

Review Article

Dental Implant Maintenance- “How to Do?” & “What to Do”- A Review

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ABSTRACT:

Unlike the natural teeth the differences in the supporting structure of the implant make them more susceptible to inflammation and bone loss when plaque accumulates. Therefore, a comprehensive maintenance protocol should be followed to ensure the longevity of the implant. Maintenance of the peri-implant health is a critical factor in the long-term success of dental implant therapy. This article reviews about the evaluation of implants and various professional and home care methods of dental implant prosthesis.

Key words: Dental implants, peri-implant mucosa, hygiene, maintenance, long term success.

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INTRODUCTION

Over three million people in the US have dental implants and the number continues to grow. The dental implant and prosthetic market in the U.S is projected to reach \$6.4 billion by the end of 2018. The estimated market for dental implant alone expected to reach \$4.2 billion by the year 2022. These are the facts and figures by *American Academy of Implant Dentistry*.

Placement of implant requires an interdisciplinary approach wherein a team of dental implant specialists including oral surgeon, prosthodontist, periodontist, and oral radiologist participate in the planning, execution, and maintenance of the implants to ensure the best possible outcome. Once the implants have been placed in the edentulous region routine maintenance, recall evaluations and radiographs are necessary to insure the long life of these restorations, and this necessitates the team of dental implant specialists to be well versed with the implant maintenance procedures as well, as an implant failure would result in a debate, which would give the profession no credit. These procedures are usually performed at selected intervals to assist the patient in maintaining oral implant health [1].

As the number of patients opting for dental implants as a treatment modality to replace missing teeth continues to grow, it becomes increasingly essential for the dental team to accept the challenges of maintaining these sometimes complex restorations [3]. It has been

emphasized that the surgical phase of implant therapy, primary stability and osseointegration for long-term success of implants. However, at present, implant success not only depends on surgical factors but also location of fixture placement, prosthesis and esthetics (4). Maintaining the health of soft tissues is as critical as the osseointegration in long-term success of implants (5). Prevention of periimplant disease is an important issue for the clinician and patient and requires regular checkups (6). Long-term implant success depends on team work between the dental clinician and the patient (7). Oral implants when evaluated after 10 years of service do not surpass the longevity of natural teeth even of those that are compromised, for either periodontal or endodontic reason. Proper evaluation, monitoring and maintenance is essential to ensure the longevity of the dental implant and its restoration by combining regular checkup, professional care and effective home care.

Implant Failure

Dental implants have a success rate of 90-98%, which in medical terms is significantly high. Implant failures can be either early or late implant failures. Peri-implantitis or infection is one of the main causes of dental implant failure. Bacterial infections and occlusal load have been emphasized as the two main etiological factors leading to implant failures. Early implant failures are the result of

events that may jeopardize or prevent osseointegration from occurring and include:

1. Improper preparation of the recipient site, which results in undue hard tissue damage such as necrosis of the bone.
2. Bacterial contamination and extensive inflammation of the wound that may delay healing of the soft & hard tissues.
3. Improper mechanical stability of the implant following its insertion.
4. Premature loading of the implant [8]

Late failures occur in situations during which osseointegration of a previously stable & properly functioning implant is lost. Lemming & Renvert in 1999 suggested that late failures are the result of excessive load and/or infection [9]. Patients with diabetes, smokers and those with poor oral hygiene are vulnerable to peri-implantitis. Thus, personal oral hygiene must be started at the time of implant placement and should be modified as and when required.

Peri-implant mucosa

The periimplant mucosa is made of well-keratinized oral epithelium, sulcular epithelium, junctional epithelium and underlying connective tissue. The soft tissue interface is formed by the epithelium and the underlying connective tissue which includes the biologic zone known as 'the biologic width', which refers to the height of the dentogingival attachment apparatus encircling the tooth. The same relationship stands apt for the bone to the overlying tissues which exist around implants. Any change in the relationship is considered to be one of the reasons for the early crestal bone loss [10]. The proliferative capacity of the junctional epithelium leads to the rapid migration of the epithelial cells as soon as the fibrin clot /granulation tissue start forming at the implant site. Berglundh speculated that the reason for the epithelium not migrating down apically is due to the interaction between the titanium and soft tissue [11].

Maintenance

Basically maintenance of dental implants includes the professional cleaning by the dentist and oral home care by the patient itself. Good oral hygiene on the patient's part is mandatory. The position and design of prostheses that are difficult to manage may limit the effectiveness of mechanical cleaning. The patient should be recalled every 3 months during the first year and at least every 6 months thereafter

Why implants are more maintenance intensive than teeth???

Lack of organized fibers in the soft tissue surrounding implants places the bone-implant interface at an increased risk of destruction by the pathogenic bacteria.

Initiation of dental implant maintenance and care:

After completion of implant treatment, follow up sessions for maintenance and care should be scheduled based on a timetable with 3 to 4- month intervals in the first year (12). Then, based on patient's specific needs, the next follow up appointments may be scheduled (13). Patients with good oral hygiene do not need as many periodic follow ups; whereas, patients with poor oral hygiene require more periodic professional care (14). After one year if the patient is clinically stable follow up session time intervals every 6 months suffice (15).

Implant maintenance regimes are based on individual's need, home care ability and patient skill. Oral hygiene aids for implant maintenance include manual scalers, sonic and ultrasonic scalers, polishing devices, manual and electric tooth brushes, dental floss, interproximal brushes and antimicrobials.

Role of dentist

A. Professional cleaning

1. Sonic and ultra-sonic scalers

Use of sonic and ultrasonic scaler tips may lead to micro roughness and plaque accumulation on implant surface. Stainless Steel tip can also lead to gouging of the implant's polished collar. To prevent this, special attachments, like nylon sleeves and plastic inserts, can be used with metal sonic and ultrasonic instruments for scaling around dental implants [16,17] By this approach, effective cleaning is done with less damage to the implant. Because of the delicacy of the perimucosal seal, short working strokes with light pressure. Plastic probes are commonly recommended because they do not change the surface. Nonmetal ultrasonic tips may be required for implant maintenance.

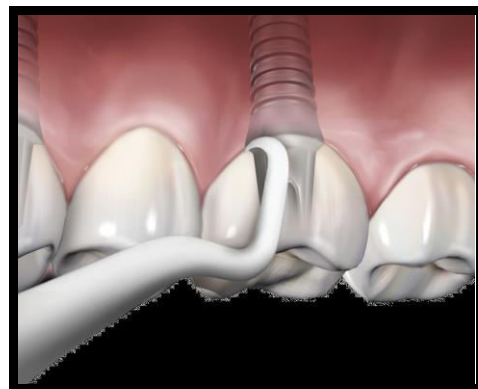


Fig-1

2. Plastic or teflon coated curettes

They can treat the sub gingival area effectively without changing the surface topography of implants. Surfaces treated with plastic and titanium curets showed greater numbers of attached cells than stainless steel curet treated surfaces. Depending on the location of the calculus, a horizontal, vertical, or oblique stroke may be used and should be performed with an exploratory-type stroke to avoid tissue trauma [18].

3. Polishing devices

Air powder polishing units have the possibility of damaging implant surface as air pressure can detach the soft tissue connection with the coronal portion of the implant, leading to emphysema. Also, the use of baking powder in these units can strip off any surface coating on the implant [19]. Titanium or titanium alloy surfaces of dental implants can be polished using a rubber cup with a non-abrasive polishing paste or gauze strip with tin oxide [20].

4. Oral irrigators

Sub gingival irrigation with or without antimicrobials is recommended using oral irrigators. Oral irrigators with chlorhexidine gluconate can be used for oral irrigation. The cannula should not be inserted to the base of the sulcus, to avoid fluid distention into the surrounding tissues [16,17]. Patients are to be instructed to use at the lowest setting possible in order to avoid undue pressure to the implant tissue cuff. Incorrect use of it can cause trauma which in turn can lead to bacteremia [18]. Mechanical debridement with 0.12% chlorhexidine can decrease inflammation because it reduces plaque and peri-implant probing depth in cases of peri-implant mucositis. Chlorhexidine mouthwash can be applied around the implants using a cotton swab or toothbrush.

ROLE OF PATIENTS

Home Care and Maintenance

1. Manual tooth brushes-

Manual tooth brushes with bristles made of synthetic material and rounded ends is recommended for implants because implants are considerably more sensitive in terms of erosion through mechanical force. A medium sized short head soft tooth brush is ideally preferred for the cleaning of dental implants. Brushes with hollow bristles should not be used, as they act as niches for bacterial colonization and growth. Modified bass technique of brushing is to be followed [16, 17, 19] Tufted brush easily maneuvers in hard to reach areas and may be bent to accommodate patient needs. Especially useful in posterior lingual regions where a conventional tooth brushes might not reach.



Fig.2

2. Mechanical tooth brushes

They are superior to manual brushes, as they are better in plaque removal. Automated mechanical tooth brush is suggested as a daily mode of tooth cleansing. These devices may have rotary, reciprocating or sonic action [16].



Fig.3

3. Dental floss

Patients usually find difficulty in cleaning the interdental areas. Dental floss acts as an effective aid in such cases. For example Proxi-Floss Disposable Elastomeric Cleaning Appliance has a textured surface designed to carry medicaments to the implant surface and surrounding tissues. Super-floss is considered to be excellent for all types of implants. Gentle insertion and motion is advocated to avoid trauma to the tissue. Woven flosses with threaders help access and cleanse larger embrassure spaces and under connector bars [18].

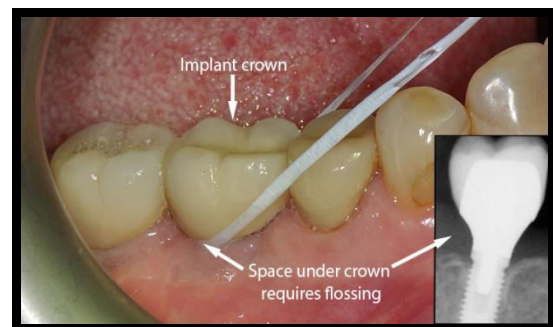


Fig.4

4. Water Irrigation:

A water irrigation unit such as the Hydro Floss (Hydro Floss, Inc.) is also beneficial in implant maintenance. However, care must be taken to direct the stream interproximally and horizontally between implants, as improper positioning can cause inadvertent damage to the peri-implant seal and bacteremia.[22,23]



Fig.5

5. Intraoral Camera.

The intraoral camera can be used for periodic tissue checks by the patient or to check the effectiveness of their oral care routine and can be connected to a patient's television. Patient can pinpoint any food lodgment, redness, swelling, or other signs around the implant and severe infections can be avoided by taking early preventive steps.[22]



Fig. 6

6. Interproximal brushes-

They should be used by implant patients only after being shown their proper use. They are available with interchangeable tips of various shapes. The brushes may have an exposed tip of metal wire that can scratch the titanium surface of the abutment and if enough pressure is exerted or if the brushes are worn, the wire can scratch the implant or abutment surface. Hence they are to be used with caution. Plastic coated wire brush is recommended to sort out this problem [17, 21]



Fig. 7

7. Antimicrobials

Use of an antimicrobial mouth rinse, such as chlorhexidine gluconate or Listerine has been found to be effective means of maintaining oral care [17] They help in reducing plaque around the implants. Long term uses of antimicrobials such as chlorhexidine gluconate and cetylpyridium chloride or phenolic compounds tend to cause staining. Hence they are recommended to be used along with brushes and floss to reduce staining [20] Foam tips can be used to apply chemotherapeutic agents interdentially and site specifically.



Fig.8

Dental Implant Care Instructions:

- 1, Brush 2-3 times daily and floss at least once per day.
2. Due to the shape of the dental implant and crown placed on top, there is a greater chance for food impaction around it than around your natural teeth. Make sure to

wrap the floss as far around the implant tooth in all directions as possible. Make this part of your daily routine to maintain healthy gum tissue.

3. If your dental implants are part of a bridge, make sure to floss underneath the bridge, as well as along the sides. "Floss threaders" can be used to assist with the task.

4. A Waterpik or similar irrigation device can be used in addition to brushing and flossing to clean the areas around your dental implant. Interproximal brushes, or "Proxy Brushes" can also be used to clean hard to reach areas.

5. Toothpaste: most toothpaste contains fluoride and will not damage your implant. Avoid toothpaste with excessively abrasive particles, such as baking soda, which can remove the glaze on the porcelain crown.

6. Maintain your regular dental hygiene schedule, usually every 3-6 months.

PROTOCOL FOR TREATING PERIIMPLANT MUCOSITIS

Mechanical scaling of implant surface with plastic, titanium or carbon fibre or ultrasonic instruments.



Fig. 9



Fig. 10

SURGICAL PROTOCOL FOR TREATING PERIIMPLANTITIS

1. Full thickness muco-periosteal flap.

2. Thorough debridement of the implant surface with titanium curettes

3. Pack gauze strips soaked in chlorhexidine placed around implant defect for five minutes.

4. Decontaminate surface with EDTA (Straumann™) for 2 mins

5. If possible, graft defect with hydroxyapatite bone mineral

6. Place barrier membrane if dehiscence or unprotected defect

7. Systemic antibiotics for five days post-operatively.

CONCLUSION

Successful implant therapy implies healthy and stable peri-implant conditions. This requires both professional maintenances on the part of the dentist and diligent home care by the patient to ensure the long-term success of the implants. With the continuing research in the field of dentistry, newer techniques and aids will keep developing for the long-term maintenance of implants. Long term success of both periodontal and implant therapy depends on an effective partnership between the patient and practitioner.

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