

Efficacy of Tinnitus Retraining Therapy, A Modish Management of Tinnitus: Our Experience

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Abstract Tinnitus retraining therapy involves masking of tinnitus at sound perception level in combination with structured counselling sessions. To assess efficacy of Tinnitus retraining therapy (TRT) in Patients of Tinnitus with Sensori Neural Hearing loss. Prospective study was carried out on patients who presented with Tinnitus in ENT OPD from December 2015 to December 2016. Severity of tinnitus was documented using Tinnitus handicap inventory scale. Response to tinnitus is evaluated at the end of 3 months. In our study 57 patients in age group 21–78 years were selected and Tinnitus retraining therapy was administered. Most of patients had moderate (75.43%) perception of tinnitus before initiation of therapy. After completion of therapy tinnitus completely disappeared in 34 (59.65%) patients. Improvement in Tinnitus perception was observed in total of 49 (85.96%) patients. There was no improvement in Tinnitus perception in 8 (14.03%) patients. TRT aims in reducing the tinnitus perception by inducing habituation of tinnitus-induced reactions allowing patients to achieve control over their tinnitus, live a normal life, and participate in everyday activities.

Keywords Tinnitus · Tinnitus retraining therapy · Tinnitus handicap inventory (THI) scale

Introduction

Tinnitus can be described as the perception of sound in the absence of external acoustic stimulation [1]. Tinnitus is defined as an auditory perception due to aberrant spontaneous activity arising from an altered state of excitation or inhibition within auditory system [2]. Perception of tinnitus can be trivial or it may be a debilitating condition. The effective management of tinnitus complaints is often a lengthy and troublesome treatment process involving numerous disciplines.

Various treatment modalities have been tried to treat tinnitus because a fully satisfactory treatment still remains elusive. These treatment modalities include Pharmacotherapy, Cognitive behaviour therapy, Tinnitus masking, Tinnitus retraining therapy and Trans-cranial electric or magnetic stimulation [3]. Among these two main treatment approaches for tinnitus are practised widely for the benefit of patients suffering with Tinnitus. These include Sound-based therapy like tinnitus retraining therapy and cognitive behaviour therapy [4].

Tinnitus retraining therapy involves masking of tinnitus at the sound perception level in combination with structured counselling sessions [5]. Habituation is a concept that has been a part of the learning and conditioning literature for many years and refers to a decrease in responsiveness because of repeated stimulation with an inconsequential stimulus [6]. This article provides tools to evaluate patients for treatment with Tinnitus Retraining Therapy and to monitor the efficacy of treatment with Tinnitus Retraining Therapy.

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Objectives

To assess the efficacy of Tinnitus retraining therapy (TRT) in Patients of Tinnitus with Sensori Neural Hearing loss.

Materials and Methods

A prospective study was carried out on patients who presented with Tinnitus in ENT OPD from December 2015 to December 2016. Patients presenting with Unilateral or Bilateral Tinnitus with Sensori neural hearing loss were included in the study. Patients suffering from Tinnitus due to conductive pathology were excluded from the study.

After an informed consent, all patients underwent a thorough ENT examination which includes the relevant otological, general and family history, and an examination focusing on the ears, teeth and neck and scalp musculature. Hearing assessment was done using pure tone and impedance audiometry to assess the degree and type of hearing loss.

Prior to the commencement of the therapy severity of tinnitus was documented based on patients response over a 25 point questionnaire according to the Tinnitus handicap inventory (THI) scale [7]. The Tinnitus handicap inventory (THI) scale scores are graded as Slight 0–16, Mild 18–36, Moderate 38–56, severe 58–76, Catastrophic 78–100. After establishing the grade of tinnitus on Tinnitus handicap inventory (THI) scale score, patients were subjected to Tinnitus Retraining Therapy.

After thorough evaluation of the patient the frequency match of the patient is identified and intensity is matched accordingly. Then a narrow band of noise above 20 db of threshold match is presented to these patients for an initial duration of ten min. If no suppression of tinnitus is observed from the patients through their verbal response then a white band of noise above 20 db of threshold match is presented to these patients for another ten min. After the initial session in the responsive patients with Tinnitus retraining therapy a second session is given after a gap of 10 min matching the initial satisfied criteria of the previous session.

The response to tinnitus is evaluated in these patients in subsequent follow ups at the end of one month and the final response is assessed at the end of three months. An improvement in tinnitus severity, Improvement in tinnitus perception, loudness or intensity, Improvement in well being and disability is measured by a validated Tinnitus handicap inventory (THI) scale after the completion of the treatment and the responses are analysed and compared with their previous responses.

Table 1 Tinnitus perception of patients before initiation of Tinnitus retraining therapy (n = 57)

Degree of tinnitus	No. of patients	Percentage
Slight	0	0.0
Mild	4	7.02
Moderate	43	75.43
Severe	9	15.78
Catastrophic	1	1.76

Table 2 Tinnitus perception after tinnitus retraining therapy

Perception change in patients	n = 57
Catastrophic to catastrophic	1
Severe to mild	2
Severe to severe	5
Moderate to slight	8
Moderate to mild	5
Moderate to moderate	2
Severe to no tinnitus	2
Moderate to no tinnitus	28
Mild to no tinnitus	4

Results

In our study a total of 57 patients of which 31 were male and 26 female patients in the age group 21–78 years were selected and Tinnitus retraining therapy was administered in them. Prior to administration of the tinnitus retraining therapy the perception of tinnitus in the patients was documented in our study. From our study it was evident that most of the patients in our study had moderate (75.43%) perception of tinnitus before initiation of therapy. The varied perception of tinnitus based on tinnitus handicap inventory (THI) scale by the patients in our study was documented in Table 1.

From the present study it was observed that after the completion of Tinnitus retraining therapy the response to tinnitus perception was varied which was documented at the end of 3 months by tinnitus handicap inventory (THI) scale. Tinnitus completely disappeared after the therapy in 34 (59.65%) patients. Improvement in Tinnitus perception was observed in a total of 49 (85.96%) patients. There was no improvement in Tinnitus perception in 8 (14.03%) patients in our study. The varied response of tinnitus perception after the completion of therapy was documented in Table 2.

In the present study 43(75.43%) patients presented with unilateral Tinnitus and 14 (24.57%) patients presented with Bilateral Tinnitus with varied frequency and intensity matches. The details of frequency, intensity match and the type of noise presented and the variation in tinnitus perception for each patient is mentioned in the Table 3.

Table 3 Frequency, intensity match and type of noise for each patient for tinnitus retraining therapy

S. No	Ear	Frequency	Intensity (dB)	Type of tone/noise	Suppression
1	Left	1 KHZ	60	White band	Seen
2	Both	750 HZ	65	Narrow band	Seen
3	Left	1.5 KHZ	60	Narrow band	Seen
4	Left	6 KHZ	65	White band	No
5	Left	1 KHZ	60	Narrow band	Seen
6	Right	2 KHZ	55	Narrow band	No
7	Left	250 HZ	55	White band	Seen
8	Left	6 KHZ	30	White band	Seen
9	Both	125 HZ	40	White band	Seen
10	Left	500 HZ	45	Narrow band	Seen
11	Left	2 KHZ	90	Narrow band	Seen
12	Both	3 KHZ	80	White band	Seen
13	Left	6 KHZ	90	Narrow band	Seen
14	Left	250 HZ	55	Narrow band	Seen
15	Right	3 KHZ	70	Narrow band	No
16	Left	1 KHZ	35	White band	Seen
17	Left	2 KHZ	65	Narrow band	Seen
18	Left	1 KHZ	40	Narrow band	Seen
19	Right	125 HZ	40	Narrow band	Seen
20	Right	125 HZ	60	Narrow band	Seen
21	Both	8 KHZ	95	Narrow band	Seen
22	Left	1 KHZ	55	White band	Seen
23	Right	1 KHZ	30	Narrow band	No
24	Right	3 KHZ	75	Narrow band	Seen
25	both	2 KHZ	50	White band	Seen
26	Both	1 KHZ	25	Narrow band	Seen
27	Right	1 KHZ	20	Narrow band	Seen
28	Both	250 HZ	25	Narrow band	No
29	Left	125 HZ	35	Narrow band	Seen
30	Left	6 KHZ	90	Narrow band	Seen
31	Left	250 HZ	55	Narrow band	Seen
32	Right	3 KHZ	70	Narrow band	Seen
33	Left	1 KHZ	35	Narrow band	Seen
34	Left	2 KHZ	65	Narrow band	Seen
35	Both	1 KHZ	40	Narrow band	Seen
36	Right	8 KHZ	95	Narrow band	Seen
37	Left	1 KHZ	55	Narrow band	Seen
38	Both	1 KHZ	30	Narrow band	No
39	both	3 KHZ	75	Narrow band	Seen
40	Right	2 KHZ	50	Narrow band	Seen
41	Both	1 KHZ	25	Narrow band	Seen
42	Left	6 KHZ	65	Narrow band	Seen
43	Left	1 KHZ	60	Narrow band	Seen
44	Right	2 KHZ	55	Narrow band	Seen
45	Left	250 HZ	55	Narrow band	Seen
46	Both	750 HZ	65	Narrow band	Seen

Table 3 continued

S. No	Ear	Frequency	Intensity (dB)	Type of tone/noise	Suppression
47	Left	1.5 KHZ	60	Narrow band	Seen
48	Left	6 KHZ	65	Narrow band	Seen
49	Left	1 KHZ	60	Narrow band	Seen
50	Right	1 KHZ	25	Narrow band	Seen
51	Left	6 KHZ	65	Narrow band	Seen
52	Left	1 KHZ	60	White band	Seen
53	Right	2 KHZ	55	Narrow band	No
54	Both	250 HZ	55	Narrow band	Seen
55	Left	2 KHZ	90	Narrow band	Seen
56	Left	1 KHZ	40	White band	Seen
57	Both	2 KHZ	55	Narrow band	No

Discussion

A wide range of therapies have been proposed for the treatment of tinnitus symptoms. Pharmacological interventions used include cortisone vasodilators, benzodiazepines, lidocaine, spasmolytic drugs, tricyclic antidepressants and Ginkgo biloba [8]. Hyperbaric oxygen therapy is also believed to be useful in patients of tinnitus by improving oxygen supply to the inner ear which it is suggested may result in an improvement in tinnitus [9].

Tinnitus retraining therapy (TRT) is a form of habituation therapy designed to help people who suffer from tinnitus. The therapy is employed at the perceived source of the tinnitus and aims to teach the brain to ignore it. Tinnitus Retraining Therapy is a neurophysiological model-based treatment [10]. The auditory system operates by a complex feedback phenomenon which includes an ascending afferent pathway and a descending efferent pathway. It's also connected with central nervous system through other non-auditory structures like limbic system, reticular activating system serotonergic, somato-sensory and hypothalamic system [11].

Sound therapy is based on experience that appropriate external sounds can diminish or even render tinnitus inaudible. Sound therapy decreases the strength of the tinnitus signal by increasing the level of background neuronal activity in the auditory system is achieved by providing an enhanced sound background [12]. Sound therapy and masking are two distinct forms of intervention. Masking devices were introduced on the principle of distraction; that if a level of noise, usually 'white noise', is introduced it can reduce the contrast between the tinnitus signal and background activity in the auditory system, with a decrease in the patient's perception of their tinnitus [13].

As a result of Tinnitus retraining therapy (TRT), habituation of both a person's reactions evoked by the tinnitus and its perception occurs. Tinnitus retraining therapy (TRT) is a useful approach to the management and treatment of tinnitus. On the positive side, Tinnitus retraining therapy (TRT) appears to be highly effective used to treat all types of patients, does not require frequent visits, and does not interfere with hearing, and there are no negative side effects. However Tinnitus retraining Therapy (TRT) is not a complete cure to the patient, since it does not remove tinnitus. It aims in reducing the tinnitus perception by inducing habituation of tinnitus-induced reactions.

Conclusion

Available literature suggests that the efficacy of Tinnitus retraining therapy (TRT) in reducing the distress of tinnitus has not been completely established. There is a scope for a lot of new research in this area in management of Tinnitus. Tinnitus retraining Therapy (TRT) aims in reducing the tinnitus perception by inducing habituation of tinnitus-induced reactions allowing patients to achieve control over their tinnitus, live a normal life, and participate in everyday activities.

Compliance with ethical standards

Conflict of interest The authors have no conflicts of interest to disclose.

Ethical approval This study was approved by the institutional Review Board of the Narayana Medical College, Nellore.

Informed consent Our research involved human participants who had obtained informed consent.

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