

Parameter on Placement and Management of the Dental Implant*

The American Academy of Periodontology has developed the following parameter on the placement and management of dental implants. Dental implants are a recognized form of tooth replacement and as such should be presented as an alternative for the replacement of missing teeth. A comprehensive treatment plan should be developed in consultation with all parties involved. Patients should be informed about all therapeutic alternatives, including non-replacement, potential complications, expected results, and their responsibility in treatment. The patient should also be informed that, to insure implant health, close monitoring and professional care by the dental team and good personal home care are imperative. Appropriate educational materials are an essential part of gaining informed consent. Given this information, patients should then be able to make informed decisions regarding their implant therapy. J Periodontol 2000;71:870-872.

KEY WORDS

Dental implants/adverse effects; dental implants/therapeutic use; patient care planning; informed consent.

DEFINITION

A dental implant is a biomedical device usually composed of an inert metal or metallic alloy that is placed on or within the osseous tissues. The implant restoration consists of components that attach the prosthesis to the implant.

Dental implants are used to replace single or multiple teeth or to serve as an abutment(s) for fixed or removable prostheses with the goal of restoring masticatory function and/or esthetics.

THERAPEUTIC GOAL

The therapeutic goal of implant therapy is to support restorations that replace a tooth or missing teeth so as to provide patient comfort, function, and esthetics.

PRETREATMENT CONSIDERATIONS

The periodontist and other members of the dental team often share the responsibility of evaluating the patient for implants. A systematic and coordinated plan delineating the responsibilities of each member of the team should be developed and followed. Treatment considerations for implant patients should include an evaluation of:

1. Oral health status;
2. Medical and psychological status;
3. Patient motivation/ability to provide home care;

4. Patient expectations of therapy outcome;
5. The various habits and conditions which may place the patient at higher risk for implant failure; e.g., alcoholism, smoking, high American Society of Anesthesiology (ASA) score, bruxism, periodontal disease, and radiation therapy;
6. Periodontal and restorative status of the remaining dentition.

Surgical considerations for patients requiring implant placement should include evaluation of: anatomy and location of vital structures, bone quality, quantity and contour, and soft tissues.

The following diagnostic aids may be utilized in presurgical considerations to assist in determining the number, location, type, and angulation of the implants and abutments:

1. Diagnostic casts, mounted or mountable;
2. Imaging techniques;
3. Surgical template.

IMPLANT PLACEMENT

Prosthetic considerations for patients requiring implant placement should include evaluation of:

1. Number and location of missing teeth;
2. Interarch distance;
3. Number, type, and location of implants to be placed;
4. Existing and proposed occlusal scheme;
5. Design of planned restoration.

* Approved by the Board of Trustees, American Academy of Periodontology, May 1998.

The surgical technique is based on the pretreatment evaluation and on the type of implant to be utilized. The following also should be considered:

1. Aseptic technique;
2. Appropriate surgical protocol;
3. Surgical template utilization;
4. Appropriate postoperative instructions.

A staged approach has been used to place endosseous implants. Implants can be placed at the time of tooth extraction as well.

Post-placement procedures: The following considerations should be reviewed prior to the restorative phase:

1. Quantity, quality, and health of soft and hard tissues;
2. Implant stability;
3. Implant position and abutment selection;
4. Oral hygiene assessment.

Appropriate restorative procedures may be initiated upon satisfactory completion of the above considerations. Mechanical failures of both the implant components and prosthetic superstructures have been associated with occlusal overload.

IMPLANT MANAGEMENT

Periodic evaluation of implants, surrounding tissues and oral hygiene are vital to the long-term success of the dental implant. Considerations in the evaluation of the implant are:

1. Presence of plaque/calculus;
2. Clinical appearance of peri-implant tissues;
3. Radiographic appearances of implant and peri-implant structures;
4. Occlusal status, stability of prostheses and implants;
5. Probing depths;
6. Presence of exudate or bleeding on probing;
7. Modification of maintenance interval (see Parameter on Periodontal Maintenance, pages 849-850);
8. Patient comfort and function.

MANAGEMENT OF IMPLANT-RELATED COMPLICATIONS

The etiology of implant complications can be multifactorial, involving both structural components and tissue considerations. Routine evaluation may reveal the need for procedures to correct the following:

1. Prosthesis instability;
2. Fixture mobility;
3. Occlusal traumatism;
4. Fractured or loosened components;
5. Inflammation/infection;
6. Excessive/progressive loss of hard and soft tissues;

7. Pain;
8. Neuropathy/paresthesia.

An unfavorable response to corrective procedures may warrant adjustment of the prostheses and/or removal of the implants.

OUTCOMES ASSESSMENT

The desired outcome of successful implant therapy is maintenance of a stable, functional, esthetically acceptable tooth replacement for the patient.

Variations from the desired outcome of implant placement include:

1. Implant mobility or loss;
2. Persistent pain and/or loss of function;
3. Progressive bone loss;
4. Persistent peri-implant radiolucency;
5. Persistent uncontrolled inflammation/infection;
6. Inability to restore the implant;
7. Increased probing depths;
8. Implant fracture.

SELECTED RESOURCES

1. Adell R, Lekholm V, Rockler B, Brånemark P-I. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. *Int J Oral Surg* 1981;10:387-416.
2. Adell R, Lekholm U, Rockler B, et al. Marginal tissue reactions at osseointegrated titanium fixtures (I). A 3-year longitudinal prospective study. *Int J Oral Maxillofac Surg* 1986;15:39-52.
3. Albrektsson T, Zarb GA, Worthington P, Eriksson AR. The long-term efficacy of currently used dental implants: a review and proposed criteria of success. *Int J Oral Maxillofac Implants* 1986;1:11-25.
4. Apse P, Ellen RP, Overall CM, Zarb GA. Microbiota and crevicular fluid collagenase activity in the osseointegrated dental implant sulcus: a comparison of sites in edentulous and partially edentulous patients. *J Periodont Res* 1989;24:96-105.
5. Bauman GR, Mills M, Rapley JW, Hallmon WH. Clinical parameters of evaluation during implant maintenance. *Int J Oral Maxillofac Implants* 1992;7:220-227.
6. Buser D, Weber HP, Lang NP. Tissue integration of non-submerged implants. 1-year results of a prospective study with 100 ITI hollow-cylinder and hollow-screw implants. *Clin Oral Implants Res* 1990;1:33-40.
7. Ericsson I, Lindhe J. Probing depth at implants and teeth. An experimental study in the dog. *J Clin Periodontol* 1993;20:623-627.
8. Jaffin RA, Berman CL. The excessive loss of Brånemark fixtures in type IV bone: a 5-year analysis. *J Periodontol* 1991;62:2-4.
9. Lekholm U, Ericksson I, Adell R, Lindhe J, Slots J. The condition of the soft tissues at tooth and fixture abutments supporting fixed bridges. A microbiological and histological study. *J Clin Periodontol* 1986;13:558-562.
10. McCollum J, O'Neal RB, Brennan WA, Van Dyke TE,

- Horner JA. The effect of titanium abutment implant surface irregularities on plaque accumulation in vivo. *J Periodontol* 1992;63:802-805.
11. Meffert RM. Treatment of failing dental implants. *Curr Opin Dent* 1992;2:109-114.
 12. Mombelli A, Mericske-Stern R. Microbiological features of stable osseointegrated implants used as abutments for overdentures. *Clin Oral Implants Res* 1990;1:1-7.
 13. Quirynen M, Listgarten MA. The distribution of bacterial morphotypes around natural teeth and titanium implants ad modum Brånemark. *Clin Oral Implants Res* 1990;1:8-12.
 14. Rosenberg ES, Torosian JP, Slots J. Microbial differences in 2 clinically distinct types of failures of osseointegrated implants. *Clin Oral Implants Res* 1991;2:135-144.
 15. Schou S, Holmstrup P, Hjorting-Hansen, Lang NP. Plaque-induced marginal tissue reactions of osseointegrated oral implants: A review of the literature. *Clin Oral Implants Res* 1992;3:149-161.
 16. Smith DE, Zarb GA. Criteria for success of osseointegrated endosseous implants. *J Prosthetic Dent* 1989; 62:567-572.
 17. Cochran, DL. Implant therapy I. *Ann Periodontol* 1996; 1:707-791.
 18. Consensus Report: Implant therapy I. *Ann Periodontol* 1996;1:792-795.
 19. Fritz, ME. Implant therapy II. *Ann Periodontol* 1996; 1:796-815.
 20. Consensus report: Implant therapy II. *Ann Periodontol* 1996;816-818.