GLUE FOR DENTURE- DENTURE ADHESIVE- A REVIEW
Pratibha Katiyar¹, Anupama Nigam²

HOW TO CITE THIS ARTICLE:

ABSTRACT: Following the loss of natural dentition the edentulous individual can be faced with a number of problems associated with wearing complete dentures. One of the most common is that of looseness of either or both of the dentures. Dentures function as a substitute for missing teeth in mouth, while dentures are carefully fitted for the user; the fit can change over time, causing discomfort and slippage. To alleviate the discomfort and to control over the slippage, a denture adhesive may be applied to the denture. Successful complete denture therapy must involve both technical excellences during prosthesis fabrication and effective patient management. Once the denture are placed ,satisfying the expectations of many patients for optimal retention, stability of dentures is often beyond the technical skills of even the most accomplished practitioner. Discussing and implementing judicious use of denture adhesives may satisfy patient’s expectation and also help to achieve the intended treatment goals. They indicated for routine use when appropriately constructed CD does not satisfy stability and retention expectations of patients.

KEYWORDS: Denture Adhesive, Denture Glue,

GLUE FOR DENTURES - DENTURE ADHESIVE:

Following the loss of natural dentition the edentulous individual can be faced with a number of problems associated with wearing complete dentures.

One of the most common is that of looseness of either or both of the dentures. Dentures function as a substitute for missing teeth in mouth, while dentures are carefully fitted for the user; the fit can change over time, causing discomfort and slippage.

To alleviate the discomfort and to control over the slippage, a denture adhesive may be applied to the denture.

More than 50 years ago it was suggested that local factors were primarily responsible for edentulous ridge resorption.

Schlosser implicated ill-fitting dentures and associated trauma to oral tissues as the primary causes of rapid destruction of the denture bearing structures. He lists faulty impressions, excessive occlusal vertical dimension, inaccurate centric jaw relationships, and occlusal disharmony as major contributing factors. Lammie suggested that a detrimental external molding force may adversely impact the residual bony ridges as overlying oral soft tissues contract or atrophy with time. This molding force may, in turn, accelerate resorption of the edentulous ridges.

The objective of complete denture therapy for patients with severe reduction of residual ridges is not solely the replacement of missing teeth. Rather, complete dentures must be designed to replace both the missing dentition and associated supporting structures.

Complete maxillary and mandibular dentures have long been considered the standard of care for treating edentulous patients. While most edentulous patients express relative satisfaction with their maxillary complete dentures, many do not enjoy equally successful mandibular denture comfort and function.
The use of endosseous dental implants to assist in the support, stability, and retention of removable prostheses is now considered an effective treatment modality for the edentulous patient.

After thorough, evidence-based review of existing information at (McGill University), the following consensus statement was formulated: “The evidence currently available suggests that the restoration of the edentulous mandible with a conventional denture is no longer the most appropriate first choice prosthodontic treatment. There is now overwhelming evidence that a two-implant overdenture should become the first choice of treatment for the edentulous mandible.”

RATIONALE:

Successful complete denture therapy must involve both technical excellences during prosthesis fabrication and effective patient management. Once the denture are placed, satisfying the expectations of many patients for optimal retention, stability of dentures is often beyond the technical skills of even the most accomplished practitioner. Discussing and implementing judicious use of denture adhesives may satisfy patient expectation and also help to achieve the intended treatment goals.

They indicated for routine use when appropriately constructed CD does not satisfy stability and retention expectations of patients.

Some clinicians disapprove the use believing that they can be used with old dentures instead of having properly constructed accurately fitting denture. Faulty, inappropriate use can lead to problems like impairment of the development of the NM system which is important in the retention and stability of the dentures.

HISTORY:

Denture adhesive has been introduced in modern dentistry in late 18th century.

The earliest patent pertaining to the adhesives was issued in 1913 and other patents followed this in the 1920's and 1930's. Till 19th century, they were used to hold base plates while recording jaw relation in immediate denture construction till final CD fabrication.

Types and composition of fixatives:

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- Made in various formulations.
- Broadly divided into two groups:
  - Temporary: Eventually lost from the dentures and swallowed during normal wear along with food and drinks. 
  - Cream, Powder and Liquid
  - Permanent: They contain irremovable products like paper.
  - Preformed sheet which can be trimmed into desired shape.

**COMPOSITION:**

All dentures adhesive have some basic ingredients
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- Adhesive components: ex: gelatin, pectin, Na carboxy methyl cellulose
  - (10%-30% wt)
  - These sensitize the adhesive to moisture, enhancing the cohesive property of formulation and enhancing gel strength.
- Antimicrobial agent: ex: Na borate, Hexachlorophene, or may be a combination of 8-hydroxyquinoline or its salt, Nystatin, or Cu salts.(0.001%-0.1% wt)
  - Action particularly against candida albicans
- Fillers: (dispersion agent):ex: Mg O2, NaPo4, CaSi
  - Prevent clumping of powder.
- Base: partially mixed salts of lower Alkyl Vinyl Ether/Malic acid, or Maleic Anhydride copolymers (GANTREZ) (10%-50%)
  - Provides base or matrix for the adhesive material.
- Thickening agents: ex: petrolatum and mineral oil.(15%-30% wt)
  - To improve handling property.
- Flavoring agent: ex: peppermint oil, menthol.
- Preservative: ex: Benzoic acid, Na benzoate, parebens (0.03%-0.6% wt)
- Sweetening agent: ex: water proof artificial sweeteners (on formulation) (0.001-0.5%)
- Colorant: ex: Tio2 dyes suitable for food drug and cosmetic application (FDC dyes) (indigo dye FDC-2) (0.001%-0.5%)

**Mode of Action:** Effective of fixative depends on both physical and chemical forces and explained in terms of anionic /cationic interactions.

The adsorption of water and saliva by fixative results in formation of an anionic layer, that are attracted to cationic protein present in mucus membrane producing stickiness and form a barrier between denture and mucoperiosteum.

Carbonyl groups in the adhesive material provide strong bio adhesive and bio cohesive forces which improves the retention of the denture.

Adhesives comprise of water swell able gums/polymers suspended in oils and petrolatum, these hydrate and become tacky when introduced to saliva in oral cavity, thus holding denture in place.

According to ADA, it should have following characters:
  - Product composition should be supplied
  - Should not affect the integrity of the denture
  - Biologically acceptable
  - Effective function as adherent

**Recommendations for use:**

Those who have Poor anatomical denture support though the denture are clinically and technically satisfactory.

Individuals with poor neuromuscular control like parkinsonism and stroke.
Xerostomia sufferer like Post radio therapy, drug induced, sjogren syndrome.
To improve retention stability of the denture following insertion of new denture when difficulties are been experienced in developing NM control. (For limited period)

Contra indications:
1. For the retention of clinically unacceptable dentures, like
   - i. Worn out dentures,
   - ii. Relining cases,
   - iii. Pt’s with physical inability to clean dentures.
2. Following insertion of immediate dentures to avoid post op discomfort.
3. Patients allergic to components of adhesives.

Aspects of denture fixatives
Clinical aspect: - Denture stability, retention and masticatory efficiency enhanced due to increased biting force with the use of denture fixative.
   - Minimal increase in VDO if not used in proper proportion.
Biological aspect: - Because of eventual loss from the denture along with the food and drink over a long period of time can lead to possible side effect like nausea, epigastric pain and allergic reactions (angioneurotic edema, hives)
   - Microbiological aspect: - Long term use of antimicrobial agent may influence the oral microflora by selectively supporting the growth of some organism and inhibiting others.
   - Use should be limited in immune-compromised patients, as some can contain bacterial and fungal contaminants that may cause infections in these individuals.

Advantages:
1. Enhances the inter facial surface tensions between denture base and supporting tissues, improving the adhesive, cohesive and viscosity characteristics of interfacial film particularly in xerostomic patients.
2. Eliminating voids occurring in the interfacial space in the absence of absolute adaptation of the denture base to the bearing tissue.
3. Reduces the food impactions under the denture bases.
4. Improved chewing efficiency, increases bite forces, improve functional load distribution under the tissues.
5. Facilitate the psychological well being of the patient.
6. Patient with xerostomia:
   - a. Provides cushioning and lubricating effect, reduce frictional irritation, preventing the tissue dehydration.
7. Disadvantages
   - Insoluble adhesives (synthetic wafers) cause tissue destruction, so better to use soluble adhesives.
   - Support bacterial growth.
   - Due to illiteracy of patient, improper use or over use of denture adhesives along with improper oral hygiene failure of adhesives is seen.
It is appropriate to prescribe adhesive to augment retention and stability of conventional complete dentures. Anticipating suboptimal stability and retention in the presence of compromised patient factors, e.g., xerostomia and informing patients that the proper use of a limited amount of denture adhesive can supplement existing denture stability and retention. The need for denture adhesive is not necessarily an indication of suboptimal therapy, or admission of failure by either to dentist or patient.

Most denture wearers, at one time or another, have attempted to use adhesive to facilitate comfortable denture function. Unfortunately, the concept that “more is better” does not hold true for denture adhesives.

Appropriate Application of Denture Adhesive

1. Inform the patient that, due to existing conditions, achieving optimal complete denture retention and stability may not be possible. Also suggest that the proper use of denture adhesive is an acceptable means of augmenting the stability and retention of a new prosthesis. Honest and realistic communication of the anticipated results of therapy may ease future patient management problems.

2. The use of small amounts of hydrated paste adhesives (e.g., Fixodent, Procter & Gamble) works well due to favorable adhesive, cohesive, and viscosity characteristics.

3.
6. The denture is then placed in the mouth and firmly seated with finger pressure for approximately 10 seconds (Figure 5). Maintenance of seating pressure will cause the adhesive to flow throughout the interfacial space between the denture base and the denture bearing soft tissues.

7. The patient may be provided with the sample container of adhesive used during the demonstration, suggesting local stores that carry this product will emphasize that adhesive use is a component of regular denture use. The patient should be told that the use of excessive adhesive may indicate an inadequate fit, necessitating denture relining or remake procedures.

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**Technique for Denture Adhesive Removal**

1. Use of an electric toothbrush can enhance thorough cleaning of both denture surfaces and denture bearing oral tissues (Figure 6). Inexpensive, battery powered brushes are now widely available to consumers (e.g., Crest Spinbrush Pro, Procter & Gamble). A small amount of toothpaste on the electric toothbrush will serve to refresh the patient’s breath and improve taste (Figure 7).

2. Remove the dentures from the mouth, and thoroughly scrub the entire integument surface of the dentures with the electric toothbrush (Figure 8). This procedure is not intended to eliminate adhesive from the dentures. Rather, this initial scrubbing will loosen residual adhesive material, facilitating subsequent removal.
3. The denture should be submerged in a container of warm water and a small amount of liquid soap added. The denture is then gently scrubbed using the non-abrasive side of a toothbrush. This technique helps to remove any debris that may have accumulated on the surface of the denture (Figure 9).

4. To clean and stimulate the oral tissues, the electric toothbrush may be used. A small amount of toothpaste is applied to the brush. All denture-bearing areas are gently massaged (Figure 11). At first, this may cause a tingling sensation in the patient. This sensation will disappear with repeated use.

5. Following thorough massaging of the oral tissues, warm water is introduced into the patient's mouth (Figure 12). Holding this water in the mouth, the electric toothbrush is again used to massage all oral tissues (Figure 13). The patient is then instructed to expectorate the water and residual debris into a sink, leaving the oral tissue free of adhesive.

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AUTHORS:  
1. Pratibha Katiyar  
2. Anupama Nigam

PARTICULARS OF CONTRIBUTORS:  
1. Senior Lecturer, Department of Prosthodontics, Chandra Dental College and Hospital, Safedabad, Barabanki, Lucknow.  
2. Reader, Department of Prosthodontics, Chandra Dental College and Hospital, Safedabad, Barabanki, Lucknow.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:  
Dr. Pratibha Katiyar,  
3/242, Vinay Khand 3 Gomti Nagar, Lucknow, U.P.  
Email- dr.pratibha2002@yahoo.com  
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