



DENTURES

When a patient no longer has any natural teeth, complete dentures are the traditional method to restore function and appearance. Many patients experience difficulty wearing conventional dentures because of poor stability and decreased chewing function. The use of dental implants to improve the stability and retention of dentures is becoming quite popular.

The oral health of the completely edentulous patient is a significant factor related to the quality of life, nutrition, social interactions and general systemic health of denture-wearing patients. While often not life threatening, the presence of oral biofilm on complete dentures has been associated with denture stomatitis, as well as with more serious systemic conditions, especially in the dependent elderly.

Oral bacteria have been implicated in bacterial endocarditis, aspiration pneumonia, chronic obstructive pulmonary disease, generalized infections of the respiratory tract and other systemic diseases. Excellent reviews of the pathogenic potential of denture plaque have been published.

A 2008 report by Ishikawa and colleagues indicated that weekly professional cleaning of complete dentures (brushing, cleaning of dentures with a denture brush, ultrasonic irrigation of dentures with denture cleanser, swabbing of oral tissues with a sponge brush) significantly decreased multiple oral bacterial strains when compared with the daily chemical disinfection methods, and suggested this to be a viable strategy for reducing aspiration pneumonia in the dependent elderly. Clearly, evidence is mounting regarding the relationship between proper complete denture hygiene and overall systemic health.

DENTURE CARE AND MAINTENANCE

To reduce levels of biofilm and potentially harmful bacteria and fungi, patients who wear dentures should do the following:

- a. Dentures should be cleaned daily by soaking and brushing with an effective, nonabrasive denture cleanser.
- b. Denture cleansers should **ONLY** be used to clean dentures outside of the mouth.

- c. Dentures should always be thoroughly rinsed after soaking and brushing with denture-cleansing solutions prior to reinsertion into the oral cavity. Always follow the product usage instructions.

Dentures should be cleaned annually by a dentist or dental professional by using ultrasonic cleansers to minimize biofilm accumulation over time.

Dentures should never be placed in boiling water.

Dentures should not be soaked in sodium hypochlorite bleach, or in products containing sodium hypochlorite, for periods that exceed 10 minutes. Placement of dentures in sodium hypochlorite solutions for periods longer than 10 minutes may damage dentures.

Dentures should be stored immersed in water after cleaning, when not replaced in the oral cavity, to avoid warping.

Denture Care and Management

Denture adhesives, when properly used, can improve the retention and stability of dentures and help seal out the accumulation of food particles beneath the dentures, even in well-fitting dentures.

In a quality-of-life study, patient ratings showed that denture adhesives may improve the denture wearer's perceptions of retention, stability and quality of life; however, there is insufficient evidence that adhesives improve masticatory function.

Evidence regarding the effects of denture adhesives on the oral tissues when used for periods longer than six months is lacking. Thus, extended use of denture adhesives should not be considered without periodic assessment of denture quality and health of the supporting tissues by a dentist, prosthodontist or dental professional.

Improper use of zinc-containing denture adhesives may have adverse systemic effects. Therefore, as a precautionary measure, zinc-containing denture adhesives should be avoided.

Denture adhesive should be used only in sufficient quantities (three or four pea-sized dollops) on each denture to provide sufficient added retention and stability to the prostheses.

Denture adhesives should be completely removed from the prosthesis and the oral cavity on a daily basis.

If increasing amounts of adhesives are required to achieve the same level of denture retention, the patient should see a dentist or dental professional to evaluate the fit and stability of the dentures.

While existing studies provide conflicting results, it is not recommended that dentures be worn continuously (24 hours per day) in an effort to reduce or minimize denture stomatitis.

Patients who wear dentures should be checked annually by the dentist, prosthodontist or dental professional for maintenance of optimum denture fit and function, for evaluation for oral lesions and bone loss, and for assessment of oral health status.

Use of denture adhesives. Complete dentures are retained in the oral cavity through a complex interaction of factors that include close adaptation of the intaglio surface of the prosthesis to the underlying tissues, appropriate peripheral extension of the denture borders, the presence of a thin film of saliva of acceptable viscosity between the prosthesis and the tissues, and atmospheric pressure. Following tooth removal and denture placement, significant resorption of the residual ridges typically occurs over the first three to 12 months. The resorption usually continues at a lower level throughout the life of the patient. As bone is lost, the adaptation of the denture to the bearing tissues is compromised; resulting in ill-fitting dentures with compromised retention that decreases the wearer's chewing ability.

Denture wearers may have conditions that significantly affect retention and stability of their oral prostheses. In addition to hard- and soft-tissue changes over time, these patients often experience problems with diminished neuromuscular control, reduced bite force, and alterations in the quantity and quality of saliva due to age or medications. Several methods have been developed to enhance both fit and retention of aging prostheses. These methods include use of denture adhesives, prosthesis relining, rebasing and the use of endosseous dental implants. Denture adhesives are widely available in formulations of creams, powders, pads/wafers, strips or liquids.

Denture wearers may have conditions that significantly affect retention and stability of their oral prostheses.

Advantages of using denture adhesives. The task force identified and reviewed 20 clinical trials that focused on the use of denture adhesives relative to their effect on denture retention, stability, movement, bite force, ability to chew test foods, food occlusion or patient satisfaction. Most of these studies were of short duration (same-day evaluation). Some trials randomly allocated patients to various experimental groups (depending on numbers of adhesives investigated), and most investigated effects on the maxillary denture only. Some did not have a control group, and many were crossover in design (comparing dentures without adhesives against the same prosthesis with adhesive).

Precautions when using denture adhesives. Cytotoxic effects. Several articles have evaluated the potential cytotoxic effects of denture adhesives. Two were in vitro studies, including studies evaluating the irritation and cytotoxic potential of commercially available adhesives (creams, powders and pads). Al and colleagues demonstrated that only one of six adhesive types evaluated induced severe cytotoxic reactions. The authors did, however, raise concerns that adhesives may contribute to mucosal inflammation in denture wearers. Dahl investigated the mucosal irritation induced in vitro by 27 different dental adhesive products. He found that most adhesives damaged the blood vessels of the test apparatus, indicating potential irritant effects on the mucous membranes.

Two in vitro studies revealed both bacterial and fungal contaminants in denture adhesives. Gates and colleagues tested four brands of adhesives and suggested that microwave irradiation of the adhesives for 10 minutes in their original containers may

reduce the contaminants. However, in their study, the irradiation had no effect on five of the 24 containers of adhesives tested. The authors recommended caution when prescribing adhesives to the immunocompromised patient cohort. Ekstrand and colleagues evaluated 19 commercially available adhesives for microbial contamination and formaldehyde content. Using the agar overlay technique, the authors found that all of the materials tested caused severe cytologic effects. Formaldehyde was found in substantial amounts in four products and in minor amounts in two other products.

Finally, Al and colleagues suggested that since denture adhesives are commonly used throughout the day, denture adhesives may contribute to mucosal inflammation in denture wearers. However, as there are no longitudinal trials of continual use of denture adhesives, the effects of long-term use of adhesives on oral tissues are currently unknown.

Toxicity of zinc-containing adhesives. The most serious consequences of the chronic and excessive use of denture adhesives reported to date is potential neurotoxicity related to the presence of zinc as a component of the adhesive. Zinc is an essential mineral usually found in some foods or used as a dietary supplement. It is involved in numerous aspects of cellular metabolism.

Correct application of denture adhesives. The following clinical technique has been advocated by several manufacturers of denture adhesives for proper application to the denture base:

- Clean and dry the intaglio surface of the dentures.
- For the maxillary denture, apply three or four pea-sized increments of denture creams to the anterior ridge, midline of the palate and posterior border.
- For the mandibular denture, apply three pea-sized increments of denture cream to several areas of the edentulous ridge.
- If using powder adhesive (instead of cream as noted above), wet the base with water, apply a thin film of adhesive to the entire tissue-contacting surface and shake off any excess.
- If using pad adhesives, place the correct size onto the denture and cut off any excess that extends beyond the denture border with sharp scissors.
- Seat the dentures independently; hold each firmly in place for five to 10 seconds.
- Remove any excess material that expresses into the cheek or tongue space.
- Bite firmly to spread the adhesive and remove any additional excess that expresses into the cheek or tongue spaces.

Residual ridge resorption. Multiple factors may lead to bone loss beneath complete dentures. Bone loss is associated with changes that affect the support and adaptation of complete dentures. Loss of alveolar bone, or residual ridge resorption (RRR), is multifactorial in nature. Factors that have been implicated in RRR include local and systemic effectors of bone resorption that include asthma (due to the use of corticosteroid inhalants), fluoride consumption, hormone replacement therapy, use of removable partial dentures prior to denture therapy, poor oral hygiene and continuous wearing of dentures.

Bone loss is associated with changes that affect the support and adaptation of complete dentures.

Relines, rebase of dentures and denture recall interval. The Glossary of Prosthodontic Terms, eighth edition, defines reline as "the procedures used to resurface the tissue side of a denture with new base material, thus producing an accurate adaptation to the denture foundation area." Similarly, the term "rebase" is defined as "the laboratory process of replacing the entire denture base material on an existing prosthesis." While these procedures seemingly are similar, the reline procedure is most often used when factors other than loss of bone or soft-tissue support have changed for the patient (i.e., the vertical dimension, occlusion, phonetics and functionality of the dentures are acceptable), and these changes are compensated for by the addition of new acrylic resin to the intaglio surface of the denture. In those instances in which these other factors have apparently been compromised, the rebase procedure is used. This procedure can effect marked changes in denture architecture that influence vertical dimension, phonetics and associated function. The reorientation of teeth to the denture-bearing surface by means of the rebase procedure provides these potential benefits and at the same time provides a pristine intaglio surface opposing the mucosa.