Tinnitus Assessment

TRQ, THQ, Tympanometry/Otoscopy, Tinnitus Ear

1. Tinnitus Reaction Questionnaire (TRQ)
   Patient to complete prior to the appointment.
   Score TRQ  < 17 Mild  17-70 Significant  >70 High
   (If >70, patient will have a higher psychological disturbance. Referral recommended)

   Determine % Awareness:  Over the past week, what percentage of the time were you aware of your tinnitus?

   Determine % Disturbance:  During the time that you were aware of your tinnitus, what percentage of that time was it bothersome?

2. Tinnitus History Questionnaire (THQ)
   Patient to complete prior to the appointment. Review questions with the patient that need clarification, as necessary.

3. Tympanometry and Otoscopy

4. Tinnitus Ear:  Right or Left
   Based on the patient report from the THQ. If the hearing loss is asymmetrical, and tinnitus is equal or central in both ears, designate the ear with greater hearing loss.

   If the hearing is symmetrical, and tinnitus is equal or central in both ears, designate a “Tinnitus Ear”.

Tinnitus Population

50 Million suffer from tinnitus

10-15 Million seek medical treatment for tinnitus

2 Million have severe, highly disturbing tinnitus

1 Million new cases of tinnitus are identified each year

Source: Amer. Tinnitus Association

Tinnitus Sufferers Experience the Following Distressing Symptoms

Loss of sleep

Inability to relax

Lack of concentration

Hyperacusis or sensitivity to loud sounds

Anxiety and depression

Negative impact on work, family, and social life

Audiogram and Tinnitus Pitch Match

5. Pure Tone Thresholds
   250 Hz – 12.5 kHz (include 3k, 6k and 10k Hz).  Change to high frequency earphones, as needed.  If NR, add 5 dB to the maximum level of the audiometer in appropriate audio box.

6. Tinnitus Pitch Match
   Select contra-lateral ear
   Use PT or NBN stimulus; depending on description of tinnitus from the THQ.
   Use continuous presentation, presented at 10 dBSL.

   Bracket:  start by comparing 1k to 8 kHz at 10 dBSL.  If 8k Hz selected under regular headphones, then switch to HF earphones to continue tinnitus match with 8k to 12.5 kHz.

   Instructions:

   I want to find the approximate pitch of your tinnitus.  This is how sharp or flat it sounds, not its loudness.

   I am using your (non-tinnitus) ear for this test.  I will present two tones.  Listen to both tones and then tell me which tone is closer to the pitch of your tinnitus; #1 or #2.
Tinnitus Loudness Match (optional)

7. Set-Up
   Contralateral ear (non-tinnitus ear)
   Use same type of stimulus as used in the Tinnitus Pitch Match task (PT or NBN)
   Select Tinnitus Pitch Match frequency
   Obtain a threshold Level utilizing 2 dB steps.

   Record *Tinnitus Loudness Match: Loudness HTL Threshold _____*

   From threshold, use continuous signal presentation and slowly increase level in
   2 dB steps until the patient indicates that the signal is approximately the same
   "loudness" as their tinnitus.

   Repeat and average results for *Loudness Match: _____*

   Instructions:
   
   *I am going to turn the sound up gradually. Tell me when it is equally as 
   loud as the tinnitus in your (tinnitus) ear.*

8. Calculate TLM SL:  Loudness Match — Loudness Threshold = TLM SL

Broadband Noise (BBN) Threshold

9. Set-Up
   Select ipsi-lateral ear (tinnitus ear)
   Select broadband noise (BBN).
   If BBN unavailable, select white noise, or speech noise
   Use standard headphones
   Search for threshold level in 2 dB step-size.
   Find the patient’s BBN threshold (usually found near patient’s best hearing
   threshold level on their audiogram)
   Repeat as necessary.

   Instructions:
   
   *I will present sounds in your (tinnitus) ear. I am going to use a 
   different type of sound, like a SHHHH noise.*

   *Press the button (or raise your hand) when you just hear it.*
**Broadband Noise Minimum Masking Level (BBN MML)**

10. **Set-Up**
   
   Use standard headphones
   
   Select broadband noise (BBN).
   
   If BBN unavailable, select white noise, or speech noise
   
   Ipsilateral ear (tinnitus ear)

   2 dB step-size, start at BBN Threshold.

   Continuous presentation, slowly increase in 2 dB steps until the patient indicates that the noise just masks (covers) the tinnitus in the ipsilateral ear.

   Replicate, as necessary

**Instructions:**

*I want to find out how much noise is needed to just cover up or mask the tinnitus in your tinnitus ear. I am going to make the noise gradually louder and I want you to press the button when you judge it is just covering up your tinnitus.*

*Try not to worry about the tinnitus in your other ear. I just want to see how much sound we need in your tinnitus ear.*

11. **Calculate BBN SL:** Masking Level — BBN Threshold = BBN MML SL

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**Loudness Discomfort Level**

12. **Set-Up**
   
   Test each ear individually
   
   500 Hz, 1000 Hz, 4000 Hz, and any other defined frequency (i.e., tinnitus pitch frequency or speech noise)

   Start initial presentation at 10 dBSL

   Use pure tone, continuous presentation, 5 dB step size

   Have patient rate the level of the sound using Loudness Level Sheet; stopping when the patient indicates “Uncomfortably Loud”

   Decrease 10dB, then increase using 2 dB steps, stopping at Uncomfortably Loud.

   Replicate if values are very different.

   *Read aloud the following instructions to the patient to establish an accurate loudness discomfort level. Helpful hint: give the patient a Loudness Level Sheet.*

**Instructions:**

*I am going to try to find the upper limit of what sounds you find comfortable. I am going to present a series of tones which gradually will get louder.*

*I would like you to point to the current levels on the chart so that I can know how loud each level of sound appears to you.*

*I am most interested in finding the Uncomfortable Loudness Level, which is the level of loudness which would be uncomfortable to listen to for more than a minute.*

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**Loudness Levels**

- Painfully Loud
- Extremely Uncomfortable
- Uncomfortable Loud
- Loud, But OK
- Comfortable, But Slightly Loud
- Comfortable
- Comfortable, But Slightly Soft
- Soft
- Very Soft

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**Sound Tolerance**

- Normal  >90 dB
- Decreased  70-90 dB
- Hyperacusis <70 dB

**Does the patient have a history of:**

- Misophonia
- Phonophobia
- Reactive Tinnitus
Residual Inhibition

13. **Set-Up:**
   - Binaural presentation
   - Select NBN at Tinnitus Pitch Matched frequency
   - Presentation level: 65-75 dBHL. Must be at least 10 dBSL
   - Present NBN for 1 minute
   - Remember to take LDL and threshold levels into consideration when determining appropriate presentation levels.

**Instructions:**

*This is the last test. To finish off, I am just going to put some noise in both ears for a minute or so. You do not have to do anything.*

*If you find the sounds a little too loud, let me know and I can turn them down or, if you want me to increase the volume I can do that as well.*

After 1 minute, quickly enter the booth and remove the headphones.

*Ask the patient: Right now, is there any change in your tinnitus?*

Record: Complete RI, Partial RI, or No Change

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**Candidacy Considerations**

**Patient Candidacy:**

- **Highly Suitable**
  - Significant Disturbance TRQ (17-70)
  - Specific TRQ $\geq 3$ e.g. sleep
  - Minimal exposure to tinnitus triggers
  - Normal to Moderate HL $\leq 50$ dB FFA
  - +/- Decreased Sound Tolerance

- **Suitable with Non-Standard Factors**
  - Low TRQ ($<17$)
  - Trained Musician
  - Pursuing Compensation
  - Severe Bilateral HL (FHA in better ear between 50 dB and 65 dBHL)
  - Continual Exposure to Triggers (stress, noise, medical)
  - Severe HL at tinnitus pitch frequency (especially within speech range)
  - Low Interaction (Low LDs/High MMLs)

- **Unsuitable / Contra-indicators**
  - No Disturbance
  - Fluctuating Hearing
  - Unrealistic Expectations
  - Severe to profound bilateral HL
  - Comprehension Problems
  - Pulsatile tinnitus (w/o tonal quality)

**Response with Demo:**

- High Interaction
- Moderate Interaction
- Low Interaction

**Recommendation:**

Neuromonics Tinnitus Treatment

Hearing Aid: Before Treatment - With Treatment - After Treatment

Counseling

Referral to Medical (ENT, PCP, other)