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ASSOCIATION OF VITAMIN D SUPPLEMENTS IN PAIN MANAGEMENT OF PATIENTS WITH TMD – A CROSS-SECTIONAL STUDY

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Abstract:
Background: Temporomandibular disorder (TMD) is characterized by pain and dysfunction in the temporomandibular joint (TMJ) and the masticatory apparatus. Associations with autoimmune diseases, inflammatory conditions, and nutrition deficiencies have been reported in previous studies of TMD patients. Typical signs and symptoms of TMDs are facial pain, clicking or crepitus of the TMJs, limited jaw movement capacity, and a deviation in the movement patterns of the mandible. Various studies have shown that reduced serum levels of vitamin D are associated with musculoskeletal disorders and data about vitamin D status and TMDs are limited. Serum vitamin D levels are a reliable qualitative and quantitative tool to assess bone metabolism and health. The objective of this study was to evaluate the Vitamin D supplements in the pain management of TMD Patients.
Material and Methods: In this study, 500 patients diagnosed with TMDs were included. VAS scale, inter incisal opening, Clicking of TMJ, and Serum calcium were evaluated before and after Vitamin D supplements.
Result: Post-treatment Mean SD is 4.21 (1.67) compared to the Pre-treatment Mean SD is 7.12 (2.87) found a highly significant statistical difference between pre and post-treatment with Vitamin D supplementation for relief of pain. The significant statistical difference found in other parameters
Discussion: Temporomandibular disorders are a collective cause of craniofacial pain. The most collective symptom recounted by patients with TMD is unilateral facial pain. Patients suffering from TMD who have low Vitamin D may benefit from this treatment.
Conclusion: Our study revealed that TMD patients with deficit Vitamin D levels benefitted more with supplementation of the same whereas those with normal/almost normal Vitamin D levels had little benefit from supplementation.

Keywords: Temporomandibular disorders (TMDs), Vitamin D, TMJ,

Introduction:

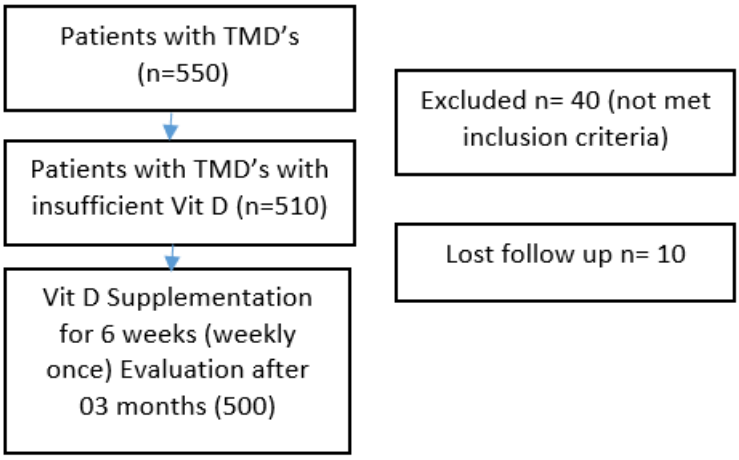
Vitamin D is an important component in calcium homeostasis, which is known to have a key role in bone health, including articular structures and muscles[1]. Vitamin D is a fat-soluble vitamin that plays a crucial role in diverse physiological processes in the body. Vitamin D has been implicated in various

other physiological processes, including immune function. Vitamin D deficiency is associated with an increased risk of several chronic diseases, including osteoporosis, type 2 diabetes, autoimmune diseases, and musculoskeletal disorders.[2,3] Low levels of vitamin D_3 have been linked with the presence of recurrent aphthous stomatitis [4] and may increase the risk of the development of periodontal disease.[5] Temporomandibular disorders (TMDs) are a set of clinical problems involving the masticatory musculature, the temporomandibular joint (TMJ), surrounding structures, or combinations of these components.[6] The signs and symptoms of TMDs are facial pain, clicking or crepitus, and a deviation in the movement of the mandible leading to chronic pain, joint noise, and functional difficulty.[7,8] The aetiological factors are not clearly understood but prolonged use of mastication muscles, altered skeletal maturity, malocclusion, trauma and psychological disorders could be potential risk factors.[9-11] Previous studies have shown that reduced serum levels of 25 (OH) vitamin D are associated with musculoskeletal disorders, such as chronic low back-leg pain and fibromyalgia, however, very few studies have shown data regarding the association of vitamin D status in pain management of TMD's. A Visual Analogue Scale (VAS) is one of the pain rating scales used for the first time in 1921 by Hayes and Patterson.[12] Vitamin D supplementation in patients who had deficiency, should improve symptoms of TMD[13]. Various treatments done for TMD include medication, occlusal splints, physiotherapy, and surgical interventions. This study was conducted with the aim of Association of Vitamin D supplements in the Pain Management of Patients with temporomandibular joint disorders.

MATERIAL AND METHOD:

500 patients of different age groups and gender were included in this prospective study who reported to the Department of Oral and Maxillofacial Surgery, with TMJ disorder according to research diagnostic criteria. VAS scale, inter incisal opening, Clicking of TMJ, and Serum calcium were evaluated before and after Vitamin D Supplements Vitamin D also plays an important role in maintaining calcium levels because the body needs it to absorb calcium. Both pretreatment and post-treatment parameters were recorded. Patients diagnosed with TMJ disorder according to research diagnostic criteria by Dworkin S F. were included in the study. And Patients with Vitamin D deficiency less than 20ng/ml. Patients with systemic illnesses and not give consent were excluded from the study.

For vitamin D levels samples 2ml collected in PBS vials and sent to the biochemistry lab. After measuring vitamin D levels patients with vitamin D deficiency will be supplemented with vitamin D tablets (60000 IU weekly once with milk). The Visual Analogue Scale (VAS) measures pain intensity. The VAS consists of a 10cm line, with two endpoints representing 0 ('no pain') and 10 ('pain as bad as it could be').



RESULTS:

Out of 500 subjects included in this study, 290 were female and 210 male patients diagnosed with TMD and their serum vitamin levels were deficient (below 20ng/ml). The mean age of the patients was found to be 36 years (ranging from 20-50 years).

Pre and Post-Treatment Pain: Pain score was measured on the VAS scale supplementation with vitamin D 60,000 I.U/week for 6 weeks in the form of tablets to be taken once a week along with milk. The mean VAS score after 3 months. Post-treatment Mean SD is 4.21 (1.67) compared to the Pre-treatment Mean SD is 7.12 (2.87). found a highly significant statistical difference between pre and post-treatment. (P<0.001) (Table 1)

Pre and Post-Treatment Inter-Incisal Opening: The maximal inter-incisal mouth opening was noted before and after vitamin D supplements. Post-treatment Mean SD is 5.12 (2.65) compared to the Pre-treatment Mean SD is 4.32 (2.08). found significant statistical differences between pre and post-treatment. (P=0.013) (Table 2)

Pre and Post-Treatment Clicking of TMJ: Post-treatment clicking of TMJ was found in 74/500 (14.8%) compared to Pre-treatment 121/500(24.2%) patients. found significant statistical differences between pre and post-treatment. (P=0.004) (Table 3)

Pre and Post-Treatment of Serum Calcium Levels: Normal serum calcium levels 9-11mg/dl. Post-treatment clicking lower level of serum calcium found in 25/500 (5.0%) compared to Pre-treatment 39/500(7.8%) patients.

Table 1: Comparison of pre and post treatment pain via VAS score after administration of supplemental Vit D therapy

	PRETREATMENT Mean (SD)	POST - TREATMENT Mean (SD)	Paired t test value	P value, Significance
VAS SCORE	7.12 (2.87)	4.21 (1.67)	t= 18.72	P< 0.001** (highly significant statistical difference)

**p< 0.001 – highly statistical significant difference

Table 2: Comparison of pre and post treatment maximal interincisal opening after administration of supplemental Vit D therapy

	PRETREATMENT Mean (SD)	POST - TREATMENT Mean (SD)	Paired t test value	P value, Significance
Maximal Mouth opening (in mm)	4.32 (2.08)	5.61 (2.65)	t = 8.361	P=0.013* (significant statistical difference)

*p< 0.05 – statistical significant difference

Table 3: Comparison of pre and post treatment clicking of TMJ after administration of supplemental Vit D therapy

	PRETREATMENT n (%)	POST - TREATMENT n (%)	Chi square test value	P value, Significance
Clicking of TMJ	121/500 (24.2%)	74/500 (14.8%)	Chi = 5.73	P=0.004* (significant statistical difference)

*p< 0.05 – statistical significant difference

Discussion:

Temporomandibular disorders are a collective cause of craniofacial pain. The most collective symptom recounted by patients with TMD is unilateral facial pain. vitamin D (25-OHD) plays a role in a wide range of processes in the body as it is required to control Ca+2 absorption and homeostasis. Low levels of vitamin D have been a concern in a numeral of chronic diseases including RA[14,15]. Dietary Ca+2 absorption is critical for Ca+2 availability for bone mineralization and vitamin D status is a significant parameter influencing intestinal Ca+2 absorption[16]. Management involves

multidisciplinary treatment modalities for the relief of pain and associated symptoms. The biologically active form of vitamin D 1,25-(OH)2 D3 inhibits IFNs[17].

Our results for TMD's Pain are similar Vitamin D, according to Park, may help to prevent joint pain. Patients suffering from TMD who have low Vitamin D may benefit from this treatment. A systemic review of Kui et al[18]. In Khanna, S.S. et al [19] showed that low serum vitamin D levels were associated with TMJ pain and/or discomfort, which had a significant (p = NR) negative impact on the various activities of daily living of the participants similar to our results.

CONCLUSION:

Vitamin D serum levels could often be lower in patients with a TMD. The potential relationship between vitamin D serum levels and TMD disorders, emphasizes the need for future studies to clarify the role of vitamin D in these detrimental conditions. The present study concludes that vitamin D can be considered a treatment option in TMD patients with vitamin D deficiency.

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