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CASE REPORT

Temporomandibular Joint Dysfunction Syndrome associated with Betel Nut Chewing: A Clinical Study

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ABSTRACT

Background: The clinical course of temporomandibular joint (TMJ) dysfunction syndrome was studied among 100 patients between the age of 20 and 50 years. Clicking and pre auricular pain appeared to be the predominant symptom in all age groups. The findings of the study revealed that most of all the patients had a generalized attrition, generalized stains, and the occurrence of pain dysfunction syndrome (PDS). The chewing habit of betel nut in this place is different from the rest of India. In this place, people chew the hardest form of betel nut.

Aims: The aim of this study is to create awareness among people regarding betel nut chewing and its associated TMJ problems.

Materials and methods: This study was conducted at the Department of Oral and Maxillofacial Surgery of Dr. H Gordon Roberts Hospital, East Khasi Hills, Shillong, Meghalaya, India. The study consisted of 100 patients. All the patients were subjected to a clinical examination.

Results: Prolonged duration of betel nut chewing will cause the masticatory forces to be transmitted to the TMJ and subsequently causes temporomandibular joint dysfunction syndrome.

Conclusion: Prolonged betel nut chewing may give rise to TMJ dysfunction syndrome. The consistency of the betel nut also plays a major role in temporomandibular joint dysfunction syndrome. Clicking and preauricular pain appeared to be the predominant symptoms for all age groups. The incidence was higher in females than in males.

Keywords: Chewers' mucosa, Myofacial pain dysfunction syndrome, Pain dysfunction syndrome, Temporomandibular joint.

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INTRODUCTION

Betel nut is the fourth most commonly used psychoactive substance in the world after caffeine, alcohol, and nicotine. Betel nut is present in a number of chewing products like mawa, paan, gutkha, and paan masala.[1] Reasons for using betel nut include achieving euphoria, combating fatigue, increasing salivation, attaining satiation, and even seeking relief from toothaches. When consuming betel nut in the absence of tobacco or lime, it may have potentially harmful effects on the oral cavity.[2] These effects can be divided into two broad categories: Those affecting the dental hard tissues, which include teeth, their supporting periodontium, and the temporomandibular joint (TMJ), and those affecting the soft tissues, you can go ahead with mucosa, which lines the oral cavity. It has been speculated that the chewing forces generated during habitual betel nut use could give rise to deterioration of the TMJ.[3] This article aims to review the effects of betel nut chewing and its associated TMJ problems.

AIMS

The aim of this study is to create awareness among people regarding betel nut chewing and its associated TMJ problems.

OBJECTIVES

- To explain the harmful effects of betel nut.
- To find out the problems of betel nut chewing related to oral musculature.
- To find out the incidence of betel nut chewing and its associated TMJ problems.

MATERIALS AND METHODS

This study was conducted at the Department of Oral and Maxillofacial Surgery of Dr. H Gordon Roberts Hospital, East Khasi Hills, Shillong, Meghalaya, India. The study consisted of 100 patients. All the patients were subjected to a clinical examination (Fig. 1).



Fig. 1: Superior view of betel nut

CRITERIA FOR SELECTION

Inclusion Criteria

- Patients of age groups between 20 and 50 years
- Patients of both sexes
- Chronic betel nut chewers
- Patients chewing betel nut for more than 8 hours a day.

Exclusion Criteria

- Chronic betel nut chewers with other pathologies
- Oral cancer patients.

RESULTS

In all the cases, TMJ pain was mainly because of betel nut chewing. Prolonged duration of betel nut chewing causes the masticatory forces to be transmitted to the TMJ and subsequently causes TMJ dysfunction syndrome.

DISCUSSION

Chewing areca nut on a habitual basis is known to be deleterious to human health. Epidemiological and experimental studies has shown that even when consumed in the absence of tobacco or lime, areca may have potentially harmful effects on the oral cavity. These effects can be divided into two broad categories: Those affecting the dental hard tissues, which include teeth, their supporting periodontium, and the TMJ, and those affecting the soft tissues, which make up the mucosa, which lines the oral cavity.[3]

Effects on Hard Tissues

The main effects of areca on the hard tissues are on the teeth. The habitual chewing of areca may result in severe wear of incisal and occlusal tooth surfaces, particularly the enamel covering. The loss of enamel may also expose the underlying dentin; the exposure of dentin may also result in dentinal sensitivity. The degree of attrition is dependent upon several factors, which include the consistency (hardness) of the areca, the frequency of chewing, and the duration of the habit. Root fractures have also been demonstrated in chronic areca chewers, and this is likely to be a consequence of the increased masticatory load, i.e., placed upon the teeth and is not the direct effect of areca.[1]In our study the areca used by the patients were hard in consistency and the duration of chewing was also more than 6 hours.

Among areca chewers, extrinsic staining of teeth due to areca deposits is often observed particularly when good oral hygiene prophylaxis is lacking and where regular dental care is minimal,[4] which correlates with our study, where all the patients had generalized staining and poor oral prophylaxis. It has been suggested that areca chewing may confer protection against dental caries. Although little is known about the cariostatic properties of areca, it has been suggested that the betel stain, which often coats the surface of the teeth, may act as a protective varnish.[5] There is also *in vitro* evidence that suggests that the tannin content of areca may have antimicrobial properties, and this may contribute to the cariostatic role of areca. In addition, chronic chewers also have marked attrition of cusps of teeth, leading to loss of occlusal pits and fissures, which may reduce the risk of pit and fissure caries by eliminating potential stagnation areas. The increased production of sclerosed dentin in response to attrition may confer protection against microbial invasion. Furthermore, the process of chewing itself brings copious amounts of saliva to the mouth, and in the presence of added slaked lime, it may increase the pH of the oral environment; this may act as a buffer against acid formed in plaque on teeth.[5]

The masticatory forces generated during chewing areca may be transmitted to the TMJ and subsequently may give rise to TMJ dysfunction syndrome. Temporomandibular joint dysfunction syndrome named by Schwartz has a plethora of synonyms, such as facial arthromyalgia, mandibular pain dysfunction syndrome (MPDS), TMJ dysarthrosis, and TMJ arthrosis.[6]

No organic changes in TMJ can be detected clinically. In early lesions, there is loss of the usual smooth surface. In later stages, there is total loss of the entire amorphous layer, and the superficial collagen masses consist only of small diameter fibrils. Disorganization of the articular surface occurs in case of more sever and prolonged disorder.[6]

The pathological change in muscles is indefinite. There will be raised intramuscular pressure attributing to edema, increased blood flow, degranulating mast cells seen in histological examination of painful muscles, no

evidence of increased levels of creatinine kinase,[6] pain, limitation of mandibular movement, muscle hypersensitivity, abnormal muscle activity, clicking sounds of the joint, jointlock, and emotional factors. Furthermore, symptoms, such as trismus are common to both TMJ pathology and other oral disorders associated with areca chewing, such as oral submucous fibrosis. It is difficult to distinguish a direct effect on the TMJ from the fibrotic involvement of the oral musculature that may contribute to limitation of mouth opening in chronic chewers.[6] In our study, the patients had clicking sounds of the joint, pain, and limitation of mandibular movement.

A provisional diagnosis of TMJ dysfunction syndrome is made when no organic lesion is detected clinically to account for the patient's symptoms and signs. The most common radiographs taken for viewing TMJ are lateral transcranial view, transpharyngeal views, TMJ tomography, orthophantoamogram, and arthrography.[6]

The management for TMJ dysfunction syndrome is conservative and surgical. Conservative management includes placebo, reassurance, occlusal correction, soft diet, splints, intermaxillary fixation, thermal agents, cold compressions, Iontophoresis, TENS (transcutaneous electric nerve stimulation), home exercise program for hypomobility, pressure point techniques, muscle injection, intra-articular injections, NSAIDs, muscle relaxants, corticosteroids, anxiolytics, and antidepressants.[7]

Surgical management includes arthrocentesis and lavage, arthroscopy, disk repositioning, disk removal followed by autologous graft disk displacement, alloplastic disk replacement, condylotomy, and condylectomy.[7]

Effects on Soft Tissues

Periodontal Disease

In vitro studies have demonstrated that areca extracts containing arecoline inhibit growth and attachment of protein synthesis in human-cultured periodontal fibroblasts. Areca may be cytotoxic to periodontal fibroblasts and may exacerbate preexisting periodontal disease as well as impair periodontal reattachment. The loss of periodontal attachment and calculus formation is greater in areca chewers.[8] Furthermore, as the majority of chewers are in the Indian subcontinent, where oral health education is limited, periodontal health may be compromised even in non-areca chewers. It is therefore difficult to ascertain the biological effects of areca on periodontal health, but in view of the recent *in vitro* evidence, further clinical and experimental studies are necessary.

Lichenoid Lesions

Areca-induced lichenoid lesions, mainly on buccal mucosa or tongue, have been reported at sites of quid application. This is considered to be a type IV contact hypersensitivity-type lesion but resembles oral lichen planus clinically. The main detectable features are that it is found at the site of quid placement in areca chewers and may be unilateral in nature. Fine wavy keratotic lines are seen to radiate from a central red/atrophic area, and interestingly, the keratotic striae do not criss-cross and are parallel to each other. The histology is suggestive of a lichenoid reaction, and the lesion is noted to resolve following cessation of areca use.[9]

Betel Chewer's Mucosa

This condition was first described by Mehta and is characterized by a brownish-red discoloration of the oral mucosa. This discoloration is often accompanied by encrustation of the affected mucosa with quid particles, which are not easily removed, and with a tendency for desquamation and peeling. The underlying area assumes a wrinkled appearance. The lesion is usually localized and associated with the site of quid placement in the buccal cavity. The lesion is associated strongly with the habit of betel quid chewing, particularly in elderly women who have been chronic chewers for long durations. At present Betel chewer's mucosa is not considered to be potentially malignant, although the condition often co-exists with other mucosal lesions, such as leukoplakia and oral submucous fibrosis, which are well known for their potential for malignant change.[10]

Oral Leukoplakia

Leukoplakia can be defined as a predominantly white patch or plaque on the oral mucosa that cannot be characterized clinically or pathologically as any other disease and is not associated with any other physical or chemical agent except tobacco. Based on clinical appearance, leukoplakia can be divided into several subtypes: Homogeneous, speckled, nodular, or verrucous. This condition is well known for its potential malignant change. Further evidence of its relationship with areca chewing has come from the increased prevalence of this condition in subjects who suffer from oral submucous fibrosis, which is associated strongly with the habit of areca chewing.[11]

Oral Submucous Fibrosis

This is a chronic disorder characterized by fibrosis of the lining mucosa of the upper digestive tract involving the oral cavity, oro- and hypopharynx, and the upper third of the esophagus.[12] The fibrosis involves the lamina propria and the submucosa and may often extend into the underlying musculature resulting in the deposition of dense fibrous bands, which give rise to the limited mouth opening, which is a hallmark of this disorder.[13]

Early blanching of mucosa, fibrous bands, intolerance to spicy food, trismus, petechiae, flattening of palate, depapillation of tongue, hockey-stick uvula, oral ulceration, reduced tongue mobility, leathery mucosa, xerostomia, taste disturbance, and keratosis.[14]

Oral Squamous Cell Carcinoma

If the premalignant condition is not treated, it can be transformed into malignancy, resulting in oral squamous cell carcinoma.[15]

CONCLUSION

Based on the study, following conclusions were made. Prolonged betel nut chewing may give rise to TMJ dysfunction syndrome. Clicking and preauricular pain appeared to be the predominant symptoms for TMJ dysfunction syndrome. The consistency of betel nut chewing plays a major role in TMJ dysfunction syndrome. The incidence was higher in females than in males.

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