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Denture adhesives: As a denture retentive aid

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***Abstract*---**Denture adhesives have been the objective of scientific research for over half a century. The use of denture adhesives is common among denture wearers, and it is also prescribed by many dentists. Prescribing denture adhesives has been viewed by many Prosthodontists as a means of compensating for any defects in the fabrication procedures. Denture adhesives add to the retention and thereby improve chewing ability, reduce any instability, provide comfort and eliminate the accumulation of food debris beneath the dentures. Consequently, they increase the patient's sense of security and satisfaction. However, obtaining the advice of the dental practitioner prior to the use of adhesives is a must. Although they are used worldwide, investigations of their effectiveness and biocompatibility have led to controversial conclusions.

***Keywords*---**bio-adhesion, cohesion, denture adhesives, retention, stability, saliva, tragacanth, vegetable gums.

Introduction

Denture adhesives, also referred to as *adherents* or *fixatives*, have long been recognized by denture wearers as a useful adjunct to denture retention, stability, and function. Excellence during the fabrication of the prosthesis and effective management of patient are the two important aspects for a successful complete denture treatment. Most clinicians find difficulty in satisfying the patient's expectations for stability and retention of the denture and it is often considered

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appropriate to prescribe a denture adhesive for these patients. Denture adhesives may also give psychological confidence to the patient as it supplements retention and stability especially during occasions of public interaction. However, denture adhesives should not be used as a method to improve retention in an improperly fabricated, ill-fitting denture.

Ideal requirements of denture adhesive

1. Biocompatible, nontoxic and non-irritant.
2. It should have a neutral odor and pleasant taste.
3. Should have easy application and removal from the tissue surface of the denture.
4. Discourage microbial growth.
5. Adhesiveness should be retained for 12-16 h.
6. Increase the comfort, retention and stability of the denture.

Composition

The main ingredients of denture adhesives are classified into three groups.
Group 1 (Adhesive agents)
Tragacanth, gelatin, methyl-cellulose, acacia, hydroxyl-methyl cellulose, Karaya gum, sodium carboxyl-methyl cellulose, pectin, and synthetic polymers like acrylamides, acetic, polyvinyl and polyethylene oxide.
Group 2 (Anti-microbial agents)
Sodium tetraborate, ethanol, hexachlorophene, and sodium borate.
Group 3 (Other agents)
Plasticizing agents, flavoring agents like oil of peppermint, oil of wintergreen, and wetting agents, etc.

Mechanism of Action

Denture adhesives are supplied as a paste, powder or cream. As the Adhesive powders absorb water, they swell to many times their original volume and the anions so formed, interact with cations in the proteins in the oral mucous membrane. The viscosity of the adhesive is increased by the thick saliva formed, thereby increasing the denture retention. The absorption of saliva expands the adhesive, which results in 'filling the empty space' that aids in more adhesion. Newer adhesive materials provide stronger bio-adhesive and cohesive forces. Free carboxyl groups formed by the hydration of adhesive form electrovalent bonds that produce stickiness or bio adhesion. The increased viscosity of the adhesive creams results in their lateral spread excluding air and saliva thereby increasing the retention.

Mode of application

1. Any residual adhesive should be removed from the tissue-bearing surface of the denture.
2. Food debris on the tissue surfaces of the denture is wiped clean.
3. Wet dentures before application of adhesive.

4. Small amounts of adhesive are applied to the tissue-bearing surface of the denture.
   - In the maxillary denture - anterior alveolar ridge, the center of the hard palate and posterior palatal seal region.
   - In the mandibular denture – adhesive must be applied along the entire sulcus.

5. Denture should be seated and held in place firmly by hand pressure for 5-10 s.
   a. Gauze is used to remove excess adhesive.
   b. Patient is advised to close into centric occlusion several times to spread the adhesive as a thin even layer.

Indications

1. Use of adhesives will increase denture try-in accuracy and decrease the patient apprehension about the fit of the final prosthesis.
2. Use of adhesives in patients with compromised denture bearing areas adds to their confidence thereby increasing the ability to adapt to the new prosthesis.
3. Immediate denture gets loosened soon due to tissue healing and resorption requiring relining, rebasing, or a new denture fabrication. Comfort and function during the interim period are aided by the use of a denture adhesive.
4. Reduced clinical findings of ulcers, tissue irritation, inflammation and compression of the oral mucosa of denture wearers were seen with concomitant use of adhesives.
5. Xerostomia in denture wearers either drug or radiotherapy induced can be alleviated with the use of denture adhesives.
6. Stabilization of dentures in patients with hormonal changes and neuromuscular disorders such as myasthenia gravis, Parkinson's and Alzheimer's disease, etc., can be achieved with denture adhesives.
7. Denture adhesives are valuable adjuncts to the retention of radiation carriers or radiation protection prostheses.
8. Usage of minimal amounts of adhesives provides high profile patients like attorneys, executives, speakers, etc. with psychological security in social situations.

Contraindications

1. Allergies to denture adhesives or any of its components.
2. Gross inadequacies in retention and function.
3. Excessive bone resorption and soft tissue shrinkage leading to loss of vertical dimension.
4. Adhesives should not be used to retain fractured dentures or dentures with lost flanges.
5. Patients with inability to maintain proper hygiene of the denture should avoid the use of denture adhesive.

Conclusion

Denture adhesives are beneficial to the patient for increasing retention and stability, enhanced comfort, improved function and in providing psychological satisfaction. They should not be used as an aid to compensate for denture deficiencies even though adhesives enhance denture performance. Patients should not use denture adhesives inadvertently without proper guidance and instructions from the dentists. The manufacturers of denture adhesives should be encouraged to develop a more effective adhesive with physical properties that enhance denture retention over a longer time frame with improved application and removal techniques.

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