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"Monday Morning Pearls of Practice by Bobby Baig"

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Biofilm Formation of Candida Albicans on the Surface of a Soft Denture-Lining Material

By Bobby Baig

Introduction

1. Soft denture-lining materials are often used for patients who cannot tolerate a conventional mandibular denture base. While soft tissue conditioners are also widely used to restore the health of inflamed and distorted denture-supporting tissues.
2. Soft denture-lining materials have some disadvantages related to their physical properties and their response to micro-organisms, where they have been found to be more prone to microbial adhesion than hard acrylic resin denture base materials.
3. The adherence of candida albicans and related micro-organisms to such surfaces has been thought to be the first step in successful candida albicans colonization, subsequent biofilm formation and in the development of pathogenesis, such as denture-related stomatitis.

Denture hygiene and candida albicans

1. The control of microbial denture plaque and subsequent biofilm formation by an appropriate technique is necessary for maintaining healthy oral mucosa.
2. Studies have revealed that poor oral hygiene and candida albicans infections are common among elderly denture wearers because these patients usually have some difficulty in keeping their dentures clean.
3. Brushing alone may be insufficient for controlling denture-plaque formation.
4. It is, thus, extremely important that chemical denture cleansers are used as an adjunct for patients unable to care properly for their dentures and manage their overall oral hygiene.

Sodium hypochlorite as a denture cleanser

1. Sodium hypochlorite is one of the earliest and most widely used chemical denture cleansers. Studies showed that hypochlorite, when used as a chemical cleanser, removes plaque from prostheses efficiently, but has a harmful effect on dental metals, acrylic resins, tissue conditioners and soft denture-lining materials.
2. This type of damage creates irregularities, differences in surface topography on the lining surface that facilitate the adherence of Candida albicans
3. This happens because the adherence of microorganisms is related to different surface roughness of the materials and surface irregularities would increase the likelihood of microorganisms remaining on the surface of such materials

Noeli Boscato et al in 2009: Clinical Findings

1. Sodium hypochlorite, when used as a chemical cleanser, has a harmful effect on the soft denture lining material and their use might, in the long- term, result in increased formation of biofilm.
2. The harmful effect of the sodium hypochlorite on the soft material could create irregularities on the lining surface that would facilitate the adherence of Candida albicans and, thereafter the formation of increased amount of biofilm.
3. The group that additionally immersed the prostheses in 0.5% sodium hypochlorite, presented the highest mean score values (MSV) of biofilm formation on the soft denture-lining material (Quick Line soft denture-lining material).
4. In this study group G1 performed daily prosthetic hygiene with a soft Colgate toothbrush and Colgate Triple Action toothpaste. In the G2 group, besides achieving daily hygiene as G1, the prostheses were also immersed in (0.5%) sodium hypochlorite for 20 min, once a week, the results shows the G2 has more bacterial colonization compared to G1.
5. Once attached, the bacteria on the irregular surface can survive longer as they are protected from the natural removal forces originating from normal oral hygiene habits.
6. In addition, the superficial roughness increases the available area for the adhesion of bacteria, increasing it by as much as three times.
7. The formation of biofilm can be initiated by inefficient oral hygiene, that can cause fungal proliferation and lesions on the oral mucosa associated with prosthesis use.

Conclusion

1. Denture-related stomatitis is an erythematous pathogenic condition of the denture-bearing mucosa caused mainly by microbial factors, especially by candida albicans.
2. Oral hygiene methods had a significant effect in the formation of the biofilm on the soft denture-lining material installed in the base of the complete or partial dentures.
3. Reservoir of Candida albicans is the fitting surface of the complete maxillary denture and that soft denture-lining materials are easily colonized and deeply infected by these organisms.

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