

CHRONIC MUCOSAL TRAUMA AND ORAL CANCER -A REVIEW

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ABSTRACT

Chronic mucosal trauma resulting from sharp teeth, dentures, faulty restoration, or implants has frequently been associated with the development of oral cancer. Oral mucosal lesions affect the quality of life of many patients and are an apparent indicator of oral and general health. The aim of these series of cases is to present interesting clinical oral manifestations that demonstrate the relationship between oral hygiene, chronic irritation, dysplasia, and oral squamous cell carcinoma. Oral mucosal changes related to chronic trauma or irritation can greatly impact patient's oral as well as general health.

KEYWORDS: Sharp teeth, Ill-fitting denture, Dental materials

INTRODUCTION:

In humans, carcinogenesis is multifactorial. Tobacco and alcohol are often cited as significant causes of oral cancer (1). However, they may not be the cause of all cancers, and people who are not exposed to such factors may develop cancerous lesions. This means that oral cancer is caused by other causes, one of which is chronic mucosal trauma.

CMI of the oral mucosa is the effect of continuous injuring by the mechanical action of an intraoral injury agent. Ill-fitting dentures (sharp or rough surfaces, lack of retention, flexibility, or overextended flanges) and/or parafunctional behaviours (e.g. oral mucosa chewing or sucking, tongue interposition or thrusting), operating individually or together, may all be responsible for any mechanical discomfort (2) CMI can cause changes in the healthy mucosa or exacerbate existing oral diseases (3). CMI causes a number of changes in terms of length and severity. If the stimulus is mild (frictional keratosis), the effects could range from a hyperproliferative epithelial response to several levels of tissue injury (atrophy, erosion, ulcer) if it is intense or lasts longer (chronic traumatic ulcer), often with fibrous connective tissue growth (Reactive hyperplasia, e.g. Denture-induced fibrous hyperplasia). (4) CMI has been suggested as a promising risk factor for oral cancer (5), and also as a potentially malignant condition (6), but this suggestion is uncertain due to the lack of evidence to back it up (7).

According to some scholars, the association between OC and CMI may be due to tumour growth; the larger the tumour, the greater the risk of injury. Limited samples or inadequate monitoring of confounding variables hindered inferences in early epidemiological studies dealing with that relationship. Lockhart et al. discovered instances of OC in relation to mechanical discomfort from teeth or dentures, but their findings were inconclusive, implying that the sample size was limited. However, it should be remembered that extra-oral malignancies were used as a control group, and some of these cancers were later linked to poor oral health (7). Rosenquist et al. discovered a connection between OC risk and the presence of five or more defective teeth. (8) Defective teeth have been identified as a common finding in OC patients by some authors (9). In addition, a statistical link has been discovered between ill-fitting dentures and oral cancer (10). A recent meta-analysis found that wearing removable dentures increases the risk of OC, particularly if the dentures are ill-fitting.

MECHANISMS OF ORAL CANCER CAUSED BY MUCOSAL TRAUMA:

The role of chronic trauma in carcinogenesis has been the subject of numerous studies. Chronic trauma has been linked to the development of cancer in two ways, according to animal experiments. Persistent mechanical irritation to mucosa is thought to cause DNA damage, which could lead to the forming of cancer. Increased development of poly-ADP-ribose polymerase[11] in cases of chronic trauma has been shown to support this theory.

Chronic mucosal trauma causes inflammation, which releases chemical mediators including cytokines, prostaglandins, and tumour necrosis factor, according to the second suggested mechanism. Oxidative stress is caused by such inflammation. [nine] This could result in carcinogenesis by causing genetic and epigenetic changes that damage DNA, prevent DNA repair, alter transcription factors, prevent apoptosis, and stimulate angiogenesis. In a nutshell, inflammation may occur at various stages and lead to the development of cancer.

ORAL CANCER ASSOCIATED WITH DENTAL TRAUMA:

The lateral border of the tongue was found to be the most common site of tumour incidence in both smokers and nonsmokers in an Australian retrospective study[12]. Tumors on the lateral border of the tongue were twice as frequent in nonsmokers as they were in smokers. This means that the tongue's lateral boundary may be a source of persistent dental trauma. The correlation between chronic mucosal trauma and oral cancer was primarily related to tongue neoplasm in a Brazilian-Canadian[13] report. Another study[14] looked at a group of 28 oral malignant neoplasms and discovered that they all occurred in places where teeth and/or dental appliances came into contact. This strong connection between trauma and cancer development has been discovered. On the other hand, another study[15] found that the majority of oral cancers were found on the alveolar arch in 67 patients without any history of addiction. As a result of the evidence presented, the lateral border of the tongue may be considered the most common site of chronic trauma-related oral cancer.

ILL-FITTING DENTURE AND ORAL CANCER:

Denture wear has long been considered to be a source of chronic mucosal insult and subsequent cancer growth. Several studies have proven that association between oral cancer and ill-fitting denture. A multivariate analysis revealed that damaged or malfunctioning complete dentures were major risk factors for the development of oral squamous cell carcinoma in a population-based case-control study conducted in Sweden[16]. They concluded that chronic physical irritation of oral mucosa contributes to the topical carcinogenic effect of tobacco. Another study suggested that 44% of the patients showed a correlation between the site of cancer development and the site of some form of chronic dental irritation. As per study, damage associated with ill-fitting dentures has a higher risk of causing oral cancer, but the same cannot be said for well-fitting dentures.

ASSOCIATION OF ORAL CANCER WITH DENTURE MATERIAL:

There were only a few researches that addressed the types of denture material used and its role in causing mucosal irritation and subsequent cancer development. Many studies [17,18,19,20] have suggested that residual monomer in the denture base induces mucosal discomfort and tissue sensitization. Chemicals leached from acrylic resin have been linked to oral tissue irritation, inflammation, and even allergic reactions in numerous studies. However, there is no evidence that these resins are carcinogenic by nature.

SHARP TOOTH AND ORAL CANCER:

Chronic mucosal trauma may also result from sharp or broken teeth. Rosenquist K[17] and Velly AM et al[14] found that sharp teeth were associated with oral cancer. On the contrary, few other studies[7,22] suggested that sharp teeth were not associated with oral cancer. Sharp teeth do not appear to be a major risk factor for oral cancer based on the available research.

CASE PRESENTATION:

- **Case report :Chronic irritation from a sharp tooth edge**

A 49-year-old Chinese man was referred to Oral Medicine clinic at the Faculty of Dentistry, Chulalongkorn University and Bangkok, Thailand with an ulcerative and keratotic white lesion presented for more than 5 months. At the first visit, an oral examination showed a keratotic white patch and erythematous region on the gingiva of the right second mandibular premolar, as well as a mucobuccal fold extending to the retro molar area, that was covered with necrotic tissue on the surface. Keratotic white lesion and erythematous area are contacted with the sharp edge of the distal marginal ridge of the right second mandibular molar. In this case, the long-term irritation from a sharp tooth edge induced chronic inflammation and subsequently developed into a moderate epithelial dysplasia. Patient is

referred to dentist for oral hygiene control, grinding and polishing the sharp edge of the tooth, and was planned for the appropriate surgical treatment of the lesion.

● **Case report:Association with dental materials:**

A 66-year-old French man came to clinic with a painless mass on the left posterior palatal area. He had no systemic diseases, took no medications, and was a nonsmoker and nondrinker. He had many gold crowns and bridges in his oral cavity. A 2 × 1.5 cm mass with irregular surface was noted in close contact with his left maxillary first and second molar gold crowns. In this case, a long standing chronic irritation from corroded metal might induce an oral lichen planus like lesion and develop to OSCC.[23]

CONCLUSION:

As a result of this review, we may conclude that chronic mucosal irritation caused by ill-fitting dentures could be a risk factor for the development of oral cancer in the future. The lateral border of the tongue, as well as the alveolus, are more often affected by trauma-related cancers. Chronic oral mucosal trauma and irritation can affect a patient's oral health, general health, and life. Oral mucosal changes are a clear indicator of oral and general health. Oral medicine specialist and oral pathologist play an important role in the early diagnosis and management of oral lesions. Early diagnosis and proper management can prevent unfavorable outcomes in these patients.

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