

## MEDICAL MANAGEMENT OF DENTURE STOMATITIS

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## ABSTRACT

Denture stomatitis is a chronic inflammatory lesion which is commonly associated with *Candida albicans* infection. It is frequently seen in complete denture patients and clinically presented as erythema and inflammation on the palatal mucosa. This review covers the different medical management of denture stomatitis. The first line of treatment is by topical antifungal agents, which are available as suspension, gels, lozenges, pastilles, etc. In patient where topical treatment was unsuccessful and in immunocompromised patient, systemic antifungal agents are prescribed. Recent studies have shown the effectiveness of natural products such as propolis, green tea extracts, and various essential oils in the treatment of denture stomatitis, to decrease colony count and reduce erythema of palatal mucosa.

**Keywords:** Denture stomatitis, Antifungal drugs, Propolis, Green tea, Essential oils.

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## INTRODUCTION

Denture stomatitis is a chronic inflammatory reaction seen in denture wearing patients, usually under the maxillary prostheses. Its signs and symptoms are redness, inflammation, pain, bleeding, and tenderness. The etiology of denture stomatitis is multifactorial, but it is commonly associated with *Candida albicans*. *Candida*-associated denture stomatitis is due to local and systemic factors related to the host and to the *Candida* capability to adhere and proliferate in the host epithelial tissue [1]. The local factors which constitute to denture stomatitis include trauma, composition of saliva, pH of the oral cavity, permeability of acrylic resins, the presence of microbial plaque, and adhesion of *Candida* to host. The systemic factors which affect denture stomatitis are diabetes mellitus, nutritional deficiencies, kidney affections, xerostomia, immunocompromised conditions, and immune suppressive drugs.

The classification of *Candida*-associated denture stomatitis according to Newton, 1962. It is based solely on the clinical criteria.

- Type I: Localized simple inflammation or pin-point hyperemia
- Type II: Diffused erythema and edema of the palatal mucosa covered by the dentures
- Type III: Granular surface or inflammatory papillary hyperplasia of the central palate.

The treatment for denture stomatitis aims at removing the etiologic agent which is the candidal overgrowth. Predisposing factors and underlying disease should also be corrected. Treatment should begin locally, maintaining oral hygiene, and also dealing with the defects in the denture such as irregular surfaces, ill-fitting dentures and broken dentures which could contribute to the candida like growth. Following that, for patients whom do not respond sufficiently to topical treatment or in immunocompromised patients, systemic medications should be administered.

## MEDICAL MANAGEMENT OF DENTURE STOMATITIS

## Systemic antifungal agents

Systemic antifungal agents are recommended for patients with poor compliance such as patients with special need or debilitating patients. It is also recommended for immunocompromised patients such as HIV positive individuals.

## Fluconazole

Fluconazole 50-100 mg capsule/day is the systemic drug of choice due to its high efficacy and good tolerability [2].

## Itraconazole

Itraconazole capsules of 100-200 mg/day for 15 days were given to patient with oropharyngeal candidiasis. It showed improvement but less effective than fluconazole. This is due to its drug interactions and unpredictable absorption of itraconazole capsules. However, it showed good results in patients where fluconazole failed, so it could be used for fluconazole-resistant *Candida* strains [3].

## Ketoconazole

Ketoconazole 200-400 mg tablets taken once or twice daily is used for the treatment of denture stomatitis but it produces side effects such as nausea, vomiting, and abdominal pain.

## Voriconazole

It is a new triazole antifungal drug administered as 200 mg tablets/day. It has shown a success rate of 98.3% in the treatment of esophageal candidiasis [4]. It is suggested to be useful against fluconazole-resistant strains of *Candida*. However, it is not fully established and more research needs to be conducted on the drug.

## Topical antifungal agents

Topical antifungal therapy is the cornerstone of treatment of localized candidiasis in healthy patients. It is available in a variety of forms such as suspensions, pastilles, tablets, lozenges, creams, powders, and gels.

## Nystatin

Nystatin is a well-tolerated drug. It rarely produces side effects such as nausea, vomiting, and gastrointestinal effects. Nystatin binds to ergosterol on the *Candida* cell membranes and causes changes in the permeability of the cell membrane which leads to the penetration of the drug into the cell and finally causing cell death [5].

- i. Nystatin tablets 500,000 units, dissolved in the mouth, 3 times a day for 14 days
- ii. Nystatin powder 100,000 units/g, placed on the tissue surface of the dentures, 3 times a day for 14 days [6]
- iii. Nystatin 100,000 IU/ml, 5 ml 4 times daily.

## Miconazole

Miconazole is a widely used topical drug. It has desirable properties such as its effectiveness and good patient tolerance. However, a drawback is its interaction with other drugs like warfarin. The antifungal property

of miconazole inhibits enzyme cytochrome P450, which affects the clearance of certain drugs [7].

- i. Miconazole mucoadhesive tablets, 50 mg, once daily, placed in the upper anterior buccal vestibule after brushing teeth in the morning. It should be held in place until dissolved. It exhibits higher salivary concentrations and better patient tolerance. It is the drug for the first line of defense of denture stomatitis but its high cost is a disadvantage [2].
- ii. Miconazole varnish, single dose [8].
- iii. Miconazole gel, applied topically, 3 times a day for 15 days [8].

#### Amphotericin-B

Amphotericin-B suspension, 5 ml thrice daily for 14 days results in complete remission of symptoms. It is a drug of choice as it is poorly absorbed by the intestinal tract; therefore, it is excreted without undergoing any change resulting in reduced hepatotoxicity. However, it has an unpleasant taste which may affect patient compliance. It binds to ergosterol on the *Candida* cellular membranes, causing changes in its permeability, leading to penetration into the cell and finally cell death [5].

#### Fluconazole

Fluconazole has been found to give good clinical results. It also reports better patient compliance due to the pleasant taste and dosage.

- i. Fluconazole oral suspension, 2 mg/ml, 3 times daily
- ii. Fluconazole oral suspension, 10 mg/ml, once daily [2].

#### Clotrimazole

One clotrimazole lozenge (10 mg) taken 5 times a day for 7-14 days [9]. It is also available as a cream or solution form. Clotrimazole 1% cream also has anti-Staphylococcal activity. It should only be used topically as it produces gastrointestinal and neurological toxicity.

#### Ketoconazole

About 2% ketoconazole applied topically twice daily together with 200 mg ketoconazole tablets once daily [10] is also used to treat denture stomatitis, but it is not preferred. This is due to the side effects such as nausea, vomiting, and gastrointestinal problems [11].

#### Chlorhexidine

Chlorhexidine has been demonstrated to have an antifungal effect. Chlorhexidine gluconate 0.2% solution used as a mouth rinse for the treatment of denture stomatitis. However, it shows more significant effect on the reduction of plaque compared to the reduction of colonies of *Candida* [5]. A 2% chlorhexidine suspension is used as an overnight denture disinfectant [12], which produces more promising results compared to its use as topical therapy. Chlorhexidine should not be administered at the same time with nystatin as it inhibits the antifungal capacity.

#### Propolis

Propolis, also known as bee glue, is a hard, resinous material derived by bees from plant juices which is used to seal openings in the hives. It contains pollen, resins, waxes, and large amounts of flavonoids [13]. The flavonoids in propolis, mainly pinocembrin, are responsible for its inhibitory effect on *Candida*. It can be applied for nystatin-resistant cases. However, it may produce side effects such as itching and complications such as contact dermatitis.

- i. About 2.5% propylene glycol Brazilian green propolis gel, 5 ml taken with cotton swab and applied on the tissue surface of the denture and immediately placed in the mouth. 4 times daily for 14 days.
- ii. About 24% propylene glycol Brazilian green propolis mouthwash, 5 ml to be taken and rinsed in the mouth for one minute and then spat out. 4 times daily for 14 days [14].

#### Herbal extracts

##### Green tea extract

*Camellia sinensis* contains polyphenols which are strong antioxidants. It also has an antimicrobial effect against oral bacteria [15], intestinal bacteria [16] and food-borne bacteria [17]. Moreover, it seems to be a valuable source for antifungal agents, especially against *C. albicans*. 0.58% green tea extract reduces inflammation seen in denture stomatitis as well as *Candida* colony count. The 0.58% green tea extract mouthwash used 4 times a day, each time 15-20 drops for 2-3 minutes, for 2 weeks. Eating and drinking were prohibited for 30 minutes post mouthwash rinse [18].

##### Garlic extract

Garlic aqueous solution used thrice daily for 4 weeks showed improvement of mucosal erythema in patients. It could be used as a substitution to nystatin, but recovery is not as rapid as when nystatin is administered [19]. The main advantages are that it is well tolerated and accepted by patients, also it lacks side effects.

##### Punica granatum fruit extract

Nearly 1.25% *P. granatum* extract gel used thrice a day topically for 2 weeks reported an improvement of symptoms and total recovery of lesion. Its antifungal effect is attributed to the tannins and polyphenols present in the fruit extract. Tannins affect the cell membranes of yeast due to the precipitation of protein, but the exact effect on *C. albicans* is currently not known [20].

##### Garcinia kola extract

*G. kola* commonly known as the "wonder plant" among South Western Nigerian people, has antifungal, antibacterial and antiviral properties which is attributed to its flavonoids and amentoflavone composition. A 30% (30 g in 100 ml) *G. kola* mouthwash used 3 times daily for 3 weeks. It should be swished in the mouth for 1 minute before spitting out. The study showed that *G. kola* had a higher efficacy as antifungal therapy compared to chlorhexidine [21].

##### Pelargonium graveolens essential oil

About 1% *P. graveolens* oil in the form of gel applied on the tissue surface on an upper complete denture was observed to reduce the fungal growth in a biweekly, double-blinded randomized clinical trial. It also dramatically reduced the erythema in the experimental group compared to the control. 34% of the patient showed complete recovery while 56% showed partial healing [22].

##### Satureja hortensis essential oil

A double-blinded clinical trial used 1% of *S. hortensis* essential oil for 2 weeks in denture wearers, which resulted in reduced *C. albicans* colony count and reduced erythema of the palatal mucosa [23]. *S. hortensis* is known to have a wide antimicrobial spectrum. It inhibits the growth of human bacteria, fungi, and yeast. Monoterpene carvacrol is the compound which is responsible for its antifungal effect, which inhibits ergosterol biosynthesis [24].

##### Zataria multiflora boiss essential oil

In an open, randomized, controlled clinical study, 0.1% gel containing *Z. multiflora* essential oil used 4 times daily for 2 weeks showed reduced colony count and reduces erythema of mucosa. *Z. multiflora* reduced the erythema more effectively compared to 2% miconazole gel. However, miconazole was more successful in reducing the colony count [25].

#### CONCLUSION

*Candida*-associated denture stomatitis is an avoidable disease by proper patient education, maintenance of oral and denture hygiene as well as regular patient reviews. The treatment of denture stomatitis

should be done as soon as lesion is identified and constant monitoring of the patient to ensure complete healing.

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