Tinnitus: A Tough Problem To Have... and To Treat!

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Disclosures

I receive royalties for an ear simulator I and my UVA colleagues developed and patented to teach otoscopy and tympanostomy tube placement.

“...only my ears whistle and buzz continuously day and night. I can say I am living a wretched life.”
-Ludwig van Beethoven (1801)

Tinnitus - Definition

Any noise in the head....
“perception of sound in one or both ears or in the head when no external sound is present.”

bells, bees, crickets, cicadas, roaring, whooshing, seashell, clicking, ticking, pulsing, buzzing

Tinnitus is a symptom not a disease.

Tinnitus - Prevalence

- 10-15% of the population
- Up to 50 million
- 2 million affected more severely
- Health and compensation costs - $26 billion annually (Am. Tinnitus Assoc.)
Tinnitus - Risk factors

- Age (older)
- Males
- Noise-induced HL
- BMI > 30kg/m²; DM, Htn, dyslipidemia, Anxiety disorder

My

“Don’t ever write a paper on tinnitus...”

John W. House, MD
House Ear Clinic

Breakpoints of Tinnitus

1) Pulsatile/Pulse-synchronous v. Non-pulsatile
2) If pulsatile, is it pulse-synchronous?
3) Objective v. Subjective
4) How disabling?

Pulsatile/Pulse-synchronous Tinnitus

Paraganglioma
Serous otitis media
Otosclerosis

Wax impaction
Hair on eardrum
Sensorineural hearing loss
Pulsatile Tinnitus

Otologic sources

- Paget’s disease
- SSCDS

Pulse-synchronous Tinnitus

Tinnitus that matches the pulse... “Doc, I hear my pulse in my ear”

Pulse-synchronous Tinnitus

Arterial
- Less common
- Bounding
- Bruit
- Postauricular
- Does not go away with gentle neck compression or change in position

Venous
- More common
- Faint, whooshing sound
- Bruit
- EAC with stethoscope
- Goes away with gentle neck compression, change in position

Arterial
- Dural AVM
- Fibromuscular dysplasia
- Carotid/vertebral artery dissection

Venous
- Sigmoid sinus dehiscence
- Sigmoid/jugular diverticulum
- Idiopathic intracranial hypertension
- High jugular bulb

Pulse-synchronous Tinnitus

Tinnitus that matches the pulse... “Doc, I hear my pulse in my ear”

Best to refer these patients for medical evaluation....

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Nonpulsatile (Subjective) Tinnitus

Physical exam
- Tuning forks
- Otoscopic exam
- Cranial nerve exam
- Auscultate [listen] – ear, mastoid, carotids
- Audiometry

Tinnitus Evaluation
- Does it keep you awake at night?
- Does it awaken you from sleep in the middle of the night?
- During the day, if you’re busy, can you ignore it?

Many times, simple reassurance goes a long way...

Evaluation of Hearing - Audiometry

Subjective Tinnitus Causes

CHEMICAL
- Aminoglycosides
- Aspirin
- Quinine
- NSAIDs (Motrin, Advil, Ibuprofen)
- Caffeine
- Platinum-based chemotherapeutic agents
- Tricyclic antidepressants
- Nicotine
- Alcohol
Subjective Tinnitus Causes

**ACOUSTIC - Noise**

- Presbycusis/SNHL
- Sudden HL
- Meniere’s Disease
- Otosclerosis
- Trauma
- Serous otitis media
- Tumors of ear
  - Acoustic neuroma
  - Paraganglioma

**PATHOLOGIC**

- Thyroid (low or high)
- Hyperlipidemia
- Zinc or other vitamin deficiency
- Anemia
- Fever
- Flu

**EMOTIONAL**

- There is no cure....

**PHYSICAL**

- Wax
- TMJ/Dental

**A Couple Others**
Tinnitus - AAO CPG 2014

Clinical Practice Guideline: Tinnitus

- Targeted H&P - to identify conditions that if promptly identified and managed may relieve tinnitus.
- Audiolgic evaluation - always in unilateral, persistent tinnitus or when there is HL. Optional otherwise.

Tinnitus Treatment

- Sound therapy
  - Maskers
  - Hearing aids
  - Tinnitus Retraining Therapy
  - Neuromonics
  - Cochlear implant

- Medical Therapy
  - GABA analogues
  - Benzodiazepines
  - Antidepressants
  - OTC
  - Zinc, Garlic
  - Ginkgo
  - CoEnzyme Q
  - Melatonin
  - Mag/B12

Strong Recommendation: Clinicians must distinguish patients with bothersome tinnitus from patients with non-bothersome tinnitus.

Recommendation

- Education about management
- Hearing Aids
- Sound Therapy
  - Optional
- Cognitive Behavioral Therapy

Recommendation Against

- Antidepressants, anticonvulsants, anxiolytics, or intra-tympanic drugs
- Gingko biloba, melatonin, zinc, or other dietary supplements
- Transcranial magnetic stimulation

Tinnitus - Sound Therapy

- Sound Enrichment
- Music/Sound generators
- Tinnitus maskers
- Hearing Aids/Devices
- Tinnitus Retraining Therapy (TRT)
- Neuromonics
- Cochlear implants

Weaken the tinnitus signal by reducing the difference between tinnitus and the background sound.
**Tinnitus Maskers**

- Masks the actual sound of the tinnitus
  - Generates white noise
  - Patient can adjust intensity and frequency
- Combination devices
  - Masker and hearing device
  - Benefit of 35-60% reduction in tinnitus scores

Sweetow & Henderson-Sabes, The use of acoustic stimuli in tinnitus management. JAAA 21,7, 461-473, 2010

**Hearing aids and Tinnitus**

- 11 interventional studies of hearing aids
- Tinnitus evaluations were used
- Up to 50% reduction in tinnitus severity

Grant D. Searchfield, Manpreet Kaur & William H. Martin (2010) Hearing aids as an adjunct to counseling. Tinnitus patients who choose amplification do better than those that don’t, International Journal of Audiology, 49(6), 574-579

**Tinnitus Treatment - Sound Therapy**

**Tinnitus Retraining Therapy**

- Use of sound therapy and counseling
  - Sound generators and environmental sounds, as well as hearing aids
  - **Counseling** is a significant component of TRT
  - Educating the patient
- Intense, committed process
  - 6 to 18 months
  - 80% success?**


**Neuromonics Device**


**Cochlear Implantation?**

- Patients with bilateral SNHL and tinnitus
- Significant suppression of tinnitus after hearing was improved by CI


**Cochlear Implantation?**

- Patients with UNILATERAL SNHL and tinnitus
- Systematic review (13 studies)
- Improvement of tinnitus after CI:
  - 34% with complete suppression
  - 54% improvement
  - 7% stable
  - 5% increase
  - No instances of tinnitus induction

Tinnitus Medical Treatment

Prescription medications

- Tricyclic antidepressants (e.g., amitriptyline)
- SSRI or other antidepressant (talk to psychiatrist)
- Benzodiazepines (BEWARE!)
- Anticonvulsants: gabapentin, carbamazepine, lamotrigine, flunarizine

OTC Medications and Supplements

- Melatonin
- Ginkgo biloba
- Zinc
- Magnesium/B12
- Bioflavinoids

(20,000 products on Amazon!)

Commercially available supplements

- Arches Tinnitus Formula™
  - 54% 1-2 star rating, 22% 5-star
  - 100 days = $119
- Tinnitus™
  - 36% 1-2 star rating, 48% 5-star
  - 3 mo supply = $230
- Ring Zen™
  - 29% 1-2 star rating, 48% 5-star
  - 3 mo supply = $166
  - Also recommended to take along with Tinnitus™ (~$405 total!)

Tinnitus Treatment - A Few Others

- Transcranial magnetic stimulation (TMS)
- Transcranial direct current stimulation (TDCS)
- Biofeedback/hypnosis
- Acceptance and commitment therapy (ACT)
- Lyophilized powder of enzymolyzed honeybee larvae
- Acupuncture

Tinnitus Treatment

The efficacy of most interventions for tinnitus benefit remains to be demonstrated conclusively.

- Background noise – ”masker” - fan, CD/DVD, “Rain Rain” app!
- Hearing aid – ”masker”
- Pharmacologic – Amitriptyline 10-25mg at bedtime
- Tinnitus Retraining Therapy/CBT

Hoare et al. Laryngoscope 2011;121:1555-74
Tinnitus Treatment

• No cure
• Some agents probably have role in select patients
  • Can't sleep? Melatonin, TCA
  • Depressed? Antidepressant
  • Pain? GABA analogue
• High placebo effect regardless
• Everything has side effects
• Be aware of costs of supplements if you recommend

Tinnitus Pearls

Pulsatile/Pulse-synchronous vs. Nonpulsatile
Objective vs. Subjective
Unilateral vs. Bilateral
Otoscope evaluation
CAPPE

Conservative Rx – sound therapy, hearing aids

How disabling is it to you?