Treatment of *Candida albicans* Biofilms – Associated with Dry Socket or Denture Stomatitis by Propolse Paste

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**ABSTRACT**

Degradation of oral health is often assumed to progress with aging. However, significantly higher total counts and greater varieties of *Candida* species can be detected in wearers of removable dentures compared with non denture wearers. Poorly fitting or unhygienic dentures leads to the presence of yeast like fungi (*Candida albicans* biofilms) attached to it. And cause inflammation. Although candidiasis is highly resistant to antifungal agents, systemic drugs usage are necessary. But the systemic use of these drugs can cause side effects like liver toxicity, drug interactions etc. Using propolse as antifungal by local application, found that it suppresses the Candida associated dry socket and denture stomatitis. The propolse past was used in the following manner. It was applied to the fitting surface of denture, twice a day for 2 weeks. The propolse putty was putted in dry socket after complete removal of inflammatory tissues from it. The results showed pain, redness area and inflammation related stomatitis were disappear gradually after 48 hours until 2 weeks that the denture stomatitis is healing by using a propolse past. Propolse putty treat the fungal inflammation of dry socket that gradual decreases of the pain and inflammation. After the treatment, all patients with denture stomatitis were subjected to examination of the palatal mucosa and socket and quantitative culture of *Candida* from the palatal mucosa and denture fitting surface and diagnosed by three method: Germ tune.Gram Stain.and ChromAgar media.

**Keywords**: *Candida albicans*, denture stomatitis, dental plaque, antifungal drugs, propolse

**INTRODUCTION**

For many years, an association between denture wear and denture stomatitis (eg, denture sore mouth) has been recognized. (Lehner, 1965) Most of the studies suggested that the etiology of the lesion was a yeast infection associated with *Candida albicans*. In the early 1980s, denture patients presenting with stomatitis (burning mucosa, erythema, and clinical leukoplakia) were evaluated in part by obtaining cultures of both the inflamed mucosa and the dentures. (Carmen et al., 2011) Frequently, when the host defense system suffers because of any alterations, like immunodeficiency, *C. albicans* become virulent and generates candidiasis, that can be manifested through various clinical forms, involving one or more oral sites, up to affect the whole oral cavity and to disseminate into invasive forms. Candida-associated denture stomatitis is a very common inflammatory process affecting about 60% of the subjects carrier of a prosthesis. (Geerts et al., 2008) Candida has been recognized as a part of the normal oral flora without any harmful effects. (Hiroyuki et al., 2007) Changes in the oral environment effected by tooth loss or denture wearing can cause
changes in oral microflora. (Sumi, 2001) Candida is not harmful in healthy hosts, but may cause opportunistic infections in immunocompromised hosts, such as patients suffering from AIDS, leukemia, or head or neck cancer.

(Zegarelli, 1993). Oral candidiasis has been reported to be associated with candidiasis in the lung and deglutition pneumonia. (Honda et al., 2000). The amount of Candida has been found to increase in elderly individuals, (Mutoh et al., 2000) but most previous investigations focused solely on Candida albicans. (Mathews et al., 2001). Denture sore mouth (Denture Stomatitis (D.S.) is an inflammation of the denture bearing area with or without cracking and inflammation of the oral commissures. Though D.S. can be trauma induced, most of them are candida related. Candida fungi are opportunistic pathogens commonly found in the oral cavity of asymptomatic individuals. In health and in a normal local environment, the host defence system prevents overt infection. (Shulman et al., 2005) Local and systemic factors can cause transformation of this commensal pathogenic organism. The most frequent cause of opportunistic infection by Candida is poorly fitting or uncleaned dentures which leads to presence of yeasts attached to it. Risk factors associated with oral candidiasis and D.S are wearing complete (in contrast to partial) dentures, wearing a maxillary (in contrast to a mandibular) removable denture, inadequate denture hygiene, nocturnal denture wear, poor denture quality, diabetes mellitus, antibiotic therapy, immune deficiencies, Vitamin A, folate and iron deficiencies, impaired salivary gland function, Xerogenic medication, tobacco use, decreased salivary secretion rate and gender.

The etiology of the candida-associated denture stomatitis is elaborate and multifactorial. It includes local and systemic factors related to the host and to them. Candida capability to adhere and proliferate in the host epithelial tissues.[ Ferreira et al., 2009] Candida-associated denture stomatitis is able to rise up when the conditions of the micro oral environment are favourable for the growth and the adhesion of the yeast and also when systemic factors of the host bring to a depression of the mechanisms of defence (Bilhan, et al., 2009).

**Systemic factors**

These affections are frequent in individuals of advanced age. The repeated treatments with antibiotics and sulphonamides can be predisposing factors because of the microbial alterations that they provoke in the oral cavity. (Yuen et al. 2009).

The saliva of diabetics favours the growth of C. albicans in vitro and it has been shown that on the denture surfaces of diabetic there are more elevated counts of colonies of the yeast by comparison with the non diabetic subjects. (Paillaud et al., 2004) Deficiency of nutritional factors. Some authors report the sideropenic anaemia and high levels of cholesterol as causes of candidiasis. (Golecka et al., 2006).

Quantitative and qualitative alterations of the salivary flow in elderly patients are probably secondary to the assumption of drugs, above all the antihypertensive ones, rather than a primary functional deficit. Such reduction has been shown to act as predisposing factor to the virulence of the C. species. (Campisi et al., 2008)

**Local factors**

The role of the saliva in the colonization of C. albicans is still controversial. Some studies have shown that it reduces the adhesion of C. albicans. (Baena-Monroy et al., 2005).

Nyquist considered trauma as the main liable to determine Candida-associated denture stomatitis with none association with the microbial communities and the presence of denture. Subsequently, Cawson showed that
Trauma and Candida infection are together responsible for the pathogenesis of the denture stomatitis. (Emami et al., 2008).

Initially, the adhesion of Candida depends on the microporosity present on the surface of the denture. Such irregularities of surface make possible the yeasts to nest and make difficult to eliminate bacteria by mechanics and chemical hygiene maneuvers; therefore, in presence of poor oral hygiene, Candida can penetrate, stick and aggregate with the bacterial communities, as Streptococcus sanguis. (Ferreira et al., 2009).

Low levels of pH can favour the adhesion and the proliferation of Candida yeast. In fact, a pH equal to 3 is optimal not only for the adhesion of the yeast like fungi (Candida albicans), but also for the enzymatic activity of the proteinases that, together with the lipases, are the most important factors of virulence of Candida because of their cytotoxic and cytolytic effects. Various microbiologic studies underlined that the plaque accumulated on the dentures during stomatitis has a complex composition, represented above all by Gram-positive bacteria. (Carmen, 2011).

Unclean and poor hygiene are the major predisposing factors. The tissue surface of the dentures usually shows micro pits and micro porosities that harbour microorganisms that are difficult to remove mechanically or by chemical cleaning. Denture sore mouth is rarely found under the mandibular denture. (Babu and Sunil, 2010).

In clinical features the mucosa beneath the denture become red, swollen, smooth or granular and painful. Multiple pin point foci of hyperemia, frequently occur. A burning sensation is common. The redness of the mucosa is sharply outlined and restricted to the tissue actually in contact with the denture. (William et al., 1997).

MATERIALS AND METHODS
Propolse is a natural black-green putty derived from honey dew was produced by bees, used to close gaps occur in honey comb and act as antifungal to prevent any contamination for it. The propolse either putty used for dry socket (Fig. 1) or paste (putty dissolved in distilled water to produce creamy like mixture) used for denture stomatitis (Fig. 2). The propolse paste was used in the following manner. It was applied to the fitting surface of denture, twice a day for 2 weeks. Before cream was applied, the surface of the prosthesis was carefully cleaned with tooth brush, soap and water to remove any depress from the preceding application. The propolse putty was putted in dry socket after complete removal of inflammatory tissues from it. Propolse putty treat the fungal inflammation of dry socket that gradual decreases of the pain and inflammation. The putty dissolved inside socket and start action as antifungal after some hours.

After the treatment, all patients were subjected to examination of the palatal mucosa and socket and quantitative culture of Candida from the
palatal mucosa, denture fitting surface and diagnosed by three methods:
1-Germ tube. Fig. (3) (Evans and Richardson, 1989, Ron, 1999, James, 2000).
2-Gram Stain. Fig. (4) (Philip and Michael, 2009 and Odds, 1979).
3-ChromAgar media. Fig. (5) (James, 2000).

RESULT AND DISCUSSION
The results showed pain, redness area and inflammation related stomatitis were disappear gradually after 48 hours until 2 weeks that the denture stomatitis healing by using a propolse past. Since the cause of the denture stomatitis is different, several treatment procedures are to be followed, like correction of ill-fitting dentures, plaque control and topical or systemic antifungal therapy. Rough areas on the tissue surface of the denture should be smoothened.

The result is in agreement with the following:
Nystatin tablets 500,000 units were allowed to dissolve in the mouth three times a day for 14 days. Bergendal and Isacsson reported similar results by treating D.S with nystatin powder, placed on the fitting surface of the denture, three times a day for 14 days. (George and Charles, 2004). Nystatin is formulated for oral use as suspension or pastille.
A miconazole varnish or gel can be topically administrated in denture related stomatitis. A once daily application of the miconazole varnish or a thrice daily application of the miconazole gel for 15 days is sufficient. (Lucio et al., 2005).
Propolse had been used to avoid the use of systemic antifungal agents in nystatin resistant cases. propolse is a used in the topical treatment of denture stomatitis and dry socket caused by Candida albicans.
No experience exists with pregnancy and nursing. Therefore the use of the miconazole varnish should be avoided during pregnancy and lactation. Side effects such as itching and complications such as allergic contact dermatitis, had been reported. But propolse paste used by the patient easily without side effect as allergy or itching.
and easy removed from denture surface.

Fig. 6.

Fig. 6: sensitive of *Candida albicans* to propolse paste

**Conclusion**

Denture stomatitis, an inflammatory lesion found in many people, is due to trauma or candida related by the use of unhygienic denture. Though *Candida albicans* is a component of normal oral microflora, local and systemic factors can transform this to a pathogen.

Management of D.S depends on accurate diagnosis, identification and elimination of predisposing factors and often use of antifungal agents. Topical application of nystatin, amphoteresin, miconazole etc: are effective in many cases. Because the biofilm formation in candidiasis is highly resistant to antifungal agents, systemic ketoconazole, fluconazole, or itraconazole can be used. But these can cause drug interactions To avoid the use of systemic antifungal agents, propolse cream was tried in candida related denture stomatitis. Propolse in a past form applied two times daily to the fitting surface of the denture base, for 2 weeks was proved to be effective. Propolse putty treat the fungal inflammation of dry socket that gradual decreases of the pain and inflammation. The putty dissolved inside socket and start action as antifungal after some hours.

**REFERENCES**


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ARABIC SUMMARY

معالجة الأغشية الحيوية للمبيضات البيضاء المصاحبة لقطع السن أو في سقف الفم عند المصابين بالالتهاب

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تدهور صحة الفم غالبا ما يكون مع تقدم العمر علاوة على ذلك زيادة اعداد من أنواع كثيرة مختلفة من مستعمرات المبيضات البيضاء مع الأشخاص الذين يستخدمون طقوم الأسنان المتهركة، مع الذين لا يستخدمونها. المبيضات البيضاء (G+) قادرة على العيش كأحياء طبيعية في فم الأشخاص الأصحاء. عدم نباتية الطلقات أو عدم نظام الطلقات يؤدي إلى وجود الفطريات والاسنادي على شكل العشاء الحيوي للمبيضات البيضاء والتي يؤدي إلى الالتهابات الفموية. بالرغم من ان المبيضات البيضاء عادة المقاومة لمضادات الفطريات السطحية فإن النظام الدوائي يكون ضروريا ولكنها يؤدي إلى مضاعفات جانبية مثل تسمم الكبد والداخل الدوائي والاختي. استخدام البروبولس موضوعيا مضاد الفطريات مع المبيضات البيضاء المصاحبة (dry socket) and denture stomatitis). يبحث عن فحص البروبولس على السطح النسيجي للطلقات مرتين في اليوم لمدة أسبوعين اما عينة البروبولس فإنها تستخدم في مكان قطع السن المتهيم بعد تنظيفه من الأنسجة الملتهبة. أظهرت النتائج اختفاء تدريجي للآلام واحمرار المنطقة المتهيئة من سقف الفم ومكان قلع السن بعد يومين واختفاءه نهائيا بعد أسبوعين من استخدام البروبولس. بعد الخراج يتم فحص سقف الفم ومكان قلع السن واحذ عينات منها لفحصها مختبريا بثلاث طرق وهي: Germ tube.Gram Stain. and ChromAgar media.