The Effect of Disinfectant Solution on Two Different Types of Soft Liners on Plaque Accumulation

Thesis

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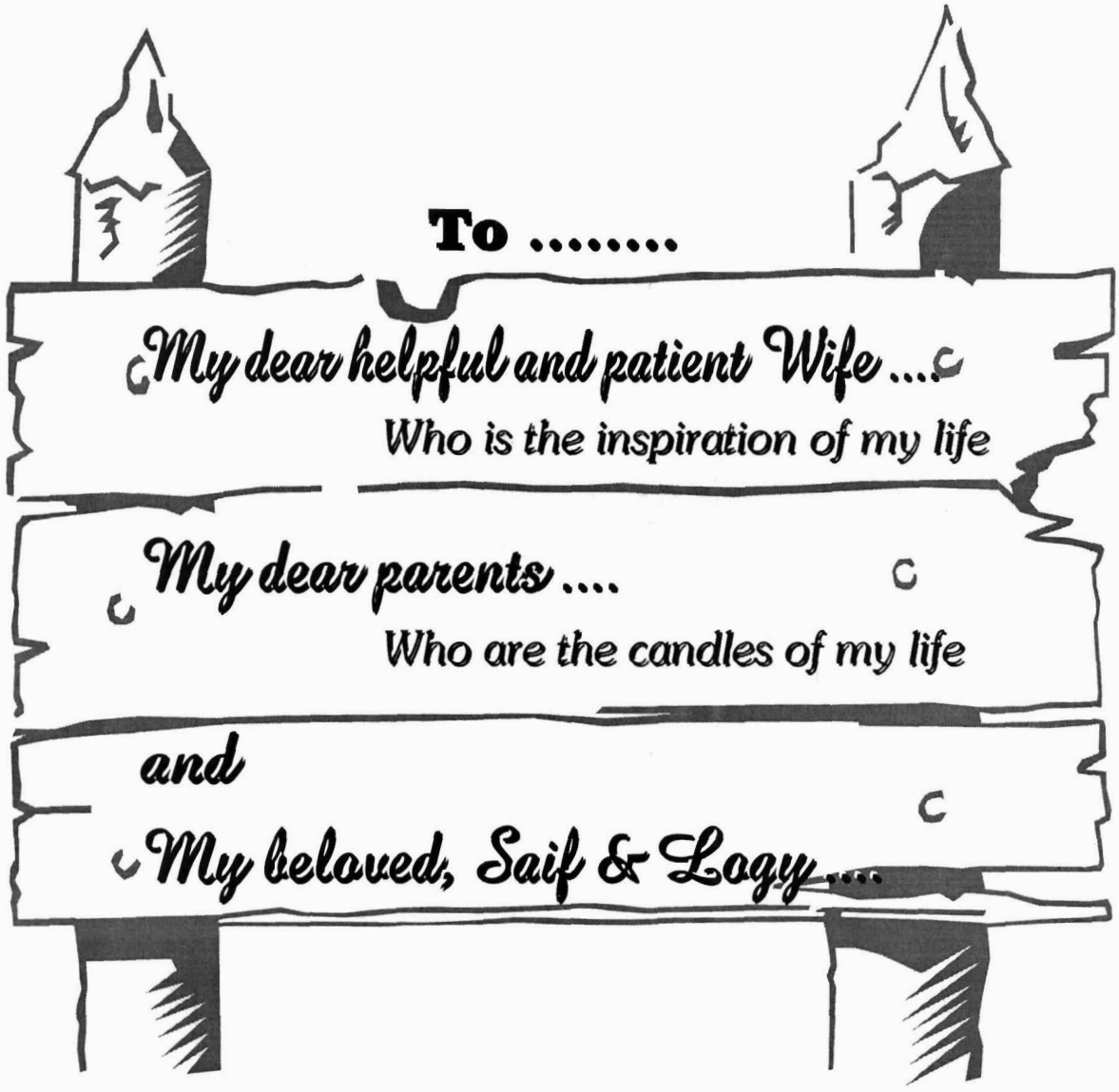
تَبَارَكَ الَّذِي بِيَدِهِ الْمُلْكُ وَهُوَ عَلَىٰ كُلِّ شَيْءٍ قَدِيرٌ
الَّذِي خَلَقَ الْمَوْتَ وَالْحَيَاةَ
لِيَبْلُوَكُمْ أَيُّكُمْ أَحْسَنُ عَمَلًا وَهُوَ الْعَزِيزُ الْغَفُورُ

الآيتان ٢،١ – سورة الملك


To .....
My dear helpful and patient Wife ...
Who is the inspiration of my life
My dear parents ....
Who are the candles of my life
and
My beloved, Saif & Logy ....

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INTRODUCTION

Residual ridges have been described as plastic in nature, always changing in topography and structure. A critical part of complete denture service is to maintain adaptation of the denture bases to the underlying ridges, therefore, to maintain the prosthesis-tissue relationship, reline or rebase procedures are commonly required.

Intraoral relining of removable prosthesis has many advantages over laboratory relining; among which is that it is less time consuming, for the intraoral relining technique, many resins have been used including autocured acrylic resins, however, presence of free monomer, their inferior physical properties and the exothermic curing reaction have limited their use.

The introduction of the triad Visible Light Cured (VLC) denture resin system has led to several useful VLC resin applications. Clinical evaluations have established the biocompatibility of the triad VLC resin and it was found that its mechanical properties are comparable to those of heat-cured acrylic resins ***(Khan et al., 1987).***

Permanent soft denture liners have been a valuable assist for dentists. Because of their viscoelastic properties, they act as shock absorbers and distribute the stresses on the denture-bearing tissues. Also their use gives more patient comfort during the treatment of the atrophic ridge, bone undercuts, bruxism and dentures opposing natural teeth.

Denture plaque is an important factor in stomatitis in patients who wear dentures with or without liners. Cleaning of dentures and removal of plaque are important steps in the maintenance of good oral health. Therefore, denture cleansers have been considered an efficacious aid to prevent denture plaque formation. Alkaline hypochlorite has been recommended as an effective denture cleanser for both temporary and permanent soft lining materials as well as in metal dentures.

So the aim of this study was to evaluate the effect of disinfectant solution on dentures relined by two different soft lining materials on plaque accumulation.

REVIEW OF LITERATURE

Acrylic resin denture bases provide an artificial substructure that maintains the position of the denture teeth and an artificial area of the oral mucosa over which the forces of occlusion are brone. The modulus of elasticity (stiffness) of acrylic resin denture bases (2400 MPa) ***(Anusavice, 1996)*** is significantly higher than that of the tissues on which they rest (1.25 to 5.0 MPa) ***(Sato et al., 2000).***

Because of the friable nature of the supporting mucosa, areas of force concentration or misfit of the denture base can result in tissue trauma and sore spots. As a result of these conditions, patients frequently do not wear dentures because of the discomfort that accompanied their use ***(Parr and Rueggeberg, 2002).***

To alleviate the possibility of discomfort arising from denture base force transfer to the oral mucosa, manufacturers have developed soft denture base liners. It has been suggested that the properties of soft lining materials should be similar to the oral soft tissues that they cover ***(Hayakawa et al., 1994).***

Soft liners can be defined as soft polymers applied in the form of a thin layer on the tissue-bearing surface of the denture base and rest directly on the oral mucosa ***(O'Brien, 1997).*** They are formulated specifically to have a low compliance. Thus, through distortion (elastic deformation), they tend to absorb much of occlusal forces. The cushioning effect of soft liners has been documented ***(Kawano et al., 1991).*** In the unloaded state, these materials adapt well to the mucosa and provide

clinically acceptable retention and resistance for prostheses ***(Parr and Rueggeberg, 2002).***

According to ***Craig and Powers, 2002,*** relining is a process in which a film of plastic is added to the inside of the denture to obtain an improved fit with the denture bearing mucosa. This is accomplished by: (1) Making an impression of the denture bearing mucosa using the denture as a tray, reflasking the denture, packing and curing the new liner or (2) Making a chair side reline where the reline material is used to make the impression.

Zarb et al., 1990, reported that with the conventional method of relining, the impression could be achieved by using either; static impression technique (either closed or open mouth technique) or functional impression technique.

Razavi et al., 1990, stated that many resin have been used for direct intraoral relining of complete and removable partial dentures, however, the presence of free monomer in the autocuring acrylic resins, their inferior physical properties and the exothermic curing reaction have limited their use.

Arena et al., 1993, stated that chair side hard resin relines offer an immediate and relatively inexpensive means to directly recondition the intaglio denture base surface of ill fitting prostheses. They also mentioned that chair side reline systems are based on either polymethyl methacrylate or its copolymer polymethyl methacrylate to which accelerators such as tertiary amines, sulfinic acids or the more stable

salts of sulfinic acid have been added. The chair side reline resins are considered to actively bond to polymethyl methacrylate denture base resins because of nearly identical chemistry.

Arima et al., 1996, reported that the chair side reline system that uses autopolymerizing reline acrylic resin is not only the convenient method compared with the laboratory processed reline system but the method can also produce the morphologic feature of the oral soft tissue directly on the denture base.

Uses, advantages and Disadvantages of resilient liners

Soft denture liners are often used for the management of painful, atrophied mucosa or traumatic ulceration associated with wearing dentures. The soft denture liner provides comfort for the patient and may reduce residual ridge resorption by reducing the impact force in the load-bearing areas in the supporting structures during function ***(Kawano et al., 1994).***

Kawano et al., 1991 and Hosni et al., 1994, showed that soft denture liners distributed pressure under dentures more evenly during function. The soft lining material is also used to modify transitional prostheses after stage I and II implant surgery ***(Schwartz-Arod and Chaushu, 1997).***

Kiat et al., 1999, reported that resilient liners absorb energy and distribute masticatory forces more evenly to the implants and edentulous ridge. They also evaluated the retention on implant/bar prosthesis with

overdentures lined with resilient denture lining material after cyclic insertion and removal over a simulated 1.5 year period. They concluded that the silicone based resilient liners retained the overdenture well than the plasticized acrylic resin which lost significant retention after cyclic insertion and removal.

Soft denture liners are sometimes considered advantageous for patients who are capable of delivering a relatively heavy occlusal load to unfavorable denture bearing tissues. Duration of softness varies from a few months to as long as five years ***(McCabe et al., 2002).***

On the other hand, considerable variations of soft liners occur in their softness and elastic recovery, as the most important property of a soft material for lining dentures is the ability to return to normal as completely as possible after it has been compressed; unfortunately, no material tested possessed this property ***(Kawano et al., 1994).***

Moreover, ***Price et al., 2002,*** mentioned that soft denture liners have several problems associated with their use such as loss of softness, water sorption, colonization by candida albicans and adhesion failure between the liner and the denture base. A weak bond between the reline and the denture base material could create potential surface for bacterial growth, promote staining or result in complete delimination of the reline and denture base resin ***(Arena et al., 1993).***

Indications and contraindications of relining

Wright, 1981, mentioned that, using resilient liners for the restoration of congenital or acquired oral defects, permits the utilization

of the undercuts in the defects, thus improving retention without traumatizing the soft sensitive tissues.

Zarb et al., 1990, enumerated the reasons for relining a denture as followed:

- To alleviate pain resulting from tilting and rocking of ill-fitted dentures that will transmit undue pressure causing pain.
- To improve retention and stability; as loss of fitness makes the maintenance of the peripheral seal impossible which will greatly impairs retention.
- To improve appearance by reorienting the denture antero-posteriorly; as alveolar resorption in the mandible result in sinking of the lower denture below the original vertical dimension in order to occlude the teeth which results in overclosure and protrusion of the mandible, which in turn leads to undue approximation of the nose and chin.
- To restore the evenness of occlusal pressure; as with any alterations in the fit of the denture, there will be some alterations of the pressure transmitted to the tissue when the teeth are brought into occlusion.

Dootz et al., 1992, mentioned that it can be used in patients taking radiotherapy and patients with xerostomia.

Polyzois, 1992, reported that the advantages of the open combination obturator (hard resilient liner) prosthesis are as follows: flexibility and resiliency can be modified by the thickness of the resilient liner, the thickness and resiliency of the obturator prosthesis can be