

Tonic Tensor Tympani Syndrome (TTTS) in Tinnitus and Hyperacusis Patients: A Multi-Clinic Incidence Study

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Introduction

Tonic tensor tympani syndrome (TTTS) is an involuntary condition where the centrally mediated reflex threshold for tensor tympani muscle activity is reduced, causing a frequent spasm.¹ This can trigger physiological reactions in and around the ear from tympanic membrane tension, alterations in middle ear ventilation and trigeminal nerve irritability.² TTTS has been proposed as the mechanism causing the symptoms of acoustic shock (AS).³⁻⁵ AS can develop involuntarily after exposure to a sudden unexpected loud sound perceived as highly threatening (acoustic incident), with hyperacusis a dominant symptom.³⁻⁵ Call centre staff are vulnerable to AS because of the increased likelihood of exposure near the ear(s) to an acoustic incident transmitted via a telephone headset.³⁻⁵ The research on AS has focused on this cohort, BUT acoustic incidents can occur anywhere AND symptoms of TTTS without underlying pathology, particularly aural pain and blockage, have been noted in tinnitus and hyperacusis patients, without wide acknowledgement.^{4,5}

This multiclinic study aims to investigate the incidence of symptoms consistent with TTTS in tinnitus and hyperacusis patients.

Method

Data was collected on all consecutive tinnitus and hyperacusis patients seen in the eight participating clinics over the 6-month survey period. All patients were

medically cleared of underlying pathology which could have caused these symptoms. Those whose only symptoms were headache or vertigo or muffled/distorted hearing were not considered to have symptoms consistent with TTTS.

Data collected:

1. Epidemiologic:

- age
- gender

2. Hearing loss:

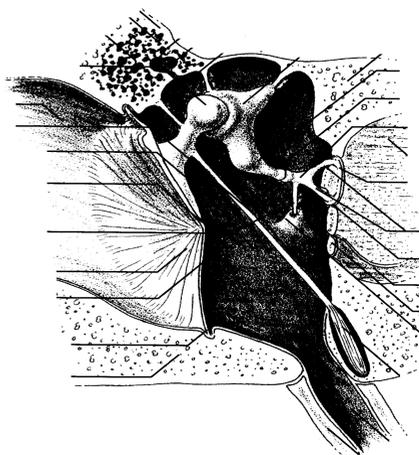
- presence
- degree

3. Tinnitus / Hyperacusis:

- severity
- triggered by an acoustic incident

4. Symptoms consistent with TTTS (pain/numbness/burning in and around the ear; aural "blockage"/pressure, mild vertigo/nausea, "muffled"/distorted hearing, tympanic flutter, headache):

- presence
- triggered or exacerbated by exposure to loud/intolerable sounds
- uni or bilateral



Results

1. Total sample:

- 345 patients, age 11-97 (mean 50.94), 179 (52%) males
- 169 from Australia, 113 from Brazil, 53 from Spain, 10 from New Zealand
- 170 (49%) had tinnitus only (T group) and 175 had hyperacusis (51%): of those, 146 (42.5%) had tinnitus plus hyperacusis (T+H group) and 29 (8.5%) had hyperacusis only (H group)

2. Presence of TTTS symptoms:

- in the whole sample: 61% had at least one symptom and 50% had ≥ 2
- in the groups: 41% of T group and 80% of T+H/H group had at least one symptom; 15% of T group and 63% of T+H/H groups had ≥ 2 symptoms

Among patients with unilateral hyperacusis (T+H and H groups): 87% had bilateral symptoms to a greater degree on that side, 7.5% had bilateral symptoms equally in both ears, and 5.5% had no symptoms.

- Acoustic Shock ("AS", defined as acoustic incident trigger + TTTS):

- in the whole sample: 19% had AS (Australia 30%, Spain 23%, New Zealand 20%, Brazil 15%)
- 82% of AS patients had hyperacusis.

- Most common symptoms:

- aural fullness (33% of total and 53% of T+H/H group)
- muffled hearing (22% of total and 33% of T+H/H group)
- TMJ pain (20% of total and 25% of T+H/H group)
- pain along side of neck (20% of total and 25% of T+H/H group)
- tympanic flutter (19% of total and 29% of T+H/H group)
- dull ache in ear (19% of total and 29% of T+H/H group)
- sharp pain in ear (18% of total and 27% of T+H/H group)

Development or exacerbation by intolerable sounds:

- 62% of the patients with sharp pain in ear
- 60% with tympanic flutter
- 55% with dull ache in ear
- 38% with aural blockage

Conclusion

These results suggest that symptoms consistent with TTTS can readily develop in patients with tinnitus, and more particularly in those with hyperacusis. TTTS offers a possible explanation for the aural pain reported by many hyperacusis patients, often aggravated by intolerable sound exposure. These symptoms should be routinely evaluated, de-mystified to patients, and treated accordingly.

References:

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