

## REVIEW ARTICLE

# Denture Adhesive in Prosthodontics - A Review

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## ABSTRACT

Prescribing denture adhesives have been viewed by many prosthodontists as a means of compensating for any defects in the fabrication procedures. The use of denture adhesives is common among denture wearers, and it is also prescribed by many dentists. 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 before the use of adhesives is a must.

**Keywords:** Bioadhesion, Cohesion, Denture adhesives, Retention, Saliva, Stability, Vegetable gums.

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## INTRODUCTION

Technical excellence during the fabrication of the prosthesis and effective management of patient are the two important features for a successful complete denture therapy. Even the most accomplished practitioners find difficulty in satisfying the patient's expectations for stability and retention of the denture, and it is often considered appropriate to prescribe a denture adhesive for these patients. Denture adhesives may also give psychological confidence for the patient<sup>[1]</sup> 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, and under any circumstances, excessive amounts of denture adhesive should be indicated. Standardized guidelines are needed for the application, use, and removal of denture adhesives.<sup>[2]</sup> The use of denture adhesives dates back to the late eighteenth century, but they were first mentioned in dental literature in the 19<sup>th</sup> century. Earlier, adhesives were formulated by

mixing vegetable gums, which absorbed moisture from the saliva and swelled to a mucilaginous substrate that adhered to the mucosa of the mouth and the denture. In 1967, Kapur<sup>[1]</sup> conducted a study on 26 denture wearers and devised a method for scoring denture retention and stability. He concluded that denture adhesives increased denture retention, thereby improving denture wearer's incisive ability. Stafford and Russell,<sup>[2]</sup> using radiotelemetry, measured the change in pressure, at the denture base-mucosa interface with and without adhesives and found that the denture adhesives allowed total occlusal greater pressure. Tarbet *et al.*<sup>[3]</sup> addressed the role of adhesives in denture retention and stability and found that the patient perceived improved chewing ability, confidence, and comfort, reduced wobble and collection of food particles under denture. Chew *et al.*<sup>[4]</sup> used a Kinseographic technique to determine the effectiveness of denture adhesives in improving the retention and stability of the complete maxillary denture *in vivo*. Abdelmelak and Michael<sup>[5]</sup> suggested that the denture adhesives act as a cushion under complete denture reducing the transmission of pressure and friction to the underlying mucosa.

## COMPOSITION

The major constituents of denture adhesives can be broadly divided into three groups.<sup>[6]</sup>

### Group 1

Materials are responsible for adhesive properties such as karaya gum, tragacanth, acacia, pectin, gelatin, methylcellulose, hydroxyl-methyl cellulose, sodium carboxymethyl cellulose, and synthetic polymers (polyethylene oxide, acrylamides, acetic, and polyvinyl).

### Group 2

Antimicrobial agents such as hexachlorophene, sodium borate, sodium tetraborate and ethanol.

### Group 3

Additives, plasticizers, wetting agents and flavouring agents such as oil of wintergreen, oil of peppermint, etc.

## MECHANISM OF ACTION OF DENTURE ADHESIVES

Denture adhesives are marketed as paste, powder, or cream. Adhesive powder includes vegetable gums such

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as acacia, tragacanth, or karaya. 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. Newer adhesive materials provide stronger bioadhesive and cohesive forces. Free carboxyl groups formed by the hydration of adhesive such as methyl cellulose, hydroxyl methyl cellulose, sodium carboxymethyl cellulose, or poly methyl vinyl ether-maleic anhydride form electrovalent bonds that produce stickiness or bioadhesion. The increased viscosity of the adhesive creams results in their lateral spread excluding air and saliva, thereby increasing the retention.<sup>[7-9]</sup>

### REQUIREMENTS OF AN IDEAL DENTURE ADHESIVE<sup>[10]</sup>

1. Available as gels, creams, and powders.
2. Biocompatible, non-toxic, and non-irritant.
3. It should have a neutral odor and taste.
4. Easy application and removal from the tissue surface of the denture.
5. Discourage microbial growth.
6. Adhesiveness should be retained for 12–16 h.
7. Increase the comfort, retention, and stability of the denture.

### MODE OF APPLICATION

Any residual adhesive should be removed from the tissue-bearing surface of the denture.

1. Food debris on the tissue surfaces of the denture is wiped clean.
2. Wet dentures before application of adhesive.
3. 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.

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

### INDICATIONS

1. Recording jaw relations and denture try in should be done using stable and retentive bases. Denture

adhesives stabilize the trial denture bases which show inadequate retention and stability due to various reasons.

2. Use of adhesives will increase denture try-in accuracy and decrease the patient apprehension about the fit of the final prosthesis.
3. Use of adhesives in patients with compromised denture-bearing areas adds to their confidence, thereby increasing the ability to adapt to the new prosthesis.
4. 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.
5. Reduced clinical findings of ulcers, tissue irritation, inflammation, and compression of the oral mucosa of denture wearers were seen with concomitant use of adhesives.
6. Xerostomia in denture wearers either drug or radiotherapy induced can be alleviated with the use of denture adhesives.
7. Stabilization of dentures in patients with hormonal changes and neuromuscular disorders such as myasthenia gravis and Parkinson's and Alzheimer's disease can be achieved with denture adhesives.
8. Prosthesis to rehabilitate gross maxillofacial defects requires denture adhesives for retention.
9. Denture adhesives are valuable adjuncts to the retention of radiation carriers or radiation protection prostheses.
10. Usage of minimal amounts of adhesives provides high profile patients such as attorneys, executives, and speakers 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

With proper use, denture adhesives are beneficial to the patient in 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.

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