

# Denture adhesives in prosthodontics- an overview



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## ABSTRACT

Denture adhesives are used by an endless number of denture wearers and also by the dentists who fabricate them. Prescribing denture adhesives has been viewed by many prosthodontists as a means of compensating for deficiencies in clinical and technical procedures. Denture adhesives increase retention and thereby improve chewing ability, reduce wobble, improve comfort and confidence and reduce amount of food particles collecting under the dentures. Moreover, they undoubtedly provide the patients an increased sense of security and satisfaction. However, patients should use denture adhesives only on the advice of their dentists.

## INTRODUCTION

Though their usage dates back to the late 18<sup>th</sup> century, they were first mentioned in dental literature in the 19<sup>th</sup> century. Earlier adhesives, formulated by mixing vegetable gums absorbed moisture from the saliva and swelled to a mucilaginous substrate that adhered to the mucosa of the mouth and the denture.

Kapur's <sup>1</sup> study in 1967 on 26 denture wearers, concluded that denture adhesives increased denture retention, thereby improving denture wearers' incisive ability.

Stafford and Russell,<sup>2</sup> using radio telemetry, measured the change in pressure, at the denture base-mucosa interface, with and without adhesives and found that denture adhesives allowed greater total occlusal pressure.

The denture adhesives improved denture retention and stability (Tarbet et al<sup>3</sup>), and found that patients perceived improved chewing ability, confidence and comfort, reduced wobble and collection of food particles under denture.

Chew et al<sup>4</sup> determined the effectiveness of denture adhesive in improving the retention and stability of the complete maxillary denture in vivo using Kinseography.

Abdelmelak and Michael<sup>5</sup> suggested that the denture adhesives acts 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 (Adhesive agents):

Tragacanth, acacia, pectin, gelatin, methyl-cellulose, hydroxyl-methyl cellulose, Karaya Gum, sodium carboxyl-methyl cellulose and synthetic polymers (polyethylene oxide, acrylamides, acetic and polyvinyl).

### Group 2 (Anti-microbial agents)

Sodium borate, sodium tetraborate, hexachlorophene and ethanol.

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### Group 3 (Other agents)

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

### Mechanism of Action

Denture adhesives are supplied as paste, powder or cream.

As the Adhesive powders absorb water, they swell to many times their original volume and the resulting anions are attracted to cations in the mucous membrane proteins. Sticky saliva thus formed increases the viscosity of the adhesive, thereby increasing the denture retention. <sup>7</sup>

Newer adhesive materials provide stronger bio-adhesive and cohesive forces. Free carboxyl groups formed by the hydration of adhesive such as methyl cellulose, hydroxyl methyl cellulose, sodium carboxyl-methyl cellulose or poly methyl vinyl-ether maleic anhydride (PVM-MA), etc. form electrovalent bonds that produce stickiness or bio adhesion.

The increased viscosity of the adhesive creams result in their lateral spread excluding air and saliva thereby increasing the retention <sup>8</sup>.

### Requirements of an ideal Denture Adhesive <sup>9</sup>

1. Available as gels, creams and powders.
2. Nontoxic, non-irritant, and biocompatible with the oral mucosa.
3. It should have a neutral odour 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 hrs.
7. Increase the comfort, retention and stability of the denture

#### Mode of application:

1. Any residual adhesive should be removed from the tissue-bearing surface of the denture .
2. The denture bearing tissues are wiped clean of any food debris.
3. Wet dentures before application of adhesive.
4. Small amounts of adhesive is applied to the tissue-bearing surface of denture.
  - In the maxillary denture -Anterior alveolar ridge, the center of hard palate and posterior palatal seal region .
  - In the mandibular denture - apply to the sulcus of denture over the crest of the ridge extending from the anterior region sulcus to the distal extension.
5. Denture should be seated and held in place firmly by hand pressure for 5-10 seconds.
  - 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. The use of denture adhesive can stabilize the trail

denture bases which show inadequate retention and stability due to various reasons.

2. Use of adhesive will improve the accuracy of the denture try-in, and also 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 get loosened soon due to soft tissue healing and bony resorption requiring relining, rebasing, or a new denture fabrication. A soft liner used to augment the retention; comfort and function during the interim period are aided by the use of a denture adhesive.
5. Reduced clinical findings of ulcers, tissue irritation, compression, and inflammation 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, Parkinson's and Alzheimer's disease, etc., 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 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 missing flange or with sectional fractures.
5. Patients with inability to maintain proper hygiene of the denture should avoid use of denture adhesive.

#### Conclusions

Denture adhesives, when used properly are safe and 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 without proper guidance and instructions from the dentists.