

# Improvement in Hyperacusis with Tinnitus Retraining Therapy

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## Background and Study Objective

- Decreased sound tolerance/ hyperacusis is present when negative reactions are exhibited on exposure to sound that would not evoke similar reaction in an average listener. In extreme cases, patients' lives are controlled by avoidance of sound, which often prevents them from normal social interactions and everyday activities.
- Decreased sound tolerance and hyperacusis are frequently found in patients who complain of tinnitus.
- Tinnitus Retraining Therapy (TRT) aims to induce and sustain habituation of reaction and perception to intrusive tinnitus and/or to external sounds.
- The 2 components of TRT are counseling and use of sound therapy, with or without hearing aids.
- Avoidance of silence and continuous exposure to background sound is even more important for hyperacusis than for tinnitus patients.
- Desensitization used for hyperacusis follows general principles of the neurophysiological model of tinnitus. It involves exposing patients to continuous low level of sound over a period of months. The sound level is adjusted as needed by the patient and is kept below the level that evokes annoyance or discomfort. Additional sounds provided by tabletop sound machines, nature's sounds, radio, television, etc, may also be utilized. The sound of instruments is set at a comfortable level that does not induce annoyance.
- TRT has been used in our institution for the treatment of tinnitus and hyperacusis for over 10years. This study aims to investigate the efficacy of Tinnitus Retraining Therapy (TRT) in our population of patients with hyperacusis.

## Method

- Prospective study of patients with hyperacusis presenting to the Tinnitus clinic in a tertiary referral Otorhinolaryngology unit in Singapore between 1997 and 2010.
- Hyperacusis was confirmed with loudness discomfort level (LDL) measurements.
- Audiometry was performed in all patients.
- Improvement in hyperacusis following TRT was measured by LDL measurements and structured interviews, with aid of questionnaires and visual analogue scores.

## Results

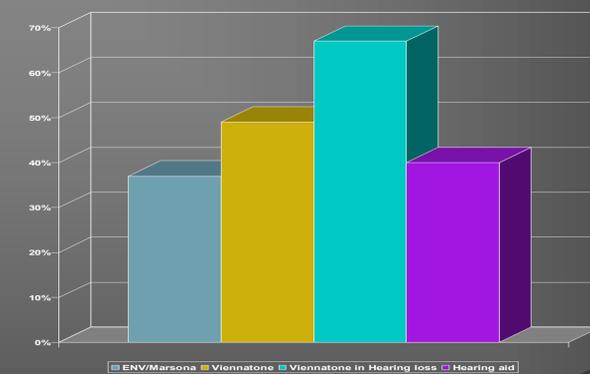
- 197 patients were studied.
- Improvement was achieved in 39%.
- 75% used environmental sound enrichment strategies (including Marsona® sound generator) alone.
- 18% used Viennatone® broadband noise generator in addition.
- 18% had hearing aids (HA) fitted even though 73% had hearing loss.
- Patients who opted for HA complained of worse effects of hyperacusis on life (7.0 vs 5.9)
- Age and presence of hearing loss were similar in patients who did and did not improve.
- There was a higher percentage of female patients who did not improve.
- Duration of treatment was significantly longer in patients that improved ( $p < 0.01$ ).
- Improvement with Viennatone® was significantly higher than with environmental sounds alone (49% vs 35%,  $p < 0.05$ ), especially when used in presence of hearing loss (67%).

## Conclusion

- Modest proportion of patients with hyperacusis improved with TRT.
- Use of broadband noise generators and longer duration of therapy appear to give better success rates.
- Overall success of TRT in patients with hyperacusis may also be related to underlying medical problems such as thyroid conditions and multiple sclerosis.

	Improvement	No Improvement
Age (years)	48	49
Hearing loss	62%	65%
Gender	45% Female	56% Female
Duration of treatment (months)		
Mean	21	12
Median	15	7

**Table 1.** Demographics and characteristics of patients with hyperacusis who did and did not improve with Tinnitus Retraining Therapy



**Figure 1.** Bar graph showing improvement rates with use of different treatment strategies and devices in Tinnitus Retraining Therapy