A DIAGNOSED MENIERE'S DISEASE (MD) CASE, WAS EVALUATED WITH A DIGITAL OCCLUSION ANALYZER AND TREATED WITH DISCLUSION TIME REDUCTION (DTR) THERAPY.

Prof. (Dr.) Prafulla Thumati*

Professor & HOD, Department of Orofacial Pain, RajaRajeshwari Dental College and Hospital, Bengaluru, Karnataka

***Corresponding author:**
Prof. (Dr.) Prafulla Thumati
Professor & HOD, Department of Orofacial Pain, RajaRajeshwari Dental College and Hospital, Bengaluru, Karnataka
Email: thumatiprafulla@gmail.com

Abstract:
Meniere's Disease/Tinnitus (MD) remains a significant challenge to diagnose and treat effectively. This case report intends to assess the measured influence of DTR (Disclusion Time Reduction Therapy) treatment in patients diagnosed with Meiners disease. A patient suffering from Tinnitus and diagnosed by ENT specialists was referred to our dental office to look for any dental component that could be a point of concern. The Meiners symptoms of ear fullness, vertigo, and tinnitus before DTR reduced post-treatment significantly in intensity, duration, and frequency and correlated to symptom improvements or resolution at post 1 month and 3 months. Occlusal forces and timing were the major contributors to the Tinnitus/MD condition in this patient. Menier's disease may have an unnoticed occlusal etiology in long Disclusion Time. Disclusion Time Reduction therapy should be considered a treatment option in patients diagnosed with MD.

Key Words: Tinnitus, Meniere's Disease (MD), Immediate Complete Anterior Guidance Development (ICAGD) Coronoplasty, Vertigo, Disclusion Time Reduction (DTR).

Introduction:
There is a debate in the health field that excessively unbalanced occlusal forces produced during mastication and other functions can induce hearing problems. [1] In 1936, Costen observed that the loss of posterior tooth support could cause the mandibular condyles to shift posteriorly, exerting pressure on the tympanum. This compression could affect the eustachian tube, auriculotemporal nerve, and/or chorda tympani. [2,3] The research question is, does unbalanced occlusal force induce ear symptoms?

Meniere's Disease (MD) has been extensively studied since Prosper Meniere first described it over 150 years ago. [4] However, its diagnosis and management continue to present significant challenges for clinicians. [5-10] There is still no consensus regarding the etiology of MD, particularly in relation to endolymphatic hydrops. [9-16]

Kerstein's published study theorized that masticatory muscle hyperactivity during oral functions and parafunction due to prolonged mechanoreceptor compressions in the periodontal ligament (pdl) of posterior teeth may lead to signs and symptoms of temporomandibular dysfunction (TMD). [17] In the last 3-4 decades, the development of biometric tools for digital analysis of occlusal forces, electromyography of masticatory muscles, joint vibratography for temporomandibular joints, study of mandibular movements using a kinesiograph helped reveal the unknown terrain of influence of occlusal forces. [18-22] TMD symptoms such as

primary headaches, hearing loss, tinnitus, ear pain, pain around the eyeball, neck pain, and facial pain are the main ones. A study by Lee et al shows that unilateral mastication was associated with hearing loss at different frequencies. [23] A study by Di Berardino et al and Peroz showed that tinnitus symptoms are more frequent in patients with occlusal disorders. [24]

Objective occlusal measurements conducted using digital occlusal technology (T-Scan 10/BioEMG III; Tekscan, Inc., S. Boston, MA, USA; Bioresearch Assoc., Milwaukee, WI, USA) (Figure 1) showed an imbalance in occlusal forces and prolonged exclusion time (DT) bilaterally. The patient opted to address the underlying occlusal dysfunction, which led to a significant improvement in MD/tinnitus symptoms, including the restoration of previous hearing loss, as confirmed by audiometric testing following occlusal treatment.

Case Report:

A patient diagnosed with Tinnitus/Meniere's Disease (MD) by an otolaryngologist (ENT) was assessed at our dental office, which provides specialized Disclusion Time Reduction (DTR) therapy for individuals with temporomandibular dysfunction (TMD). The patient had previously undergone magnetic resonance imaging (MRI), which excluded the presence of auditory neuromas.

The dental practice was located at Raja Rajeshwari Dental College, Department of Orofacial Pain in Bengaluru, India. The Otolaryngology Department of Raja Rajeshwari Medical College referred this patient who met for dental evaluation.

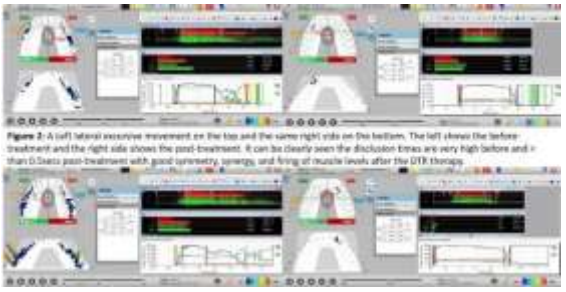
Informed consent was obtained from the patient for both the DTR coronoplasty procedure and the collection of data on the severity, frequency, and duration of tinnitus/MD symptoms via questionnaires. The patient's oral health history was also recorded, with the patient reporting MD symptoms such as ear fullness, tinnitus, vertigo (including drop attacks), and hearing loss in at least one ear.

Before the development of Immediate Complete Anterior Guidance (ICAGD), the participant underwent an excursive assessment of right and left lateral movements using the synchronized T-Scan 10/BioEMG III system (Tekscan Inc., S. Boston, MA, USA; Bioresearch Assoc., Inc., Milwaukee, WI, USA) (Figure 1).

Figure 1: T-Scan 10/BioEMG III measuring the temporalis (red leads) and masseter muscles (green leads) in real-time. Subjects closed firmly into their Maximum Intercuspation Position (MIP) and clenched their teeth together for 1- 3 seconds.

Description of DTR Therapy with the ICAGD Coronoplasty:

Clinical maximum intercuspation (MIP) photographs of the subject, along with her right and left excursive occlusal relationships, were taken before any ICAGD procedures. On the first day of treatment, recordings were made, including right and left excursive T-Scan/BioEMG data, as well as pre-treatment exclusion durations (DT) and excursive electromyography (EMG) levels. These initial measurements were recorded for comparison with the DT and EMG values following ICAGD (Figure 2).



ICAGD occlusal corrections were performed in 2 phases:

• **ICAGD Phase I adjustments –**The patient's teeth were air-dried, and then the patient closed ICAGD occlusal corrections were carried out in two phases:

• **ICAGD Phase I adjustments** – The patient's teeth were air-dried, and the patient then closed into the maximum intercuspal position (MIP) with articulation paper (Arti-Fol® Red, 8µ, Bausch, Germany) inserted. The patient was instructed to initiate a right outward excursion to contact the right canine's incisal edges,

return to the MIP, then perform a left excursion to the incisal edges of the left canine before sliding back into the MIP. Pre-treatment T-Scan/BioEMG recordings were used to identify and correct extended excursive contacts, marked with articulation paper, using finishing burs (Mani Dia-Burs, Japan), leaving contact points on the central fossa, tip, and marginal ridges.

• **Phase II** – Modifications to the usual closure at MIP. After all posterior quadrants underwent ICAGD, the subject performed unguided mandibular closures to MIP. All high-force contacts were refined until the new MIP felt "comfortable". When only the contacts in the MIP remained and the trajectory of the center of force rested on the midline of the arch, indicating that there was good occlusal balance, the closure adjustments were complete.

Post-therapy recordings were taken in the same manner as pre-treatment to verify that the excursion times were accurate (Figure 2). The patient was followed up on day 1, one month, and three months to refine the procedure, allowing the muscles to heal after the occlusal corrections. At each of the three visits, the patient completed new questionnaires assessing the frequency, duration, and intensity of symptoms.

Symptoms of vertigo, tinnitus, and ear fullness, along with their duration and frequency, showed a decrease from baseline to three months post-DTR. The disclusion time (DT) was reduced to less than the neurophysiological level of <0.5 seconds, and the symmetry, synergy, and muscle EMG firing were all neurophysiologically healthy, as indicated by EMG measurements.

Discussion:

The findings in this patient support earlier clinical studies on Meniere's disease (MD) (Sutter, 2016, 2019), which showed that reducing the lateral excursive time through ICAGD led to significant improvement in MD symptoms within a short time frame, lasting up to six months. The complexity of MD may be partly due to the fact that both medical and dental fields have been investigating the wrong factors for answers. This case report suggests that MD and malocclusion may not be separate conditions, but rather two aspects of the same underlying disease process, diagnosed differently depending on whether the diagnosis comes from an otolaryngologist or a dentist. Treating the true cause of MD could prevent the recurrence of symptoms and stop the disease from worsening. The authors recommend that the Academy of Otolaryngology-Head and Neck Surgery implement a symptom screening protocol to include MD under the scope of temporomandibular disorders (TMD), helping avoid unnecessary treatments and inefficient use of resources.

This case confirms that the patient diagnosed with MD experienced a reduction in the frequency, duration, and intensity of symptoms, as well as a decrease in muscle activity, after shortening the lateral excursion time through computer-guided coronoplasty. Although occlusion has not been widely acknowledged as a potential cause of MD in both medical and dental literature, the findings of this study indicate that malocclusion—especially issues related to bite force and timing—may be the root cause of the symptoms experienced by this MD patient.

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