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DENTURE HYGIENE

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The College of Dentistry, University of Baghdad, Department of
Prosthodontics in Partial Fulfillment for the Bachelor of Dental Surgery

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Certification of the Supervisor

I certify that this project entitled “**Denture Hygiene**” was prepared by **Qya Mahmoud Hamza** under my Supervision at the College of Dentistry/University of Baghdad in partial fulfillment of the graduation requirements for the Bachelor Degree in Dentistry.

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Date: 26/4/2022

Dedication

As well as everything that I do, I would be honored to dedicate this project to my parents and my brother. They supported me and encouraged me on every step in my life and they gave me everything necessary to be who I am now.

Finally my dream came true and I am writing my graduation project from the College of Dentistry / University of Baghdad.

Last but not least I would like to thank my supervisor *Dr. Noor Falah* to help me in this project and I am very lucky to be under his supervision.

AYA

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Introduction

As life expectancy in both developing and developed countries has increased over the past few decades, so has the proportion of the elderly among the total population. Along with this increase, the oral health status of the elderly has gained in importance. The number of individuals requiring dentures has increased with the aging population (**Mersel et al., 2000**).

Poor hygiene is associated with lack of guidance, intrinsic characteristics of dentures and diminished manual dexterity of most denture wearers due to old age (**Paranhos; 2007**).

Most of the partial denture or complete denture patients leave the dental clinic with little or no knowledge of maintenance of their dentures. This could be attributed to dental practitioner's failure to adequately educate the patient regarding the availability of different methods of cleansing/disinfecting dentures, the post insertion complications and systemic implications of poorly maintained dentures. This scenario is widely prevalent due to dentist unawareness of the different disinfecting techniques, lack of quality time for individual patient care, patient's inability to implement the disinfection and patient's negligence of maintaining denture hygiene (**Karthikeyan et al, 2018**).

Because regular oral and denture hygiene procedures play a major role in the maintenance of oral health and the long-term success of removable prosthodontics treatment, dentists should be sure to explain to their patients the need for periodical visits to the dentist for maintenance purposes and provide thorough instruction in denture cleansing and wearing habits (**Budtz-Jorgensen et al., 1975**).

In the dental literature, some strategies for improving the oral health care for elderly people are described. One of the basic principles is that preventive dentistry should not be limited to saving the dentition, but should be expanded to promote overall general health (**Wesson, 1981**).

Oral hygiene has ancient roots; the first reference toward maintenance of oral hygiene by people was in the form of—chewing sticks.|| As early as 3500 BC, the Babylonians used chewing sticks taken from special aromatic trees designed to clean the teeth and freshen breath (**Mandel ID, 1988**).

Most common device used to achieve oral hygiene in the present day is the—toothbrush.|| Mechanical tooth cleaning by means of a toothbrush is considered the most common ways of disturbing dental plaque development (**Suresan et al 2015**).

Researchers have concentrated their focus on denture wearers attitude and practice toward denture cleansing when they should be more focusing on the attitudes of the dentists‘ and practices toward patient education at the time of denture delivery (**Dikbas et al , 2006**).

Aims of the Study:

This review attempts to:

1. Focus on the influence of different types of removable prosthesis on denture hygiene.
2. Highlight the techniques and materials that are available for cleaning dentures and keeping them in a hygienic state.
3. Focus on the relationship between denture hygiene and denture stomatitis and other denture associated lesions.
4. Highlight the points to be considered in the aftercare of removable prostheses wearers.

Chapter One

Review of the Literature

Review of the Literature

1.1. Denture induced oral mucosal lesions:

The negative impact of poor denture hygiene among older adults is an important public health issue (**Petersen and Yamamoto, 2005**).

A number of studies have reported that the incidence of oral mucosal lesions (OMLs) and especially prosthesis-related OMLs is correlated with the use of removable prostheses (**Macentee et al, 1998**).

The frequency of prosthesis-related OMLs seemed to be higher than that of other OML types. In clinical practice, the most frequently seen prosthesis-related OMLs are stomatitis, hyperplasia, angular cheilitis, and traumatic ulcers (**Dorey et al, 1985**).

1.1.1 Contributing factors for denture-induced oral mucosal lesions:

a. Ill-fitting dentures:

Food particles become lodged under an ill-fitting denture and may irritate the soft tissues and provide an environment for growth of microorganisms. Because tissue changes under dentures can occur gradually over a long period, the patient may not be aware of developing disease (**Mubarak et al, 2015**).

b. Improper storage of denture:

Storage of the denture in water when not in the mouth increased risk of OMLs by eight times. Leaving the denture dry also resulted in a six times higher risk of OMLs (**Ercalik-Yalcinkaya and Ozcan, 2015**).

c. Inadequate or improper oral hygiene:

Continuous wearing of dentures, nocturnal wearing of dentures more than doubles the risk of oral lesions, such as denture stomatitis (**Ercalik-Yalcinkaya and Ozcan, 2015**).

- d. Chemotoxic effect from residual cleansing paste or solution not thoroughly rinsed from the denture.
- e. Allergy to the denture base (rare).
- f. Patient self-treatment with over-the-counter products for relining.
- g. Xerostomia due to medications or medical conditions (**Mubarak et al, 2015**).

1.1.2 Types of denture induced oral mucosal lesions

1.1.2.1 Denture-induced irritation (also called traumatic ulcers or sore spots)

Appearance:

Isolated, red, inflamed area sometimes ulcerated. (Figure 1)

Contributing factors:

New denture wearer, trauma from an ill-fitting denture, an overextended denture flanges, unbalanced occlusion, a rough spot on a denture surface, a tongue bite, or a foreign object caught under the denture (**Mubarak et al, 2015**).

The ulcer may resemble a cancerous lesion and need to be biopsied when it persists longer than (7–14 days) after denture adjustment (**Boyd et al, 2019**).



Figure (1.1): Traumatic ulcer: Molar Area, under denture, adopted from (**Boyd et al, 2019**).

1.1.2.2 Denture Stomatitis:

Many studies have reported higher prevalence of prosthesis stomatitis, in complete removable denture wearers (**Gendreau and Loewy, 2011**) than in partial removable denture wearers (**Mikkonen et al, 1984**).

This is due to predisposing factors such as Candida infection, mechanical issues, and long-term prosthesis wearing as well as the larger area of oral mucosa covered by a complete removable denture (**Coelho et al, 2004**).

The frequency of denture stomatitis has been found to be greater among women than men, and it has also been found to increase with age (**Fenlon et al, 1998**).

Inflammatory condition of high prevalence among denture wearers and may be characterized by:

Generalized inflammation and erythema of mucosa covered by the denture (**figure 2**). May be asymptomatic, but some patients may experience pain, itching, or a burning sensation.

Etiologic factors include the following:

1. Poor denture hygiene.
2. Continuous denture wearing, particularly nocturnal use of dentures.
3. Cigarette smoking.
4. Wearing dentures longer than 5 years.
5. Elderly denture wearer.
6. Trauma from ill-fitting denture (**Gendreau and Loewy, 2011**).

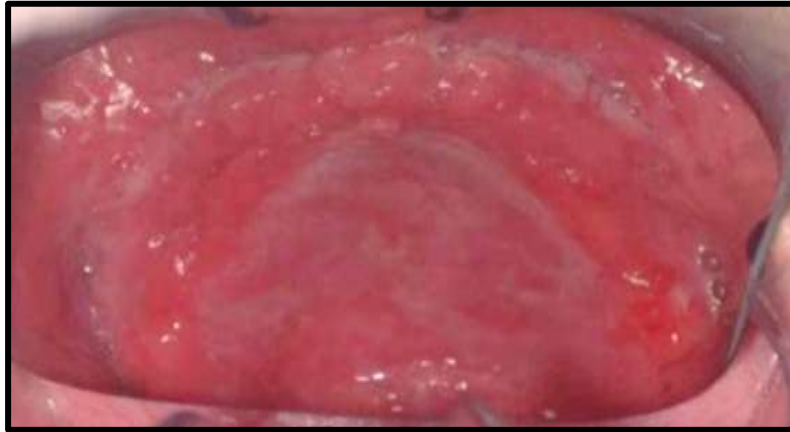


Figure (1.2): Erythema and Papillary Hyperplasia Seen with Denture Stomatitis, adopted from (Boyd et al, 2019).

1.1.2.3 Angular Cheilitis

Appearance

Deep fissuring at the angles of the mouth, with cracks, ulcerations, and erythema moist with saliva or sometimes dry with a crust (Boyd et al, 2019).

Contributing factors

1. Local factors including infection by *C. albicans*.
2. Poor oral hygiene.
3. Irritation from saliva is associated with anatomic changes that make the folds at the corners of the mouth deeper and more pronounced.
4. Vitamins B deficiency can further complicate angular cheilitis, particularly in debilitated and dependent elder patients, so encouraging adequate nutrition is important.
5. Prevalence is higher in females than in men and is associated with use of removable denture and not closely associated with being edentulous (Boyd et al, 2019).

1.1.2.4 Tissue Hyperplasia

There are several types of tissue hyperplasia seen in those who wear dentures.

1.1.2.4.1 Epulis fissuratum

Long-standing chronic inflammatory tissue appears as tissue growth over the alveolar ridges. **(Figure 3)**

The etiology is often multifactorial and may include poor oral self-care, smoking, and ill-fitting dentures **(Mubarak et al, 2015)**.



Figure (1.3): Epulis fissuratum at partial flange, adopted from **(Boyd et al, 2019)**.

1.1.2.4.2 Inflammatory hyperplasia

Inflammatory hyperplasia is located on the palate, rarely outside the confines of the bony ridges. The lesion appears as a group of closely arranged, pebble shaped, red, edematous projections. Associated primarily with chronic injury from poor-fitting dentures **(Mubarak et al, 2015)**.

1.1.2.4.3 Flabby ridge

Mobile soft tissue present on the superficial aspect of the alveolar ridge due to a replacement by fibrous tissue.

Typically located on the anterior aspect of the maxilla **(Mubarak et al, 2015)**.

1.2. Removable partial denture hygiene

Removable partial dentures are a device that serves to restore one or more of the original tooth that has been lost, supported by the remaining original tooth and mucosa beneath the denture base (**Patel et al, 2012**).

Many studies have been carried out to determine the effect of removable partial dentures (RPD) on the periodontal health and, particularly, on plaque accumulation, gingival inflammation, mobility, pocket depth and marginal bone loss on the remaining teeth (**Drake and Beck, 1993**).

Although several studies reported extensive periodontal injuries (**Markkanen et al., 1987; Tuominen et al., 1989**).

Others demonstrated more favorable results, with moderate injuries or practically no periodontal changes (**Kratochvil et al., 1982; Chandler and Brudvik, 1984**).

Vanzeveren et al., in 2002 conducted a study on the influence of removable partial denture on periodontal indices and microbiological status, in this study thirty patients (19 men and 11 women) were provided with a removable partial denture (RPD) and assigned randomly to two groups: 15 patients were called back twice a year for plaque control, reinforcement of instructions, denture hygiene control and professional prophylaxis; the other 15 were not called back. The 30 patients were examined after 2 ± 3 weeks following the end of the prosthetic treatment, after 1 and 2 years. At each examination, the following parameters were recorded [gingival inflammation, plaque index (PI I), tooth mobility, attachment level, pocket depth] and a bacteriological examination of sub gingival plaque was carried out. In their conclusions few differences appeared between the two groups; the values observed show a relatively low level of hygiene and but little motivation with regard to prophylaxis techniques.

1.2.1 Periodontal reactions related to removable partial dentures:

1.2.1.1 Plaque and oral hygiene

Placement of an RPD in the oral cavity seems to influence the existing ecologic situation by causing increased plaque formation on the remaining teeth (El ghamrawy, 1976).

It has also been shown that the presence of RPDs favors a proliferation of spiral organisms (El ghamrawy, 1979).

This increase in plaque accumulation was the result of a significant increase in both buccal and lingual plaque. Overall the wearing of a partial denture day and night significantly increased the plaque scores compared to wearing the denture during the day only.

Nevertheless this increase was only apparent in the patients wearing upper or lower dentures without gingival coverage. No significant increase was seen in those patients wearing lower partial dentures with lingual plates (Addy and Bates, 1979).

1.2.1.2 Coverage of marginal gingivae by parts of an RPD

In several studies various degrees of periodontal reactions were observed when the marginal gingivae were covered by the prosthesis (Schwalm et al, 1977). Bissada et al (1974) compared three different designs of the denture base in relation to the marginal gingivae. The severest pathologic change was observed with coverage without relief. Less change was found with coverage and relief, and the least change was observed when marginal gingivae were left uncovered. On the other hand, Gomes et al (1981) found no difference after 2 years in the degree of inflammation between two patient groups provided with swing lock RPDs with regard to the condition of gingival tissues that were and were not covered by the components of a swing lock RPD. A study by Hobkirk and Strahan (1978) supports previous speculations that periodontal changes of marginal gingivae covered by an RPD may be caused by vacuum.

1.2.1.3 Occlusal forces transmitted to remaining teeth and their periodontal tissues

The influence of an RPD on abutment tooth mobility has been studied in the laboratory, (**MacGregor, 1978**) clinically, (**Ludwig et al, 1976**). It was shown that distal extension RPDs cause movement of abutment teeth during function. In a pilot study on four patients provided with RPDs, **Fenner et al. (1956)** reported changes in tooth mobility during a 200-day follow-up period. In another study, three clasping systems were compared for 4 weeks regarding their influence on abutment tooth mobility. No significant differences were found among the systems (**Tebroek et al, 1979**).

The mobility increase, was in a buccal direction toward the flexible clasp arm. **Rissin et al (1979)** reported a significant increase in tooth mobility of the mesial abutment teeth among RPD patients after 6 years. Other studies reported no increase of tooth mobility (**Bergman et al, 1982**) or even a decrease (**Schulte and Smith, 1980**).

Although the forces transmitted to abutment teeth and their periodontal tissues have sometimes been accused of being a primary cause of periodontal disease, there is no supporting evidence from experimental studies.

Akaltan and Kaynak in (2005) conducted a study on 36 patients to evaluate the effects of the lingual plate and lingual bar-type as a major connector in distally extended removable partial dentures (RPDs) on periodontal health. The most striking finding of the study was that, with the exception of gingival recession (GR), periodontal conditions improved with both types of RPDs. At the end of 30 months, there were significant differences in plaque index, GR and tooth mobility (TM) values between treatment groups. Plaque accumulation was greater in the lingual plate treatment group; however, this did not result in periodontal breakdown. There were no statistically significant differences between treatment groups with respect to pocket depth, gingival index or attachment loss. Moreover, patients treated with lingual plate-type

RPDs demonstrated less TM when compared with patients treated with lingual bar-type RPDs at the end of 30 months follow-up. Overall study findings established that with adequate checks on oral and denture hygiene at regular intervals, patients with RPDs may even experience improved periodontal health. Moreover, the clinical interpretation of decreased TM observed in patients treated with lingual plate-type RPDs may be questionable as the plaque accumulation was greater in the lingual plate treatment group in spite of periodic recalls.

1.2.2 Professional cleaning for removable partial prosthesis

1.2.2.1 Ultrasonic cleaner:

Ultrasonic cleaning of dentures occurs frequently in both the dental office and the dental laboratory. The mode of action of ultrasonic devices is unique in that they produce ultrasonic sound waves (**20-120 kilohertz**), which create microscopic cavities (**bubbles**) that grow and implode. This implosion creates voids that result in localized areas of suction. Materials adhering to the denture are loosened and removed by this action. This action is commonly known as —cavitation|| (**Benner et al, 1998**).

Ultrasonic cleaning can be done in the dental office with an approved denture-cleaning solution such as Bio sonic Enzymatic and Ultra-Kleen (**Sterilex**) and has been shown to improve bacterial kill rates (**American College of Prosthodontists, 2018**).

The literature review indicated that the use of other commercially available denture cleansers in conjunction with ultrasonic cleaning in the dental office has not been investigated (**Felton et al, 2011**).

The procedure:

A: First, the removable prosthesis is placed in a sealed bag with cleaning solution and placed in a beaker filled with water.

B: Beaker is then placed in an ultrasonic unit and set according to manufacturer directions. (**Figure 4**)



Figure (1.4): Ultrasonic cleaner adopted from (**Boyd et al, 2019**).

After removal from the cleaning solution, carefully brush the prosthesis with a denture brush and wrap in a wet paper towel or put in a new resalable plastic bag with water to keep it moist until patient care is complete (**Boyd et al, 2019**).

1.2.3 Patient education on proper use of removable prosthesis

1. Partial dentures should be removed at night or for a 6- to 8-hour period daily (**Szalewski et al, 2017**).
2. Not removing the RPD overnight may result in inflammation from exposure to microorganisms.
3. Clean the prosthesis as recommended at least twice a day (**Ercalik-Yalcinkaya S and Ozcan M, 2015**).
4. Proper storage at night in a recommended cleaning solution (**Bidra et al, 2016**).
5. Regular dental examinations are needed to identify when the RPD needs to be replaced (**Bidra et al, 2016**).

1.2.3.1 Cleaning the Prosthesis

Rinsing

Rinsing is used to remove food debris when complete cleaning of the prosthesis is not possible. Remove the partial denture; rinse under running water. Rinsing does not remove biofilm, which is attached firmly, so it is not a substitute for complete biofilm removal and disinfection (**Boyd et al, 2019**).

Mechanical Denture Cleansing

Guidelines recommend brushing the RPD twice a day (**Bidra et al, 2016**). Brushing is primarily for biofilm removal but is considered the least effective method to disinfect a partial or complete prosthesis (**Ercalik- Yalcinkaya and Ozcan, 2015**).

Precautions to take when brushing an RPD include: Partially fill the sink with water and line the sink with a wash cloth or towel to prevent breakage if the prosthesis is dropped (**Boyd et al, 2019**).

The procedure:

1. Spread a towel, wash cloth, or rubber mat over the bottom of the sink to serve as a cushion should the denture be dropped; partially fill the sink with water.
2. Grasp denture in palm of hand securely but without squeezing because dentures can be broken.
3. Apply warm water, nonabrasive cleanser, and brush to all areas of the denture. Pay particular attention to the impression surfaces where configurations of the surface correspond with those of the oral topography. The anterior areas of the inner surfaces of both the maxillary and mandibular dentures require special adaptations of the brush.
4. Rinse denture and brush under running water. Use the brush to remove denture cleanser that may be retained in the grooves.

5. Visually check each area carefully for biofilm (**Boyd et al, 2019**).
6. Denture brush: A good-quality soft denture brush with end- rounded filaments is recommended (**American Dental Association, 2018**). (**figure5**)

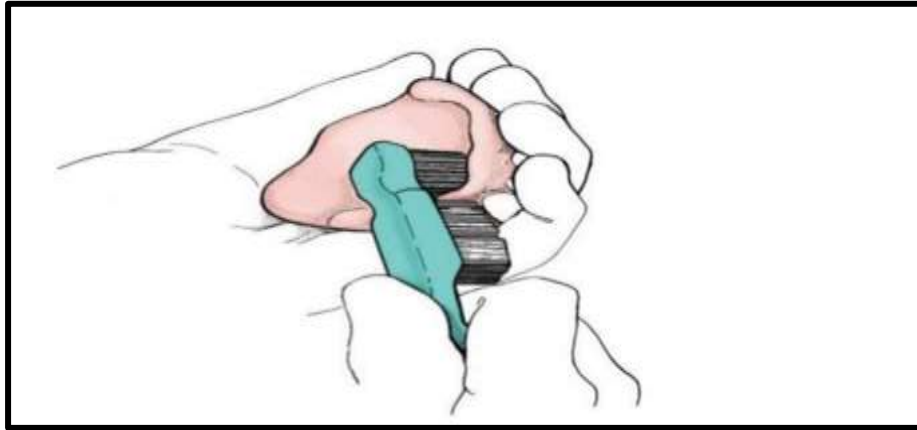


Figure (1.5): Denture brush, adopted from (**Boyd et al, 2019**).

Clasp brush:

A specially designed narrow, tapered brush about 2–3 inches long that can be adapted to the inner surfaces of clasps or precision attachments is recommended (**Boyd et al, 2019**). (**Figure 6**)

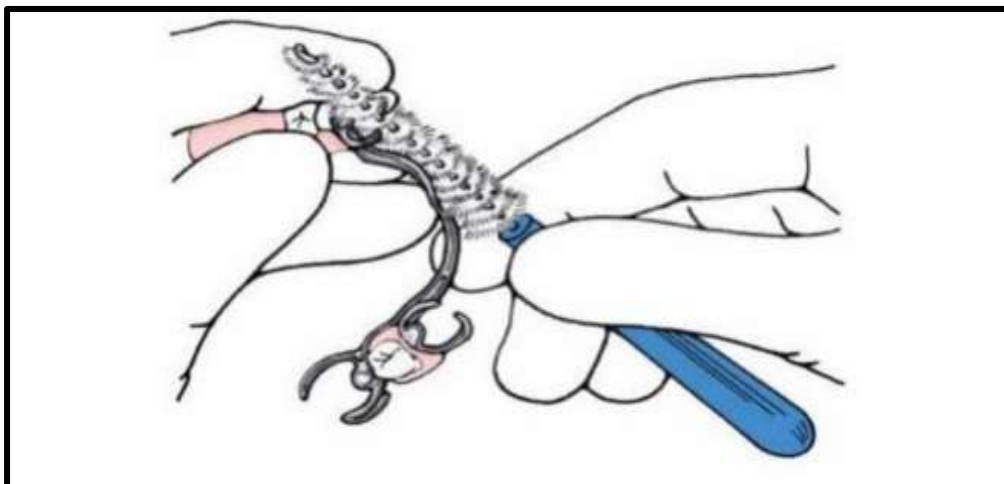


Figure (1.6): Clasp brush, adopted by (**Boyd et al, 2019**).

Brushing the RPD with denture-cleaning creams and pastes:**Precaution:**

All denture creams and pastes are to be used extraorally and may cause adverse effects such as damage to the esophagus, seizures, vomiting, and so on, if misused. (**American College of Prosthodontists, 2018**).

The American College of Prosthodontists does not recommend use of traditional toothpastes on RPDs because they may be too abrasive for the acrylic resin and may scratch it leading to a nidus for biofilm attachment. (**Felton et al, 2011**). Choose a cream or paste specifically designed for RPDs or dentures. Choices may also include a dishwashing liquid (**Felton et al, 2011**). However, it should be noted that brushing alone has not been shown to eliminate *Candida*, so immersion in a denture cleanser is recommended in addition to brushing (**American College of Prosthodontists, 2018**).

Chemical Denture Cleansers:

Denture cleansers should be used with the RPD outside the mouth to prevent adverse effects (**American College of Prosthodontists, 2018**).

The procedure:

1. Place denture in a plastic container with a fitted cover specifically for this purpose.
2. Use only warm water, which promotes the action of the cleanser, for rinsing and mixing the solution. Hot water is never used because it can distort plastic resin.
3. Follow manufacturer's specifications to ensure correct dilution of cleanser and time length for immersion.
4. Check that the denture is completely submerged in the solution; cover the container.
5. When the denture is removed, rinse under running water and remove loosened debris and chemicals before proceeding to clean.

6. Empty and clean container daily. Mix fresh solution to prevent contamination and growth of microorganisms.
7. Precaution: The solution should be changed and the container should be cleaned daily to prevent contamination and growth of microorganisms (**Boyd et al, 2019**).

1.3. Complete denture hygiene:

The number of fully edentulous patients is still large in present days. Dentures are used for replacing lost teeth and returning the functional and esthetic conditions to the patients (**Peracini et al, 2010**).

The fitting of complete dentures should not be considered the final stage of treatment, but the beginning of a long relationship between patient and dentist in order to maintain the health of oral tissues (**Jeganathan et al, 1997**).

It is extremely important that patients return regularly to the dentist for oral health maintenance and for the evaluation of their dentures. However, surveys have reported that complete denture wearers have difficulty in cleaning their dentures, and so preventive programs are effective in promoting good oral health (**Hoad-Reddick et al, 1990**).

Patients do not return to the dentist for control and maintenance of their dentures generally at the appropriate intervals (**Marchini et al, 2004**). Thus, it is up to the dentist to guide their patients properly about proper denture cleaning and the appropriate products to be used.

1.3.1 Professional care procedures for complete dentures

A professional denture cleaning in a dental office or clinic needs is suggested annually to minimize calculus and biofilm accumulation over time (**American College of Prosthodontists, 2018**).

Ultrasonic cleaning can be done in the dental office with an approved denture-cleaning solution such as Bio sonic Enzymatic and Ultra-Kleen

(**Sterilex**) and has been shown to improve bacterial kill rates (**American College of Prosthodontists, 2018**).

Avoid scaling the prosthesis with a sharp instrument to remove calculus deposits as it may scratch the resin or denture teeth resulting in a nidus for biofilm and calculus accumulation (**Boyd et al, 2019**).

1.3.2 Denture deposits

Accumulation of stains and deposits on dentures varies between individuals in a manner similar to that on natural teeth. The phases of deposit formation may be divided as follows: Mucin and food debris on the denture surfaces. Readily removed by rinsing, brushing, and irrigation (**Boyd et al, 2019**).

1.3.3 Denture pellicle and denture biofilm

Denture pellicle forms readily after a denture is cleaned.

Denture biofilm or oral microbiome is different in those who are edentulous with complete dentures versus those who are dentate with partial dentures (**Bathala et al, 2016**).

1.3.4 Denture calculus

When biofilm is not thoroughly removed on a regular basis, calcification occurs within 3 days and is completely calcified by 2 weeks. Stains dentures can become stained similarly to natural teeth. Frequent causes of stain include tobacco, marijuana betel nut, red wine, coffee, and tea (**Matsumura et al, 2018**).

1.3.5 Care of Dentures during Intraoral Procedures

1. Provide a disposable cup and tissue for the patient's use when requesting the patient to remove or insert the denture.
2. Rinse in running water being careful to avoid splashing to remove any unattached debris.
3. Professionally clean the denture in an ultrasonic denture cleaner, following manufacturer's instructions, with appropriate cleaning solution.
4. Follow strict procedures to protect the denture from exposure to unclean areas during transportation and when in the ultrasonic cleaner.
5. Provide a clean disposable cup or sterile container with a fitted cover to hold the prosthesis after rinsing.
6. Immerse denture in water after cleaning to prevent drying, which can cause distortion of the denture (**American College of Prosthodontists, 2018**).
7. Place container in a safe place away from treatment area to prevent spilling or inadvertently discarding it.
8. At the end of the appointment, remember to rinse and return the moist denture before dismissing the patient from the dental chair (**Boyd et al, 2019**).

1.3.6 Aftercare of the complete denture patient

There are three factors involved in the maintenance of healthy edentulous oral tissue: importance of tissue rest, complete denture hygiene, and cleansing of oral tissues (**Shigli, 2009**).

1.3.6.1 Tissue rest

Removing the maxillary and mandibular dentures before sleeping serves two purposes: it provides a convenient time for soaking the dentures in a cleaning solution and it allows the oral tissues to rest. Adequate rest allows the oral tissues to offset the daily stress placed upon them by denture wearing (**Jacob et al, 2005**).

The dentures should be removed for at least 8 of each 24 hours to allow the tissues to rest. Patients should be advised that the oral tissues were never intended to be covered or to support a hard denture base. All occlusal forces are compressive to the soft tissues and squeeze the tissue between denture and bone. Failure to allow the tissues to recover from these forces may result in increased soreness and irritation. Additionally, many patients clench and brux during sleep. These can be powerful movements that can severely damage the underlying foundation. Removal of dentures will eliminate this potential hazard (**Ortman, 2004**).

Immediately after processing, a denture produced in a mold with tinfoil substitutes contains some water.

In service, further water absorption can occur up to an equilibrium value of about 2%. It has been claimed that each 1% increase in weight of the resin due to water absorption causes a linear expansion of 0.23%.

Similarly, drying out of the material is associated with shrinkage. For this reason, dentures should be kept wet at all times when not in service (**Combe, 1992**).

1.3.6.2 Complete denture cleaning

Denture cleanliness is essential to prevent malodor, poor esthetics, and the accumulation of plaque/calculus and biofilm (**Combe, 1992**).

Abelson in 1981 pointed out that the plaque on the tissue surface side of the denture is unquestionably a major etiologic factor in the pathogenesis of denture stomatitis, inflammatory papillary hyperplasia, and chronic candidiasis.

Survey by Jagger and Harrison in (**1995**) found that a large number of people did not know how to clean their dentures satisfactorily, either as a result of never having been given advice or not following that advice. De Castelluci Barbosa et al in (**2008**) showed that 78% of their prostheses, and none of the patients interviewed knew anything about brushes designed specifically for

complete dentures. Therefore, it is crucial for dental practitioners to inform their patients about denture cleanliness for the prevention of such adverse effects. Patients should be instructed to rinse their dentures and their mouths after meals. Once a day, it is essential that the dentures be removed and placed in a soaking type of cleanser for a minimum of 30 minutes for effective killing of microorganisms on the dentures, as well as removal of all stains. Before the dentures are placed in the cleanser, they should be brushed gently with a soft brush. Patients need to be instructed that brushing is required to remove plaque, because soaking alone will not do so. The dentures should be brushed over a basin partially filled with water or covered with a wet washcloth to prevent breakage, in case they slip from the hand (**Jacob et al, 2005**).

When the lower denture is cleaned, it should not be held in the palm of the hand. If the denture slips, it may snap into two pieces when it is clutched. The patient should be instructed to grasp the denture between the thumb and the forefinger. Patients should be discouraged from using toothpastes, because most of them contain an abrasive material that will wear away the surface of acrylic resin (**Jacob et al, 2005**).

For acrylic resin dentures, it is recommended that the dentures be rinsed after every meal, and any debris be removed by brushing with a soft brush, soap, and cold water (**Jagger and Harrison, 1995**).

1.3.6.3 Tissue hygiene and massage

An often neglected facet of complete denture care is tissue cleansing and massage. The best regimen should include denture brushing and tissue cleansing (**Ortman, 2004**).

The mucosal surfaces of the residual ridges and the dorsal surface of the tongue also should be brushed daily with a soft brush. This will increase the circulation and remove plaque and debris that can cause irritation of the soft tissue or offensive odors (**Jacob et al, 2005**).

1.3.7 The denture box

This is a simple device to hold the denture in place during cleaning, (figure 4). It reduces the risk of fracture and distortion of prosthesis. It will also allow a career minimal handling of the denture and allow its storage with reduced risk of getting lost'. In an institution its footprint' will make positive discovery of the owner certain. One half of an orthodontic retainer or denture box (or a soap box) is filled with activated laboratory putty. The occlusal surface of the denture is pressed into the putty sufficiently deeply to produce firm retention. The denture can be replaced in the negative impression and the surface rigorously cleaned with a brush. Where the patient has the loss of the use of a hand, the box can be steadied while brushing or it can be secured on its base with a suction pad or a fabric fastener. The occlusal surface of the denture can be similarly displayed, following an imprint of the intaglio surface in the lid of the box if it has sufficient depth (Felton et al, 2011).

1.3.7.1 Storage

The denture box provides a secure method of storage particularly in an institutional environment where it is not unusual for dentures to be wrapped in tissue and inadvertently discarded. In addition, where the denture is not marked for identification it possible for the ownership of a denture to be confused with others. The imprint of the denture being unique to the individual can be used to reclaim it to its owner. The imprint can be kept clean by washing under a tap and, if required, a small amount of chlorhexidine gluconate can be left in situ when stored (Felton et al, 2011). (Figure 7)



Figure (1.7): Denture box, adopted from (Faigenblum, 2014).

Chapter Two

Conclusion

2.1 Conclusions

After construction of a removable prosthesis:

1. The dentist should care of educating the patient how he could keep it in good hygiene.
2. Take responsibility of patient's health even after treatment by adopting review appointments especially to observe the oral and denture hygiene.
3. Dentists must continually learn about the chemical content of products used at work and they should be in touch with the new technologies, methods and items to improve them self in the work and present best service for the patient.
4. Give the patient a leaflet of instructions, as below:

Instructions for the patients

Rinse mouth properly before wearing dentures.

Clean your denture as recommended at least twice daily by rinsing under running water, use soft toothbrush and specified paste and denture cleansers.

Removed at night or for a 6 to 8 hour period daily and storage in recommended denture cleanser.

Clean tongue and Tissues by soft brush.

Tissue massage by soft brush or clean finger.

Patient should not use any abrasive or detergents to clean the denture.

Patient should not make any adjustment or repair by himself.

Regular dental examinations are needed to identify if there is a problem with your denture or to identify when the prosthesis needs to be replaced or professional cleaning.

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