



DENTURE STOMATITIS: MELATONIN AN EFFECTIVE NEW TREATMENT

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ABSTRACT

Denture-related stomatitis indicates an inflammatory process of the mucosa that bears a complete or partial removable dental appliance, typically a denture. The classical expression “denture sore mouth” is being abandoned as most patients show asymptomatic lesions. Nowadays, “denture stomatitis” stands for a mild chronic erythematous candidiasis, usually seen after middle age as erythema limited to the area beneath an upper denture, with the presence of the denture as the only common etiologic factor to these situations. It is not caused by allergy to the denture material. Melatonin, N-acetyl-5-methoxytryptamine, is a derivative of the essential amino acid tryptophan and is produced primarily in the pineal gland in mammals. Known as a regulator of circadian rhythm, it also has physiologic roles in oral medicine and dentistry. Oral cavity is affected by number of conditions such as periodontitis, mucositis, cancers and cytotoxicity from various drugs or biomaterials. Research has suggested that melatonin is effective in treating the aforementioned pathologies. The aim of this article is to critically analyze and summarize the research focusing on the concentration of melatonin in saliva & plasma of patients after application of melatonin to the restricted area of oral mucosa such as palate.

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INTRODUCTION

Since denture stomatitis was described as “sore mouth under plates”, several terms have been used in the past to define this condition: “chronic denture palatitis”, “stomatitis prothetica”, “denture related candidiasis” “denture-induced stomatitis” and “denture stomatitis”. Melatonin was found to be released with saliva into oral cavity and to be implicated in various dental and periodontal diseases. Due to the fact that circulating melatonin is bound to albumin, its salivary concentration is only about 20-30% of that in the plasma because only free melatonin can be secreted into the saliva in appreciable extent¹. According to the results the concentration of salivary melatonin under basal conditions is negligible but following local oral application of this indoleamine, its plasma level increases dose dependently & this is accompanied by the increase of salivary melatonin, reaching about 20% of that in plasma. This suggests that locally applied melatonin to the oral cavity lining may be useful in the treatment of oral lesions.² cutando *et al*³ reported recently that local application of melatonin into alveolar sockets in beagle dogs markedly reduced oxidative stress that follows tooth extraction.

Evaluating the salivary concentration of melatonin may serve as a reliable method of monitoring circadian rhythm of this indoleamine. Moreover, melatonin has several specific

functions in oral cavity. It acts as potent antioxidant & free radical scavenger, as an immunomodulatory agent, strong promoter of bone formation & anti inflammatory factor in periodontal diseases.⁴. It was found that melatonin is quickly absorbed into the circulation from oral cavity as documented by the increment of plasma immunoreactive indole levels which was paralleled by the increase in salivary concentrations of this indole. These results may be of clinical importance in prevention of healing of oral mucosal lesions such as occurring in denture-induced stomatitis, gingivitis or mucosal ulcerations resulting from the post surgical trauma in the oral cavity & vestibular plastic operations with the use of CO-laser. Our studies which are in progress indicate that topically applied melatonin to oral mucosa in the area of damage or inflammation is effective in combating the inflammatory processes & acceleration of the healing of erosions and ulcerations in oral cavity.⁴

Denture stomatitis

Epidemiology - Denture stomatitis is a common condition: findings from several studies suggest that it can affect as many as 35-50% of persons who wear complete dentures. The prevalence of denture stomatitis among those wearing partial dentures is markedly lower than among complete denture wearers, whose rank goes from 10% to 70% depending on the

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population studied. No racial or sex predilection exists, although some authors have described a higher prevalence among women. This disorder is more frequent among elderly people, as they are more likely to wear removable dentures. However, there are reports that could not prove significant differences in the prevalence according to the age of the subject. Paradoxically, several authors have described a significant fall in the prevalence of denture stomatitis in older patients. The highest prevalence, though, has been reported in aged people, especially those living in nursing facilities.

Clinical presentation - Denture stomatitis lesions may show different clinical patterns, and are more frequently found in the upper jaw, especially on the palate. The absence of denture stomatitis in the lower jaw is probably due to the washing action of saliva. Despite the fact that denture stomatitis is frequently asymptomatic, patients may complain of halitosis, slight bleeding and swelling in the involved area, or a burning sensation, xerostomia, or taste alterations (dysgeusia). These symptoms occur, with variable intensity, in 20% to 70% of patients with denture stomatitis. In these situations, the patient usually does not relate the use of a denture to the experienced symptoms.

Staging Different classifications have been proposed, but the reference classification for denture stomatitis is the one suggested by Newton in 1962, based exclusively on clinical criteria:

Newton's type I: pin-point hyperaemic lesions (localized simple inflammation)

Newton's type II: diffuse erythema confined to the mucosa contacting the denture (generalized simple inflammation)

Newton's type III: granular surface (inflammatory papillary hyperplasia).

Related disorders

Denture stomatitis can occasionally be associated with different lesions of fungal origin such as angular cheilitis, median rhomboid glossitis and candidal leukoplakia.

Aetiopathogenesis

The aetiology is best considered multifactorial, but denture wearing, especially when worn during the night, represents the major causative factor.

Among the aetiological factors that should be considered are:

1. Prosthetic factors
 - No denture stomatitis can exist without a prosthesis. Ill-fitting, traumatic, badly-maintained dentures have been considered as the most frequent causes of denture stomatitis.
 - Prosthetic traumatism is favoured by denture functional deficiencies, like:
 - Occlusal alterations
 - Vertical dimension alterations
 - Retention alterations
 - Unstable prosthesis

The type of material employed for its construction (Newton's type III is 5-fold more frequent with acrylic dentures than with metallic ones) also condition the development of denture stomatitis.

Infectious factors- Denture can produce a number of ecological changes that facilitate the accumulation of bacteria and yeasts.

- Bacteria proliferate. Certain bacterial species, like Staphylococcus species, Streptococcus species, Neisseria species, Fusobacterium species, or Bacteroides species has been identified in patients with denture stomatitis, although no direct relationship between bacteria and the aetiology of denture stomatitis could be proved.
- Candida species, particularly Candida albicans, have been identified in most patients. Patients with denture stomatitis show higher intraoral concentrations of fungi than individuals without this disorder and the lesions objectively improve after antifungal drug administration. However, the role of this organism as the sole aetiological factor remains unclear.

Predisposing factors for oral candidosis include:

Systemic factors

1. Physiological. (advanced age)
2. Endocrine dysfunctions.
3. Nutritional deficiencies.
4. Neoplasias.
5. Immunosuppression.
6. Ample spectrum antibiotics.

Local factors

1. Antimicrobials and topical or inhaled corticosteroids
2. Carbohydrate rich diet
3. Tobacco and alcohol consumption
4. Hyposalivation
5. Deficient oral hygiene
6. Wearing dentures (especially through the night)

Diagnosis

The clinical presentation of erythema and oedema on the palatal mucosa covered by the denture base (but not beyond) is a diagnostic finding. A smear of the palate stained with KOH or periodic acid-Schiff can demonstrate the presence of Candida species. Other techniques for identifying fungal isolates such as imprint cultures may also be applied.

Treatment

- Good oral hygiene is mandatory. The mouth must be kept as clean as possible and a thorough rinse after meals should be performed.
- Local factors which promote growth of yeasts, such as smoking or wearing the dentures throughout the night, must be discouraged.
- Dentures should be removed for as long as possible and definitely overnight. Dentures should be brushed in warm, soapy water and soaked overnight in an antiseptic solution such as bleach (10 drops of household bleach in a denture cup), chlorhexidine (not when the denture has metal components), or in any solution suitable for sterilizing baby's feeding bottles. Benzoic acid containing products should be avoided as they induce changes in the composition of acrylic materials.
- Denture fitting and occlusal balance should be checked to avoid trauma. A new prosthesis should be made, if necessary. Tissue conditioning agents are porous

materials easier to colonize than acrylic, so they are not recommended for these patients. If there is no other choice, an antifungal agent, like nystatin, miconazole or ketoconazole may be incorporated to the agent. Dentures must be adequately polished and glazed, as pores increase denture contamination by oral microorganisms.

- Newton's type I and II denture stomatitis have been successfully treated with low energy lasers to reduce inflammation of the supporting mucosa. Inflammatory papillary hyperplasia usually needs to be surgically removed (by scalpel, cryosurgery, electrosurgery or with a laser beam) before the denture is placed, although mild cases may respond to antifungal treatment.
- Antifungal medications are recommended when yeasts have been isolated, or when lesions do not resolve with hygiene instructions. First choice treatment is the topical application of nystatin or miconazole. Resistance to nystatin is rare; the drug is administered as an oral suspension, with an unpleasant taste and can induce gastrointestinal problems and hypersensitivity. Miconazole is available as gel, varnish, lacquer and chewing gum. It also provokes gastrointestinal alterations and hypersensitivity, but it tastes better. Miconazole enhances warfarin effect. Systemic antifungal drugs (i.e. fluconazole, itraconazole, ketoconazole), are almost exclusively reserved for patients with systemic factors that condition the development and persistence of candidosis, such as immunosuppression or diabetes.

Prognosis and complication

If untreated, denture stomatitis can cause soreness and palatal inflammatory papillary hyperplasia and may lead to poorly fitting dentures in the future. The administration of topical antifungal therapy, removal of mechanical traumatism caused by the denture and reinforcement or hygienic measures, ease the disappearance of the lesions. However, local recurrences are frequent if aetiopathologic factors persist. The prognosis of this disorder is good, as malignant transformation has not been reported, although continuous aspiration and swallowing of *Candida* species may rarely have potentially fatal consequences immunocompromised patients.⁵⁻⁹

Melatonin and Candidiasis

As an immunomodulator, melatonin reportedly exhibits protective effects in severe sepsis/shock induced by bacterial lipopolysaccharide in animal models. Melatonin reduced IL-6 levels and shortened time to improvement in animals with *Candida sepsis*. Levels of TNF-alpha and adhesion molecules in melatonin-treated septic rats were reduced compared with those in untreated septic rats¹⁰. Considering these findings, melatonin may have therapeutic benefits in *Candida* sepsis and classic antimycotic treatment because of this immune-regulatory effects. Thus, melatonin may also be useful as a topical and/or systemic treatment of oral candidiasis. Terron *et al.*¹⁰ evaluated the effect of melatonin on the ingestion and destruction of *Candida albicans* (live particles) by the ring dove (*Streptopelia risoria*) at different durations of incubation with physiological as well as with a pharmacological concentration of melatonin. Also, some study results support the proposal that melatonin enhances phagocytic function and

at the same time reduces oxidative stress originating during candidiasis^{11,12}.

CONCLUSION

Denture stomatitis is a common condition in complete denture patients. Topically applied melatonin to oral mucosa in the area of damage or inflammation is effective in combating the inflammatory processes & acceleration of the healing of erosions and ulcerations in oral cavity melatonin may also be useful as a topical and/or systemic treatment of oral candidiasis. Nowadays, experimental and clinical evidences are still inconsistent, so further studies are needed to clarify melatonin role in the homeostasis of oral tissues and enable the use of this hormone in the therapy of oral pathologies. Nevertheless, the scientific community believes that assumptions exist to look at this molecule with attention.

Conflict of interest -none

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