

The Tinnitus Retraining Therapy Trial (TRTT)

Representing the TRTT Study Group:

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National Institute on Deafness and
Other Communication Disorders

Improving the lives of people who have communication disorders



Tinnitus in the General Population

- Tinnitus affects over 50 million Americans (about 15% of the U.S. population)
- ~ 6 million Americans are severely distressed by tinnitus (about 2% of the U.S. population)
- ~ The TRTT is targeting the latter distressed group for study

Tinnitus in the Military

- Prevalence of tinnitus among military personnel is not known, but is likely greater than that found in the general American population
- Tinnitus is the #1 service-connected disability among veterans returning from the Middle East conflicts
- A recent study from Walter Reed reported 49% of IED blast-exposed veterans from Middle East conflicts report tinnitus

Tinnitus is a **BIG** and **CO\$TLY** Military Problem

- The VA estimates at least 4 million veterans currently suffer from chronic tinnitus
- VA compensation for tinnitus disability in 2011 is projected to exceed \$1.1 billion and to impact more than 800,000 veterans
- Projected VA compensation for 2014 is expected to exceed \$2.26 billion for more than 1.5 million veterans



No Cure for Subjective Tinnitus

Numerous intervention options have been evaluated, but to date there is either insufficient evidence or no significant benefit established for any intervention except possibly for cognitive behavioral therapy (CBT).

<ul style="list-style-type: none">-Electrical Stimulation-Biofeedback-Psychotherapy-Antidepressants	<ul style="list-style-type: none">-Acupuncture-Behavioral Modification-Cognitive Behavioral Therapy	<ul style="list-style-type: none">-Ultrasound-Hypnosis-Masking-Gingko Biloba
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Cochrane Reviews of Clinical Trials for Tinnitus Treatments

- As of 8/31/11, Cochrane reviews, which serve as the gold standard for evaluating the quality of evidence-based treatment research, revealed negative efficacy in published reviews of clinical trials for: anti-depressants, Gingko biloba, hyperbaric oxygen, anti-convulsants, sound therapy (e.g., masking, Neuromonics), and tinnitus retraining therapy
- CBT may be efficacious for reducing tinnitus-related distress

Cochrane Conclusions for TRT

- The 2010 Cochrane Review of the TRT literature revealed a single TRT trial (Henry et al, 2006) that qualified for review. The reviewers concluded:

“Although this study suggested considerable benefit for TRT in the treatment of tinnitus, the study quality was not good enough to draw firm conclusions.”
- Until controlled studies are conducted, TRT should continue to be viewed as investigational and controversial

What is Tinnitus Retraining Therapy (TRT)?

- TRT is a structured treatment protocol that uses directive counseling and sound therapy to facilitate habituation of intrusive, and sometimes debilitating tinnitus, within the context of Jastreboff's neurophysiological model of tinnitus
- The goal of TRT is to habituate the patient's associated negative emotional reactions to tinnitus, its perception, and impact
- TRT offers a systematic method to address the issues of tinnitus, hyperacusis, and hearing loss



Components of TRT

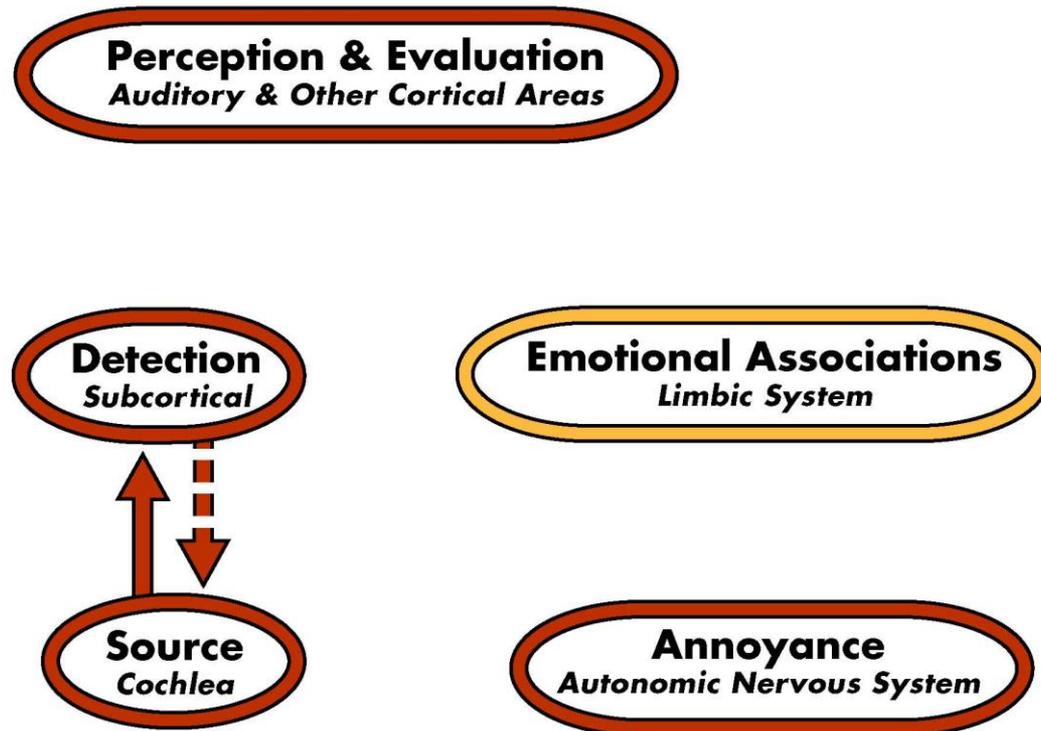
**Directive
Counseling**

initiates habituation
of the ***reaction to
tinnitus***
(*annoyance*)

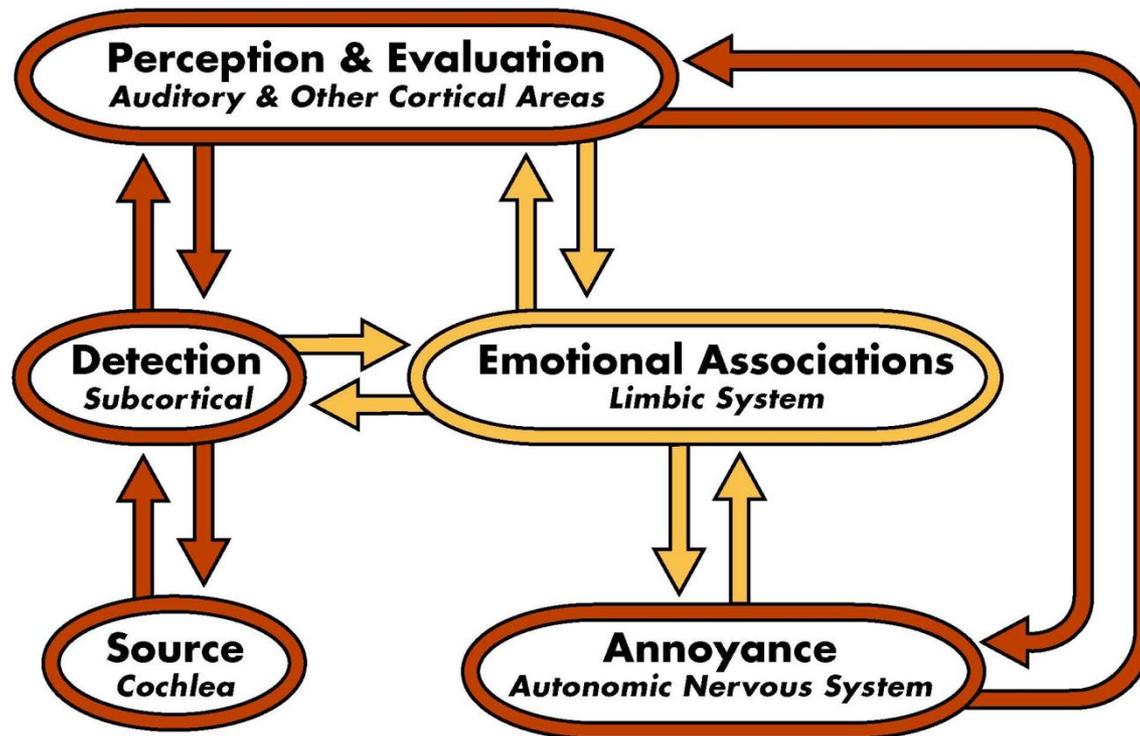
**Sound
Therapy**

facilitates habituation
of the ***perception of
tinnitus***
(*awareness*)

Tinnitus Without Awareness & Annoyance: Subcortical Filtering



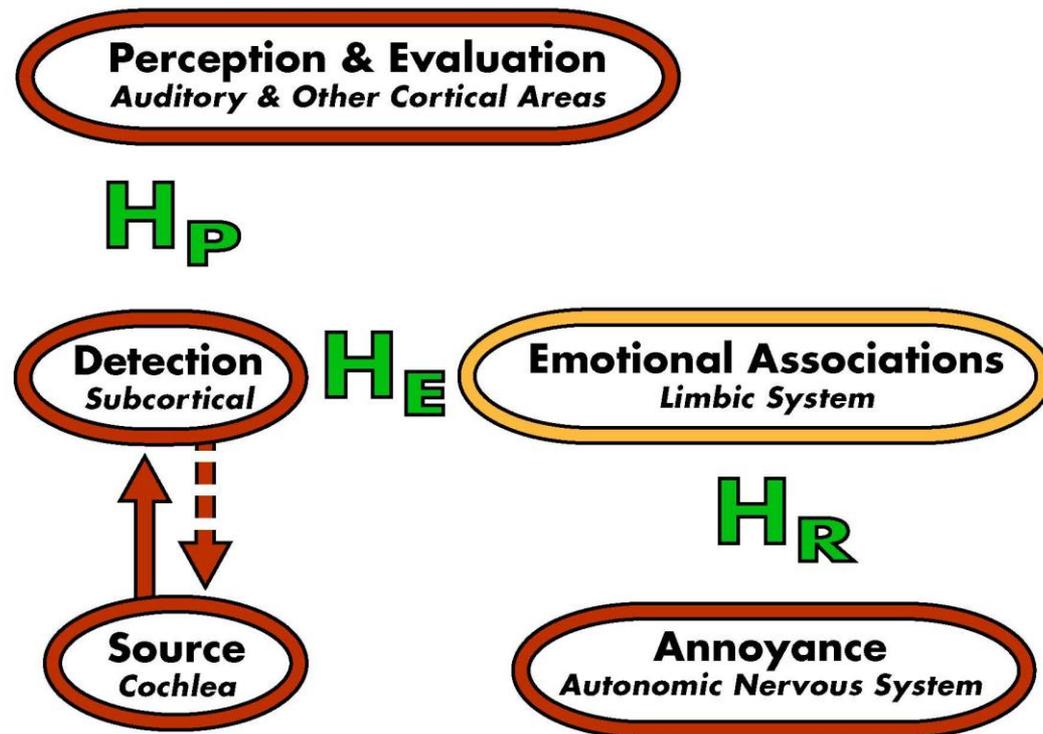
Conscious & Subconscious Neuronal Circuits Activated by Distressing Tinnitus



©TRTT (after Jastreboff, 1995)



Habituation of the Reaction, Emotional Associations, & Perception (Awareness) to Tinnitus



©TRTT (after Jastreboff, 1995)



Why is TRT important?

- TRT has been popularized and promoted globally for treatment of tinnitus over the past 20 years
- Google Scholar currently lists over 2000 citations with reference to: “Tinnitus Retraining Therapy”
- Most significantly, numerous uncontrolled studies of TRT routinely claim treatment efficacy for ~80% of treated patients

TRT Controversy

- The current literature reveals inadequate investigational studies of TRT because of the lack of:

**-Prospective and
Double-Blind Designs
-Randomized Treatment
Assignments
-Placebo Controls**

**-Baseline Measurements
-Comparison Groups
-Predetermined Outcome
Measurements
-Patient Homogeneity**

Setting the Stage for a Randomized Controlled Trial of TRT

- Recent clinical trials of TRT have begun to address concerns raised about the validity and efficacy of TRT
- These studies set the stage for the TRTT, which is the first NIH-sponsored definitive, randomized, controlled clinical trial to assess the validity and efficacy of TRT

Design of the Tinnitus Retraining Therapy Trial (TRTT)

Tinnitus Retraining Therapy Trial (TRTT)

The TRTT is a randomized, placebo-controlled, multi-center trial that is testing the efficacies of TRT and its component parts, directive (DC) and sound therapy (ST), versus standard of care (SC) treatment in individuals who have self-perceived debilitating tinnitus.



Hallmarks of the TRTT

- First Phase III Clinical Trial of TRT
- Independent and Impartial Study Chair & DCC Offices
- Multi-Center Trial (6 military sites)
- Multiple Treatment Groups (3)
- Randomized Treatment Assignment
- Placebo-Controlled Treatment (sound therapy)
- Fixed Sample Size (n=228, 76/group)
- Blinding
- Structured Data Collection Protocol at Baseline and Follow-Up Visits at 3, 6, 12, and 18 months



TRTT Administration



Study Chair's Office
University of Alabama
Craig Formby, PhD, Study Chair



Data Coordinating Center
Johns Hopkins University
Roberta W. Scherer, PhD, Director



National Institute on Deafness & Other
Communication Disorders (NIDCD)
Gordon Hughes, MD, Project Officer



TRTT Clinical Sites



- Wilford Hall Ambulatory Surgical Center (TX)
- David Grant Medical Center (CA)



- Walter Reed National Military Medical Center Bethesda (MD)



- Naval Medical Center Portsmouth (VA)
- Naval Hospital Camp Pendleton (CA)
- Naval Medical Center San Diego (CA)

Key Eligibility Criteria

NON-MEDICAL

- Active and retired military personnel & dependents
- Age 18 or older
- Able to understand counseling & complete English-language questionnaires
- Willing and able to participate in a research study

MEDICAL

- Continuous, chronic, subjective tinnitus of at least 1 year
- Tinnitus Questionnaire (TQ) score 40 or greater (moderate to severe impact of tinnitus)
- Unaided hearing sensitivity bilaterally within audiometric range from normal to mild limits



TRTT Eligibility Criteria Related to Brain Injury (TBI)

- No evidence currently to support the effectiveness of TRT for persons with TBI
- Accordingly, a prospective participant is excluded if he/she is undergoing treatment for TBI or if treatment for TBI has occurred within the past 24 months

Information on Blast/Noise Exposure and TBI History Collected in the TRTT

- Enrolled study participants
 - History of exposure to military noise (artillery, armaments, tanks, explosions, etc.)
 - History of prior TBI
 - Documentation of previous treatment for TBI
 - Diagnosis of TBI not requiring treatment
- Pending TBI study participants
 - Ongoing documentation of current/recent treatment for TBI

TRTT Treatment Groups



TRT

Directive
Counseling

Sound
Generator



Partial
TRT

Directive
Counseling

Placebo Sound
Generator



Standard
of Care

Standard of Care

TRTT Directive Counseling

- Approach is didactic
- Review of audiological, tinnitus & hyperacusis (ATH) examination results
- Describe anatomy and physiology of auditory system
- Describe how the brain handles auditory input
- Describe how auditory anatomy & physiology are associated with brain function in terms of tinnitus
- Present Jastreboff's Neurophysiological Model of Tinnitus
- Describe goals of treatment

TRTT Sound Therapy



❖ Conventional Sound Therapy

- Behind-the-ear devices
- Open canal fit
- Generates low-level (seashell-like) noise
- Volume set at/ just below “mixing point”
- Unique data-logging features to monitor protocol compliance and sound environment



❖ Placebo Sound Therapy

- Similar to above, but...
- Noise begins to fade after 40 minutes
- Noise undetectable after additional 30 minutes
- Resets upon removal from behind ear
- Operation enables double-blind ST



TRTT Standard of Care Treatment

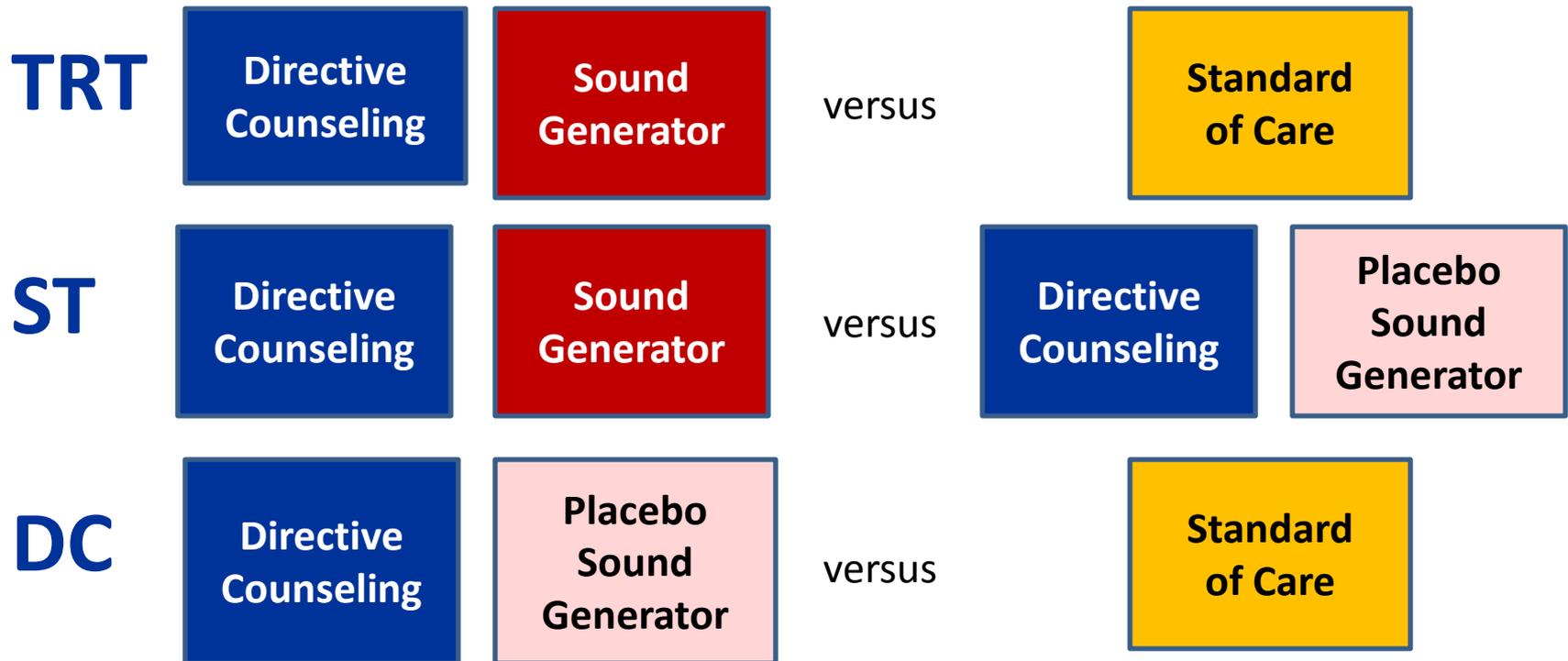
(survey-based consensus military tinnitus treatment)

- Approach may be educational, behavioral, or eclectic in nature based on the patient's needs
- Goal is to facilitate motivation, progress, engagement
- Elicit patient narrative, summarizing key points
- Discuss hearing mechanism and ATH exam
- Describe strategies to deal with problems related to:
 - Sleep
 - Stress
 - Concentration
- Describe use of environmental sound
- Set goals based on assessment of patient's needs

Study Hypotheses

- TRT is an efficacious therapeutic intervention for severe disabling tinnitus and will result in habituation of the awareness, annoyance, and impact of tinnitus
- TRT is predicted to be more effective than the SC treatment
- Both directive counseling (DC) and sound therapy (ST) are essential for TRT treatment success
- ST will be more effective than a placebo ST
- DC will be more effective than SC

Primary Treatment Comparisons to Test the Efficacies of TRT, ST, and DC



TRTT Outcomes

- **Primary Outcome**

- Change in Tinnitus Questionnaire (TQ) score evaluated longitudinally between the baseline visit and the 18-month follow-up visit

- **Secondary Outcomes**

Change at each time point in:

TQ subscales, Tinnitus Handicap Inventory, Tinnitus Functional Index, visual analog scale of the TRT Interview, Digit Symbol Substitution Task, EuroQoL, and multiple audiometric measures



TRTT Study Visits

- Baseline Eligibility Visit
- Randomization visit
- 2 treatment visits
 - Within one week of randomization
 - One month after first treatment visit
- Follow-up visits (3, 6, 12, and 18 months after first treatment visit)

Data Collected in the TRTT

Data Collected in the TRT	Baseline	3 mos	6 mos	12 mos	18 mos
Audiometric data	√	√	√	√	√
Tinnitus pitch and match	√	√	√	√	√
Loudness discomfort level	√	√	√	√	√
Tinnitus Questionnaire	√	√	√	√	√
Tinnitus Functional Index	√	√	√	√	√
Tinnitus Handicap Inventory	√	√	√	√	√
TRT Interview	√		√	√	√
Beck Depression Inventory, short form	√	√	√	√	√
Digit Symbol Substitution Task	√		√		√
Hearing Handicap Inventory	√		√		√
State-Trait Anxiety Inventory	√		√		√
PANAS	√		√		√
Life Events Checklist	√		√		√
EuroQol	√		√		√



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