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ORIGINAL RESEARCH

Role of Vitamin D in pain management of patients with Temporomandibular Disorders (TMD's)

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ABSTRACT:

Introduction: Temporomandibular disorder (TMD) is characterized by pain and dysfunction in the temporomandibular joint (TMJ) and the masticatory apparatus. Approximately, 35% of individuals in the whole world suffer from temporomandibular disorder within their lifetime, thereby making it one of the most common problem affecting individuals worldwide. 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. Previous studies have shown that reduced serum levels of vitamin D are associated with musculoskeletal disorders, such as chronic low back-leg pain and fibromyalgia, however, data regarding vitamin D status and TMDs are limited. The aim of our study was to evaluate role of vitamin d in pain management of patients with temporomandibular disorders. **Material and Method**: 100 patients of different age groups diagnosed with TMD according to research diagnostic criteria were evaluated for pain relief in terms of pre & post treatment pain via VAS scale, Pre and post treatment maximal interincisal opening & Pre and post treatment clicking of TMJ following Vitamin D supplementation with a follow-up period of 6 months. **Research**: Our study revealed that TMD patients with deficit Vit D levels benefitted more with supplementation of same whereas those with normal/almost normal Vit D levels had little benefit from supplementation. **Discussion**: Present study reveals that Vitamin D supplementation can be a simple, safe and reliable method of pain alleviation in TMD patients with Vitamin D deficiency.

INTRODUCTION:

Temporomandibular disorder (TMD) is characterized by pain and dysfunction in the temporomandibular joint (TMJ) and the masticatory apparatus.[1] Approximately, 35% of individuals in the whole world suffer from temporomandibular disorder within their lifetime, thereby making it one of the most common problem affecting individuals worldwide. Associations with autoimmune diseases, inflammatory conditions, and nutrition deficiencies have been reported in previous studies of TMD patients. Summary from the Prospective Evaluation and Risk Assessment (OPPERA) project describes the etiology of TMD as complex and multifactorial, where pain sensitivity, biopsychosocial effects, and comorbidity are some of the contributing factors.[2] 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. Not surprisingly, studies have shown an association between low vitamin D

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status and musculoskeletal disorders. 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, data regarding vitamin D status and TMDs are limited. Patients with TMD as well as TMJD showed high prevalence of nutrition deficiencies, including iron, ferritin, vitamin D, vitamin C, vitamin B1, vitamin B6, vitamin B12, and folate.[1] Kashmir has often being reported as a high-incidence area for Vit D deficiency because of the climatic conditions and life style. To our knowledge, there are not enough studies investigating the association of TMD'S with Vitamin D deficiency in the literature. The aim of our study was to evaluate role of vitamin D in pain management of patients with temporomandibular joint disorders.

AIMS & OBJECTIVES:

The proposed work was aimed to evaluate whether Vitamin D supplementation has a role in pain management in patients with TMJ-Disorders.

MATERIAL AND METHOD:

100 patients of different age groups and gender were included in this prospective study who reported to the Department of Oral and Maxillofacial Surgery, Government Dental College and Hospital, Srinagar with TMJ disorder according to research diagnostic criteria[25].The patients were evaluated in terms of pre & post treatment pain via VAS scale, Pre and post treatment maximal interincisal opening & Pre and post treatment clicking of TMJ following Vitamin D supplementation with a follow-up period of 6 months.

INCLUSION CRITERIAS:

- Patients diagnosed with TMJ disorder according to research diagnostic criteria by Dworkin S F.
- Patients with Vitamin D deficiency less than 20ng/ml.

EXCLUSION CRITERIAS:

- Patients with other systemic illnesses.
- Patients with obvious pshychiatric diagnosis.
- Patients with Wilkies Class IV TMJ disorder.

PROCEDURE:

The 100 patients diagnosed with TMD according to research diagnostic criteria were subjected to the following steps:

- Patients name, age, sex, address, signs and symptoms were recorded.
- All the selected patients underwent vitamin D level tests.
- For vitamin D levels- sample (2-3ml blood) was collected in PBS vials and sent to biochemistry lab.
- Vitamin D levels were measured according to standard measurement units.
- After measuring vitamin D levels, patients with vitamin D deficiency were supplemented with vitamin D (60000 IU weekly for 4 weeks) and after that relief of TMD was analyzed clinically through following parameters;

1. Pre and post treatment pain via VAS scale
2. Pre and post treatment maximal interincisal opening

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3. Pre and post treatment clicking of TMJ.

RESULTS:

Out of total 100 subjects included in this study, 69 were female and 31 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 39years (ranging from 20-48 years).The patients were evaluated for the following variables:

PRE AND POST OPERATIVE PAIN: Pain score was measured on VAS scale and 65 out of 100 patients reported with relief of symptoms 15-30 days after supplementation with vitamin D 60,000 I.U/week for 6 weeks either in the form of tablets, sachets or bottles. Mean VAS score after 3 months and 6 months was found to be 0.41 and 0.32 respectively. The remaining 15 patients did not present with significant pain relief after Vitamin D intake.

PRE AND POST TREATMENT INTER-INCISAL OPENING: The maximal inter-incisal mouth opening was noted before and after vitamin D intake 71 out of 100 patients reported improvement in mouth opening and remaining 9 patients had no significant improvement.

PRE AND POST OPERATIVE CLICKING OF TMJ: 80 out of 100 patients reported with relief in clicking on TMJ. 1 -2 months after intake of vitamin D supplementation.

DISCUSSION:

Temporomandibular disorders are a heterogeneous group of diseases involving the temporomandibular joint and related structures, mainly characterised by symptoms such as alterations in joint movement, articular sounds or pain.[3] A lot nonsurgical, minimally invasive surgical procedures have been advocated till now for the management of these disorders but most of the researches are either based on symptomatic treatments or disc related issue.[5]

While musculoskeletal conditions are responsible for at least 50% of TMDs, osteoarthritis and disk displacement are the most frequent intra-articular disorders of temporomandibular joints (TMJs). Since pain is often the main symptom that determines the patients to seek medical aid, TMD diagnosis requires a thorough medical history and physical examination. [3,4,15]

As the etiology of TMDs is multifactorial, their management protocol often involves a multidisciplinary approach. The initial aim of therapy should be resolving pain and dysfunction, while invasive treatments such as joint surgery should be reserved for nonresponsive cases.[6,7,16] Among the conservative therapies, patient education and self-care, physical therapy, medication (non-inflammatory drugs and muscle relaxants), and the use of occlusal splints and occlusal adjustments are often indicated.[15,17]

Vitamin D is synthesized in the skin with the aid of ultraviolet-B radiation and converted to the active form 1,25-dihydroxyvitamin D in two steps, which binds to the vitamin D receptor (VDR).[18] Compared with1,25-dihydroxyvitamin D (which has a half-life of four hours), the pro-form 25-hydroxyvitamin D has a half-life of about three weeks, and it is also more stable than the former. As a result, 25-OHD is used to determine the vitamin D status .[19,20]

Whether synthesized endogenously in the skin after sun exposure or ingested in the diet, vitamin D (25-OHD) plays a role in a wide range of processes in the body. Vitamin D is required for a healthy musculoskeletal system, as it plays an important role in calcium and phosphorus metabolism—not only by increasing their intestinal absorption and regulating the

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parathyroid hormone (PTH) production, but also by inducing the pre-osteoclasts to become mature osteoclasts.[21-23]

The present study revealed that Vitamin D supplementation is beneficial for majority of patients having deficient vitamin D levels with TMD & presenting with pain, decreased mouth opening and clicking in TMJ. In this study, TMD patients with deficiency of vitamin D were supplemented with vitamin D 60,000I.U/week for 6 weeks and the parameters were found to improve in majority of patients. However, a lesser number of patients did not report significant improvement post vitamin D supplementation.

CONCLUSION:

The present study concludes that vitamin D can be considered a simple, reliable and non-invasive treatment option in TMD patients with vitamin D deficiency.

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