated with serious chronic physical, cognitive, and emotional symptoms in some individuals (Nordströmet al. 2013; Combs et al. 2015). For Veterans and Military Service Members, the potential for chronic sequelae may be increased by factors such as multiple TBI events, destructive forces associated with combat-related blasts, and concomitant combat-related mental health problems such as post-traumatic stress disorder (PTSD; Combs et al. 2015). One potential chronic effect of mTBI is damage to the auditory system. Studies have shown head injuries, including mTBI, to be associated with tinnitus and hearing loss (Gondusky & Reiter 2005; Oleksiak et al. 2012). These can occur as direct effects of the events causing mTBI, as in the case of blasts; as symptoms of neural injury associated with mTBI; and as side effects of medications used to treat cognitive, emotional, and pain problems associated with mTBI (Myers et al. 2009).

Lew et al. (2012) found that 76% of a Veteran sample with

Counseling Patients and Family Members
The Placebo Effect is Your Friend

- Tinnitus Research
  - Placebo effect is a very clear factor in outcome
  - Accounts for up to 40% of apparent benefit from "treatment"
  - Control (non-treatment) group is essential in tinnitus research
- Clinical Service
  - Placebo effect can contribute significantly to improved patient outcome
  - Placebo effect is enhanced by:
    - ✓Perceived and actual expertise of the audiologist
    - ✓Good bedside manner
    - ✓Confident and compassionate interactions with

An Ounce of Prevention is Worth a Pound of Cure

by James W. Hall III, Ph.D.

Tinnitus is a symptom, not a disease. It's important to always remember this simple fact. When someone begins noticing an unusual sound in his or her ears, whether it's a ringing, buzzing, roaring, cricket sound, or any other sound or combination of sounds, the first logical step is to discover the underlying disorder related to the tinnitus. The exact type of tinnitus sound that a person hears is not important diagnostically. Almost all tinnitus is associated with a disorder in the auditory system – that is, somewhere within the ear or the nerves that carry signals from the inner ear to the hearing parts of the brain. By analyzing information from the patient (what health professionals call "taking a history") in combination with the results of diagnostic tests, a physician and an audiologist can usually rule out the diseases that include tinnitus as a symptom.

The majority of people with tinnitus do not have an active disease or pathology but, rather, damage or dysfunction within the inner ear that is related to exposure to high levels of sound and/or to the aging process. Nonetheless, until disease or pathology is ruled out with a thorough diagnostic assessment, it is irresponsible to simply offer to a person with tinnitus reassurance that "it's nothing to be concerned about...most people hear sounds like that."

Persistent or almost constant tinnitus is very different from the temporary ringing-type tinnitus – called spontaneous transient tinnitus – that most people notice from time to time. Spontaneous transient tinnitus typically occurs abruptly, often when a person is in a quiet setting. The ringing sound lasts only seconds, then fades away. Hearing might be muffled during this brief time period. The precise scientific explanation for spontaneous transient tinnitus is not known, but there is general agreement that it is a normal auditory experience and not a reason for concern about health or hearing.

Knowledge is Power.
—Francis Bacon

There is evidence, dating back more than 50 years, that tinnitus can be viewed as a normal auditory experience. In 1953, an otologist (a medical doctor specializing in the ear) and an audiologist conducted a very clever study (Heller and Bergman, 1953). Eighty people were enrolled as subjects in the study. Morris Heller, M.D., verified by medical history and a physical examination that the subjects had no ear disease, while Moe Bergman, Ph.D., performed an audiogram (a simple test of hearing tones) to confirm that the subjects had normal hearing sensitivity. One by one, the subjects were placed in a specialized sound-treated room. Upon emerging from the room, these normal-hearing subjects were asked if they heard anything. The vast majority (75 out of the 80, or 94%) reported that they heard some type of sound in the room. The three sounds described most often by the subjects were "humming," "buzzing," and "ringing," although a diverse collection of 23 other sounds were also noted (e.g., whistling, squeaking, and a thumping pulsation). Because of this study, we've learned that almost everyone will hear sounds...that is, tinnitus...in a very quiet setting.

It's reasonable to assume that most people who are reading an article in *Tinnitus Today* already hear their tinnitus. Therefore, you might think it's too late to prevent a problem that already exists. But there is a type of prevention that is important to focus on – the prevention of deteriorating quality of life sometimes brought about by persistent tinnitus.

Hearing Protection – The First Line of Defense

The old adage coined by Ben Franklin, "An ounce of prevention is worth a pound of cure," certainly applies in any discussion of the best treatment strategy for tinnitus. The most common single cause of hearing loss and tinnitus in adults is exposure to excessive sound levels. As a rule, sound levels that you have to shout over to be heard can cause inner ear damage. The source or type of sound – for example, rock or classic music, gunfire, machinery noise, factory noise, or fireworks – does not determine the risk for hearing loss. The two most important factors that determine the risk for hearing loss are the intensity (or loudness) of the sound and the length of time that a person is exposed to the sound. There is also a genetic factor in the susceptibility to noise-induced hearing loss. That is, some people are more likely to sustain damage to the tiny and delicate hair cells in the inner ear than others. Two people may be exposed to the same levels of noise for the same duration of time, for example, two factory workers or two musicians in an orchestra or a rock band. Despite the similarity in sound exposure, one person will develop a significant and permanent hearing loss, while the other person's hearing will remain normal.

Other risk factors are associated with the onset of tinnitus, among them middle ear problems (pressure imbalances behind the eardrum due to Eustachian tube dysfunction), sinus disease, temporomandibular joint (TMJ) disorders, high levels of personal stress, and some drugs used to treat health problems unrelated to tinnitus. In my clinical experience, a person will often first notice tinnitus when *two or more* of these risk factors occur during the same period of time. Prompt medical or, as appropriate, non-medical attention to each of these disorders can help prevent persistent tinnitus.

Professional Care – the Second Line of Defense

You may already have bothersome tinnitus. But you can prevent further deterioration in the quality of your life. In fact, you can almost always return to the quality of life you enjoyed in the past – before it was negatively affected by tinnitus. Knowledge is an essential ingredient in the process of restoring quality of life and of recovering from the debilitating effects of tinnitus. For a person with tinnitus, knowledge is truly power. What does a person with tinnitus need to know?

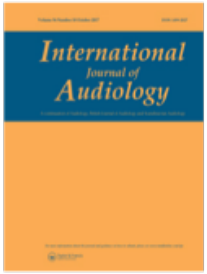
Sometimes, the silence can be like thunder.
— Bob Dylan

(continued on page 16)

Life Style Choices:
Diet and Tinnitus Management

Healthy Living = Healthy Hearing

Life Style Choices
A Healthy Diet is
Evidence Based Tinnitus Management



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Relationship between dietary quality, tinnitus and hearing level: data from the national health and nutrition examination survey, 1999–2002

Christopher Spankovich, Charles Bishop, Mary Frances Johnson, Alex Elkins, Dan Su, Edward Lobarinas & Colleen G. Le Prell

Life Style Choices:
A Healthy Diet is
Evidence Based Tinnitus Management

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Original Article

Relationship Between Diet and Tinnitus: Korea National Health and Nutrition Examination Survey

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Life Style Choices:
Quitting Smoking (or Never Smoking) is Evidence Based Tinnitus Management

Open Access Research

BMJ Open

Is smoking a risk factor for tinnitus? A systematic review, meta-analysis and estimation of the population attributable risk in Germany

Annette Veile,[1] Heiko Zimmermann,[1] Eva Lorenz,[1,2] Heiko Becher[1,3]

Tinnitus Assessment and Management
Improving Quantity and Quality of Sleep

Table 3

Sleep Hygiene

- Try to maintain a regular bedtime and waking time, even on weekends.
- Avoid napping.
- Use the bedroom only for sleep or sexual activity.
- Keep the bedroom environment cool, quiet, and dark. Avoid bright-light exposure during the night.
- Develop a relaxing bedtime routine. Avoid strenuous exercise or stressful activities before bedtime.
- Do not drink caffeine-containing beverages after noon; eliminate them if possible.
- Avoid heavy meals just before bedtime, a light bedtime snack may be helpful.
- Reduce fluid intake for several hours before bedtime to decrease the need to urinate during the night.
- Regular exercise, particularly during the late afternoon or early evening, may help to promote sleep. A hot bath or sauna at least several hours before bedtime may also be helpful.
- Avoid alcohol or nicotine use prior to bedtime.
- Turn the clock face away and do not check the time if you wake up at night.

Tinnitus Assessment and Management
Melatonin to Reduce Tinnitus and Enhance Sleep

Piccirillo JF. Melatonin. *Prog Brain Res. 2007;166*:331-333

Hurtuk et al. Melatonin: can it stop the ringing? Ann Otol Rhinol Laryngol, 120, 433-440, 2011

Coelho et al. Survey on the effectiveness of dietary supplements to treat tinnitus. Am J Audiol, 25, 184-205, 2016

Tinnitus Assessment and Management
Sound Enrichment in the Management of Tinnitus (And to Enhance Sleep)

Environment Sound Machine
~ $25

Sound Pillow
~ $40

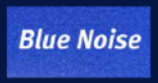
Sound Pillow Sleep System Content – Version 3.0 (www.SoundPillow.com)

dBA/dBC 74/73

dBA/dBC 78/76

dBA/dBC 65/63

dBA/dBC: 76/75



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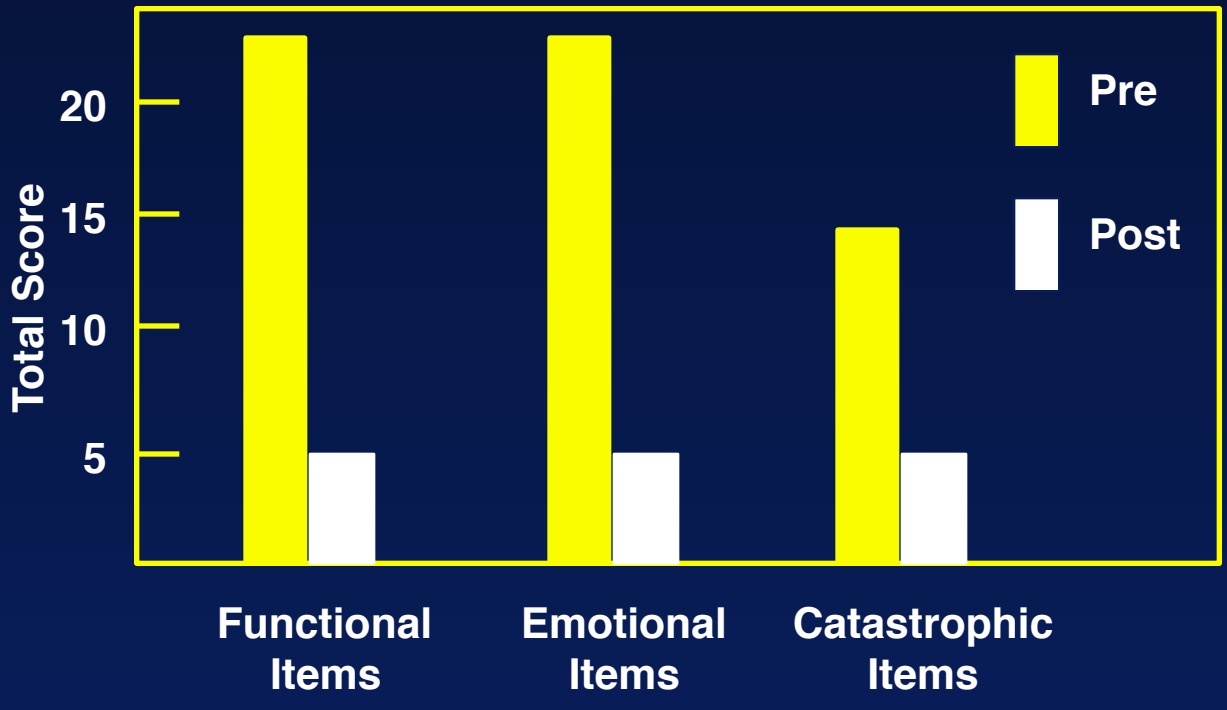
Benefit of Directive Counseling and Sound Enrichment in Tinnitus: Tinnitus Handicap Inventory Scores Before versus 6 Months After Counseling and Environmental Sound Therapy *(Hall, 1999)*



Tinnitus Management for Patients with Hearing Loss
Combination Hearing Aid and Sound Therapy Devices

Amplification is Evidence-Based Management of Tinnitus
For Patient's with Any Degree of Hearing Loss

- An option for any patient with any degree of hearing loss
- Evidence in peer-reviewed literature as an effective form of treatment
- Natural sound therapy with amplified environmental and speech sound in frequency region of tinnitus
- Open fit hearing aids are especially useful and well accepted
- Offer as a *tinnitus treatment device*, not a hearing aid
- Combination hearing aid/sound therapy devices are available from most hearing aid manufacturers
- *Refer to hearing aid as "tinnitus treatment device"*

Management of Tinnitus with Combination Hearing Aids/Sound Devices

Young et al (2016)

	Tinnitus Feature Name/HA Models	Interesting Features	App Available?	App Features
Widex	Zen / Dream	Fractal "color" programs, reputation	No	n/a
GN ReSound	TSG & nature sounds/Linx2, Enzo, (Verso & Alero w/ phone clip)	6 nature sounds, "mixer" feature	Yes, Apple only	No steamer needed to track progress, bubbles calming experience
Starkey	Multiflex Tinnitus/ Z Series and Xino (RICs only)	16 bands of frequency adjustment	Yes, Apple & Android	No streamer needed. Soundpoint fitting, Target match
Phonak	Tinnitus Balance/ Bolero, Audeo	Can be used with com accessories, headphone or sound pillows	Yes, Apple & Android	No streamer needed calming exercises
Signia/Sivantos	Tinnitus Therapy Feature/ All current models	Ocean waves sound, up to 20 bands	Yes, Apple & Android	No streamer needed, adjust mic or therapy signal level
Oticon	Sound Support/ Alta2, Nera2, Ria2 Pro TI models	Ocean sounds	Yes, Apple	Uses streamer, can use sounds from own music library

Table 1. Comparison of hearing instruments with tinnitus features.

Tinnitus Assessment and Management is Primary Care Audiology

- Introduction to Tinnitus
- Tinnitus Assessment
- Tinnitus Management: Level 1. Counseling and General Recommendations
- Tinnitus Management: Level 2. Evidence-Based Effective Treatment Options … *Needed for < 20% of Patients*
  - Tinnitus Retraining Therapy (TRT)
  - Cognitive Behavioral Therapy (CBT)
- The Bottom line … There is Hope for Every Person with Bothersome Tinnitus.

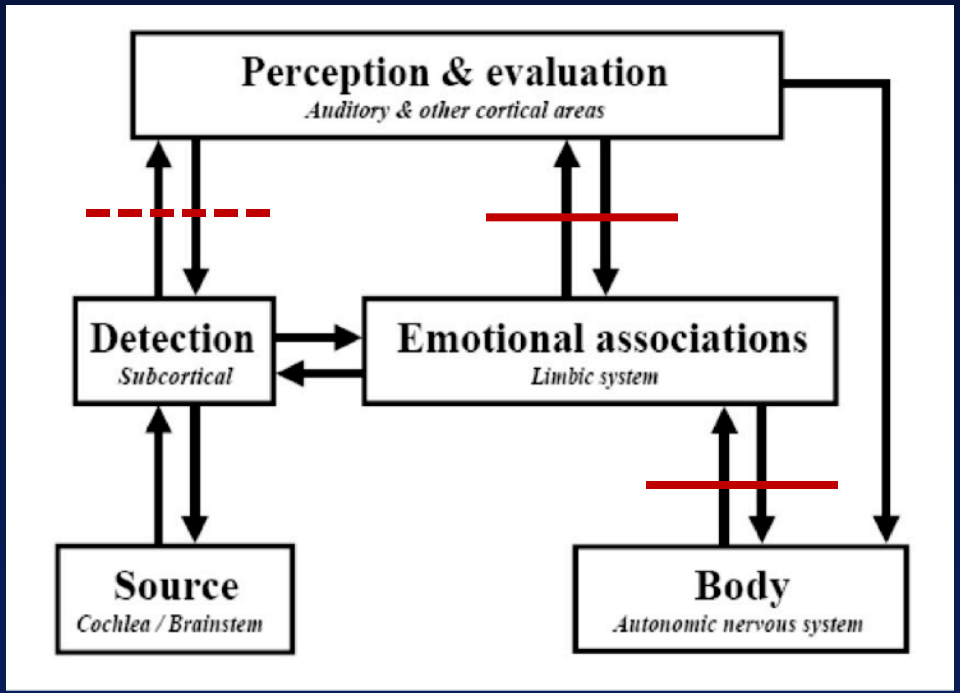
Tinnitus Retraining Therapy (TRT)

- Directive Counseling
  - Educational counseling that helps patient *neutralize* the negative *reaction* to tinnitus
  - Describes tinnitus mechanisms to *rationalize* and *demystify* the tinnitus
- Sound Therapy
  - Helps patient *minimize* tinnitus *perception*
  - Uses soft background noise without completely masking the tinnitus

Pawel Jastreboff, PhD, ScD

Neurophysiological Model for Tinnitus Retraining Therapy (TRT)

Sound Therapy



Directive Counseling

Evidence Based Tinnitus Management

Cognitive Behavioral Therapy or CBT

(Figure from AAOHNS Guidelines)

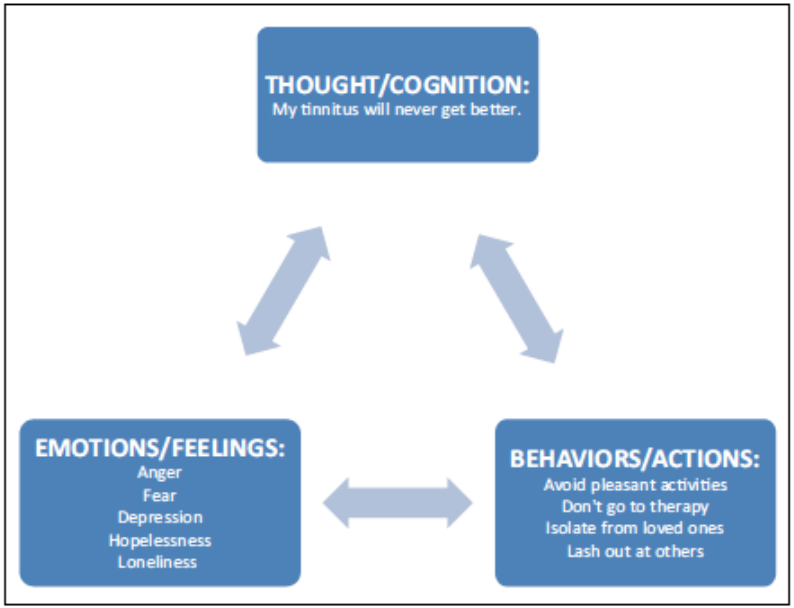


Figure 2. Cognitive behavioral therapy for tinnitus-related distress.

Evidence Based Tinnitus Management with *Cognitive Behavioral Therapy or CBT*

Study	Design	Positive findings	Negative findings
Sweetow[16]	Case series	Introduction to CBT	
Kröner-Herwig, et al.[23]	Case-control study	More satisfaction with training than with yoga	
Henry and Wilson[20]	Case-control study	Distress, handicaps associated with tinnitus: engagement in dysfunctional cognition	No effect on depression or subjective loudness
Andersson, et al.[26]	Controlled trial	Effectiveness in the elderly	
Rief, et al.[21]	Randomized clinical trial	Emotional distress	Reactivity of head muscles at the beginning predicted significant treatment effects
Kaldo, et al.[24]	Randomized clinical trial	Effectiveness of CBT-based self-help book	
Weise, et al.[22]	Randomized clinical trial	Tinnitus annoyance, diary ratings of loudness, feelings of controllability	
Andersson and Lyttkens[19]	Meta-analysis	Strong effect on tinnitus annoyance, some effect on tinnitus loudness	Lower effect on negative affect and sleep problems
Hesser, et al.[17]	Meta-analysis	Tinnitus distress Effective in the long term	
Martinez-Devesa, et al.[18]	Cochrane review	Depression score, quality of life	No effect on subjective loudness

Tinnitus Assessment and Management is Primary Care Audiology

Thank You! … Questions?

- Introduction to Tinnitus
- Tinnitus Assessment
- Tinnitus Management: Level 1. Counseling and General Recommendations
- Tinnitus Management: Level 2. Evidence-Based Effective Treatment Options
- The Bottom line … Clinical Audiologists Can Offer Hope and Effective Management for Persons with Bothersome Tinnitus