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# Foreword

The Parameters of Care were developed by the Ad Hoc Committee on the Parameters of Care and have been approved by the Board of Trustees of the American Academy of Periodontology. This publication has been edited to reflect decisions by the Board of Trustees in approving the term “periodontal maintenance” in lieu of “supportive periodontal therapy” (January 2000) and a new classification of periodontal diseases, as published in the *Annals of Periodontology*, December 1999; Volume 4, number 1 (April 2000).

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# Overview

In response to increasing concerns on the part of health care providers, third-party payers, and consumers about the quality, cost, and access to dental care, the American Academy of Periodontology has developed practice parameters on the diagnosis and treatment of periodontal diseases. These parameters are strategies to assist dentists in making clinical decisions from a range of reasonable treatment options to achieve a desired outcome. Practice parameters are designed to help the profession provide appropriate dental services while containing costs, without sacrificing quality. These parameters are constantly updated and are partially based on methodology utilized by participants in the American Academy of Periodontology 1996 World Workshop in Periodontics (*Annals of Periodontology*, Volume 1, 1996) to assess the evidentiary status of periodontal and implant treatment. The major goal is to improve treatment decisions by increasing the strength of the inference that practitioners can derive from the base of knowledge contained within the literature.

There are several types of periodontal diseases, with many treatment options. The Academy has developed a series of parameters to address a full range of clin-

ical conditions. Although the parameters vary in their specificity and research base, they incorporate the best available knowledge on the diagnosis, prevention, and treatment of periodontal diseases.

Each parameter should be considered in its entirety. It should be recognized that adherence to any parameter will not obviate all complications or post-care problems in periodontal therapy. A parameter should not be deemed inclusive of all methods of care or exclusive of treatment appropriately directed to obtain the same results. It should also be noted that these parameters summarize patient evaluation and treatment procedures which have been presented in more detail in the medical and dental literature.

It is important to emphasize that the final judgment regarding the care for any given patient must be determined by the dentist. The fact that dental treatment varies from a practice parameter does not of itself establish that a dentist has not met the required standard of care. Ultimately, it is the dentist who must determine the appropriate course of treatment to provide a reasonable outcome for the patient. It is the dentist, together with the patient, who has the final responsibility for making decisions about therapeutic options.

## Parameter on Comprehensive Periodontal Examination\*

*The American Academy of Periodontology has developed the following parameter on comprehensive periodontal examination for periodontal diseases. Appropriate screening procedures may be performed to determine the need for a comprehensive periodontal evaluation. Periodontal Screening and Recording (PSR), a screening procedure endorsed by the American Dental Association and the American Academy of Periodontology, may be utilized. J Periodontol 2000;71:847-848.*

### KEY WORDS

Periodontal diseases/diagnosis; dental history; medical history; patient care planning.

### PATIENT EVALUATION/EXAMINATION

Evaluation of the patient's periodontal status requires obtaining a relevant medical and dental history and conducting a thorough clinical and radiographic examination with evaluation of extraoral and intraoral structures. All relevant findings should be documented. When an examination is performed for limited purposes, such as for a specifically focused problem or an emergency, records appropriate for the condition should be made and retained.

1. A medical history should be taken and evaluated to identify predisposing conditions that may affect treatment, patient management, and outcomes. Such conditions include, but are not limited to, diabetes, hypertension, pregnancy, smoking, substance abuse and medications, or other existing conditions that impact traditional dental therapy. When there is a condition that in the judgment of the dentist requires further evaluation, consultation with an appropriate health care provider should be obtained.

2. A dental history, including the chief complaint or reason for the visit, should be taken and evaluated. Information about past dental and periodontal care and records, including radiographs of previous treatment, may be useful.

3. Extraoral structures should be examined and evaluated. The temporomandibular apparatus and associated structures may also be evaluated.

4. Intraoral tissues and structures, including the oral mucosa, muscles of mastication, lips, floor of mouth, tongue, salivary glands, palate, and the oropharynx, should be examined and evaluated.

5. The teeth and their replacements should be examined and evaluated. The examination should include observation of missing teeth, condition of

restorations, caries, tooth mobility, tooth position, occlusal and interdental relationships, signs of parafunctional habits, and, when applicable, pulpal status.

6. Radiographs that are current, based on the diagnostic needs of the patient, should be utilized for proper evaluation and interpretation of the status of the periodontium and dental implants. Radiographs of diagnostic quality are necessary for these purposes. Radiographic abnormalities should be noted.

7. The presence and distribution of plaque and calculus should be determined.

8. Periodontal soft tissues, including peri-implant tissues, should be examined. The presence and types of exudates should be determined.

9. Probing depths, location of the gingival margin (clinical attachment levels), and the presence of bleeding on probing should be evaluated.

10. Mucogingival relationships should be evaluated to identify deficiencies of keratinized tissue, abnormal frenulum insertions, and other tissue abnormalities such as clinically significant gingival recession.

11. The presence, location, and extent of furcation invasions should be determined.

12. In addition to conventional methods of evaluation; i.e., visual inspection, probing, and radiographic examinations, the patient's periodontal condition may warrant the use of additional diagnostic aids. These include, but are not limited to, diagnostic casts, microbial and other biologic assessments, radiographic imaging, or other appropriate medical laboratory tests.

13. All relevant clinical findings should be documented in the patient's record.

14. Referral to other health care providers should be made and documented when warranted.

15. Based on the results of the examination, a diagnosis and proposed treatment plan should be

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

presented to the patient. Patients should be informed of the disease process, therapeutic alternatives, potential complications, the expected results and their responsibilities in treatment. Consequences of no treatment should be explained to the patient.

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## Parameter on Periodontal Maintenance\*

*The American Academy of Periodontology has developed the following parameter on Periodontal Maintenance. Periodontal maintenance is an integral part of periodontal therapy for patients with a history of inflammatory periodontal diseases. Patients should be informed of the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. Failure to comply with a periodontal maintenance program may result in recurrence or progression of the disease process. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. J Periodontol 2000;71:849-850.*

### KEY WORDS

Health education, dental; periodontal diseases/prevention and control; periodontal diseases/therapy; disease progression.

Periodontal maintenance is started after completion of active periodontal therapy and continues at varying intervals for the life of the dentition or its implant replacements. Periodontal maintenance is an extension of active periodontal therapy. Periodontal maintenance procedures are supervised by the dentist and include an update of the medical and dental histories, radiographic review, extraoral and intraoral soft tissue examination, dental examination, periodontal examination, review of the patient's plaque control effectiveness, removal of microbial flora from sulcular or pocket areas, scaling and root planing where indicated, and polishing the teeth. These procedures are performed at selected intervals to assist the periodontal patient in maintaining oral health. This is the phase of periodontal therapy during which periodontal diseases and conditions are monitored and etiologic factors are reduced or eliminated. It is distinct from, but integrated with, active therapy. The patient may move from active therapy to periodontal maintenance and back into active care if the disease recurs.

### THERAPEUTIC GOALS

1. To minimize the recurrence and progression of periodontal disease in patients who have been previously treated for gingivitis and periodontitis.
2. To reduce the incidence of tooth loss by monitoring the dentition and any prosthetic replacements of the natural teeth.
3. To increase the probability of locating and treating, in a timely manner, other diseases or conditions found within the oral cavity.

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

### TREATMENT CONSIDERATIONS

The following items may be included in an periodontal maintenance visit, subject to previous examination, history, and the judgment of the clinician.

#### *Review and Update of Medical and Dental History*

#### *Clinical Examination (to be compared with previous baseline measurements)*

1. Extraoral examination and recording of results
2. Dental examination and recording of results:
  - A. Tooth mobility/fremitus;
  - B. Caries assessment;
  - C. Restorative, prosthetic;
  - D. Other tooth-related problems.
3. Periodontal examination and recording of results:
  - A. Probing depths;
  - B. Bleeding on probing;
  - C. General levels of plaque and calculus;
  - D. Evaluation of furcation invasion;
  - E. Exudation;
  - F. Gingival recession;
  - G. Occlusal examination and tooth mobility;
  - H. Other signs and symptoms of disease activity.
4. Examination of dental implants and peri-implant tissues and recording of results:
  - A. Probing depths;
  - B. Bleeding on probing;
  - C. Examination of prosthesis/abutment components;
  - D. Evaluation of implant stability;
  - E. Occlusal examination;
  - F. Other signs and symptoms of disease activity.



## **Radiographic Examination**

Radiographs should be current and should be based on the diagnostic needs of the patient and should permit proper evaluation and interpretation of the status of the periodontium and dental implants. Radiographs of diagnostic quality are necessary for these purposes.

The judgement of the clinician, as well as the degree of disease activity, may help determine the need for, the frequency of, and the number of radiographs.

Radiographic abnormalities should be noted.

## **Assessment**

1. Assessment of disease status by reviewing the clinical and radiographic examination findings compared with baseline.

2. Assessment of personal oral hygiene status.

## **Treatment**

1. Removal of subgingival and supragingival plaque and calculus

2. Behavior modification:

A. Oral hygiene instruction

B. Compliance with suggested periodontal maintenance intervals

C. Counseling on control of risk factors; e.g., cessation of smoking

3. Antimicrobial agents as necessary

4. Surgical treatment of recurrent disease

## **Communication**

1. Informing the patient of current status and alterations in treatment if indicated.

2. Consultation with other health care practitioners who will be providing additional therapy or participating in the periodontal maintenance program.

## **Planning**

1. For most patients with a history of periodontitis, visits at 3-month intervals have been found to be effective in maintaining the established gingival health.

2. Based on evaluation of clinical findings and assessment of disease status, periodontal maintenance frequency may be modified or the patient may be returned to active treatment.

## **OUTCOMES ASSESSMENT**

1. The desired outcome for patients on periodontal maintenance should result in maintenance of the periodontal health status attained as a result of active therapy.

2. Inadequate periodontal maintenance or non-compliance may result in recurrence or progression of the disease process.

3. Despite adequate periodontal maintenance and patient compliance, patients may demonstrate recurrence or progression of periodontal disease. In these patients additional therapy may be warranted.

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## Parameter on Plaque-Induced Gingivitis\*

The American Academy of Periodontology has developed the following parameter on plaque-induced gingivitis in the absence of clinical attachment loss. Plaque-induced gingivitis is the most common form of the periodontal diseases, affecting a significant portion of the population in susceptible individuals. Patients should be informed of the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. No treatment may result in continuation of clinical signs of disease, with possible development of gingival defects and progression to periodontitis. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. *J Periodontol* 2000;71:851-852.

### KEY WORDS

Dental plaque/adverse effects; gingivitis/pathogenesis; disease progression; periodontal attachment loss/prevention and control.

### CLINICAL DIAGNOSIS

#### Definition

Plaque-induced gingivitis is defined as inflammation of the gingiva in the absence of clinical attachment loss.

#### Clinical Features

Gingivitis may be characterized by the presence of any of the following clinical signs: redness and edema of the gingival tissue, bleeding upon provocation, changes in contour and consistency, presence of calculus and/or plaque, and no radiographic evidence of crestal bone loss.

### THERAPEUTIC GOALS

The therapeutic goal is to establish gingival health through the elimination of the etiologic factors; e.g., plaque, calculus, and other plaque-retentive factors.

### TREATMENT CONSIDERATIONS

Contributing systemic risk factors may affect treatment and therapeutic outcomes for plaque-induced gingivitis. These may include diabetes, smoking, and certain periodontal bacteria, aging, gender, genetic predisposition, systemic diseases and conditions (immunosuppression), stress, nutrition, pregnancy, substance abuse, HIV infection, and medications.

A treatment plan for active therapy should be developed that may include the following:

1. Patient education and customized oral hygiene instruction.
2. Debridement of tooth surfaces to remove supra- and subgingival plaque and calculus.
3. Antimicrobial and antiplaque agents or devices may be used to augment the oral hygiene efforts of patients who are partially effective with traditional mechanical methods.
4. Correction of plaque-retentive factors such as over-contoured crowns, open and/or overhanging margins, narrow embrasure spaces, open contacts, ill-fitting fixed or removable partial dentures, caries, and tooth malposition.
5. In selected cases, surgical correction of gingival deformities that hinder the patient's ability to perform adequate plaque control may be indicated.
6. Following the completion of active therapy, the patient's condition should be evaluated to determine the course of future treatment.

### OUTCOMES ASSESSMENT

1. Satisfactory response to therapy should result in significant reduction of clinical signs of gingival inflammation, stability of clinical attachment levels, and reduction of clinically-detectible plaque to a level compatible with gingival health. An appropriate initial interval for follow up care and prophylaxis should be determined by the clinician.
2. If the therapy performed does not resolve the periodontal condition, there may be: continuation of clinical signs of disease (bleeding on probing, redness, swelling, etc.) with possible development of gingival defects such as gingival clefts, gingival craters, etc.,

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



and possible progression to periodontitis with associated attachment loss.

3. Factors which may contribute to the periodontal condition not resolving include lack of effectiveness and/or patient non-compliance in controlling plaque, underlying systemic disease, presence of supra- and/or subgingival calculus, restorations which do not permit sufficient control of local factors, patient noncompliance with prophylaxis intervals, and mental and/or physical disability.

4. In the management of patients where the periodontal condition does not respond, treatment may include additional sessions of oral hygiene instruction and education, additional or alternative methods and devices for plaque removal, medical/dental consultation, additional tooth debridement, increasing the frequency of prophylaxis, microbial assessment, and continuous monitoring and evaluation to determine further treatment needs.

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## Parameter on Chronic Periodontitis With Slight to Moderate Loss of Periodontal Support\*

*The American Academy of Periodontology has developed the following parameter on the treatment of chronic periodontitis with slight to moderate loss of periodontal supporting tissues. Patients should be informed of the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. Failure to appropriately treat chronic periodontitis can result in progressive loss of periodontal supporting tissues, an adverse change in prognosis, and could result in tooth loss. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. J Periodontol 2000;71:853-855.*

### KEY WORDS

Disease progression; periodontitis/diagnosis; periodontitis/complications; periodontal attachment loss/prevention and control; tooth loss/prevention and control; patient care planning.

### CLINICAL DIAGNOSIS

#### Definition

Chronic periodontitis is defined as inflammation of the gingiva extending into the adjacent attachment apparatus. The disease is characterized by loss of clinical attachment due to destruction of the periodontal ligament and loss of the adjacent supporting bone.

#### Clinical Features

Although chronic periodontitis is the most common form of destructive periodontal disease in adults, it can occur over a wide range of ages. It can occur in both the primary and secondary dentition. It usually has slow to moderate rates of progression, but may have periods of rapid progression.

Clinical features may include combinations of the following signs and symptoms: edema, erythema, gingival bleeding upon probing, and/or suppuration. Chronic periodontitis with slight to moderate destruction is characterized by a loss of up to one-third of the supporting periodontal tissues. In molars, if the furcation is involved, loss of clinical attachment should not exceed Class I (incipient). Slight to moderate destruction is generally characterized by periodontal probing depths up to 6 mm with clinical attachment loss of up to 4 mm. Radiographic evidence of bone loss and increased tooth mobility may be present. Chronic periodontitis with slight to mod-

erate loss of periodontal supporting tissues may be localized, involving one area of a tooth's attachment, or more generalized, involving several teeth or the entire dentition. A patient may simultaneously have areas of health and chronic periodontitis with slight, moderate, and advanced destruction.

### THERAPEUTIC GOALS

The goals of periodontal therapy are to alter or eliminate the microbial etiology and contributing risk factors for periodontitis, thereby arresting the progression of the disease and preserving the dentition in a state of health, comfort, and function with appropriate esthetics; and to prevent the recurrence of periodontitis. In addition, regeneration of the periodontal attachment apparatus, where indicated, may be attempted.

### TREATMENT CONSIDERATIONS

Clinical judgment is an integral part of the decision-making process. Many factors affect the decisions for the appropriate therapy(ies) and the expected therapeutic results. Patient-related factors include systemic health, age, compliance, therapeutic preferences, and patient's ability to control plaque. Other factors include the clinician's ability to remove subgingival deposits, restorative and prosthetic demands, and the presence and treatment of teeth with more advanced chronic periodontitis.

Treatment considerations for patients with slight to moderate loss of periodontal support are described below.

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

## Initial Therapy

1. Contributing systemic risk factors may affect treatment and therapeutic outcomes for chronic periodontitis. These may include diabetes, smoking, certain periodontal bacteria, aging, gender, genetic predisposition, systemic diseases and conditions (immunosuppression), stress, nutrition, pregnancy, HIV infection, substance abuse, and medications. Elimination, alteration, or control of risk factors which may contribute to chronic periodontitis should be attempted. Consultation with the patient's physician may be indicated.

2. Instruction, reinforcement, and evaluation of the patient's plaque control should be performed.

3. Supra- and subgingival scaling and root planing should be performed to remove microbial plaque and calculus.

4. Antimicrobial agents or devices may be used as adjuncts.

5. Local factors contributing to chronic periodontitis should be eliminated, or controlled. To accomplish this, the following procedures may be considered:

- A. Removal or reshaping of restorative overhangs and over-contoured crowns;
- B. Correction of ill-fitting prosthetic appliances;
- C. Restoration of carious lesions;
- D. Odontoplasty;
- E. Tooth movement;
- F. Restoration of open contacts which have resulted in food impaction;
- G. Treatment of occlusal trauma.

6. Evaluation of the initial therapy's outcomes should be performed after an appropriate interval for resolution of inflammation and tissue repair. A periodontal examination and re-evaluation may be performed with the relevant clinical findings documented in the patient's record. These findings may be compared to initial documentation to assist in determining the outcome of initial therapy as well as the need for and the type of further treatment.

7. For reasons of health, lack of effectiveness or non-compliance with plaque control, patient desires, or therapist's decision, appropriate treatment to control the disease may be deferred or declined.

8. If the results of initial therapy resolve the periodontal condition, periodontal maintenance should be scheduled at appropriate intervals (see Parameter on Periodontal Maintenance, pages 849-850).

9. If the results of initial therapy do not resolve the periodontal condition, periodontal surgery should be considered to resolve the disease process and/or correct anatomic defects.

## Periodontal Surgery

A variety of surgical treatment modalities may be appropriate in managing the patient.

1. Gingival augmentation therapy.
2. Regenerative therapy:
  - A. Bone replacement grafts;
  - B. Guided tissue regeneration;
  - C. Combined regenerative techniques.
3. Resective therapy:
  - A. Flaps with or without osseous surgery;
  - B. Gingivectomy.

## Other Treatments

1. Refinement therapy to achieve therapeutic objectives.

2. Treatment of residual risk factors should be considered; e.g., cessation of smoking, control of diabetes.

3. An appropriate initial interval for periodontal maintenance should be determined by the clinician (Periodontal Maintenance Parameter, pages 849-850).

## OUTCOMES ASSESSMENT

1. The desired outcome of periodontal therapy in patients with chronic periodontitis with slight to moderate loss of periodontal support should result in:

- A. Significant reduction of clinical signs of gingival inflammation;
- B. Reduction of probing depths;
- C. Stabilization or gain of clinical attachment;
- D. Reduction of clinically detectable plaque to a level compatible with gingival health.

2. Areas where the periodontal condition does not resolve may occur and be characterized by:

- A. Inflammation of the gingival tissues;
- B. Persistent or increasing probing depths;
- C. Lack of stability of clinical attachment;
- D. Persistent clinically detectable plaque levels not compatible with gingival health.

3. In patients where the periodontal condition does not resolve, additional therapy may be required.

- A. Not all patients or sites will respond equally or acceptably;
- B. Additional therapy may be warranted on a site specific basis.

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## Parameter on Chronic Periodontitis With Advanced Loss of Periodontal Support\*

*The American Academy of Periodontology has developed the following parameter on the treatment of chronic periodontitis with advanced loss of periodontal supporting tissues. Patients should be informed of the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. Failure to appropriately treat chronic periodontitis can result in progressive loss of periodontal supporting tissues, an adverse change in prognosis, and could result in tooth loss. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. J Periodontol 2000;71:856-858.*

### KEY WORDS

Disease progression; periodontitis/diagnosis; periodontitis/complications; periodontal attachment loss/prevention and control; tooth loss/prevention and control; patient care planning.

### CLINICAL DIAGNOSIS

#### Definition

Chronic periodontitis is defined as inflammation of the gingiva and the adjacent attachment apparatus. The disease is characterized by loss of clinical attachment due to destruction of the periodontal ligament and loss of the adjacent supporting bone.

#### Clinical Features

Clinical features may include combinations of the following signs and symptoms: edema, erythema, gingival bleeding upon probing, and/or suppuration. Chronic periodontitis with advanced loss of periodontal support is characterized by a loss of greater than one-third of the supporting periodontal tissues. Loss of clinical attachment, in the furcation, if present, will exceed Class I (incipient). Advanced destruction is generally characterized by periodontal probing depths greater than 6 mm with attachment loss greater than 4 mm. Radiographic evidence of bone loss is apparent. Increased tooth mobility may be present.

Chronic periodontitis with advanced loss of periodontal supporting tissues may be localized, involving one area of a tooth's attachment, or more generalized, involving several teeth or the entire dentition. A patient may simultaneously have areas of health and chronic periodontitis with slight, moderate, and advanced destruction.

### THERAPEUTIC GOALS

The goals of periodontal therapy are to alter or eliminate the microbial etiology and contributing risk factors for periodontitis, thereby arresting the progression of disease and preserving the dentition in a state of health, comfort, and function with appropriate esthetics; and to prevent the recurrence of periodontitis. In addition, regeneration of the periodontal attachment apparatus, where indicated, may be attempted.

### TREATMENT CONSIDERATIONS

Clinical judgment is an integral part of the decision-making process. Many factors affect the decisions for appropriate therapy(ies) and the expected therapeutic results. Patient-related factors include systemic health, age, compliance, therapeutic preferences, and patient's ability to control plaque. Other factors include the clinician's ability to remove subgingival deposits, prosthetic demands, and the presence and treatment of teeth with more advanced chronic periodontitis.

Treatment considerations for patients with advanced loss of periodontal support are described below.

#### Initial Therapy

1. Contributing systemic risk factors may affect treatment and therapeutic outcomes for chronic periodontitis. These may include diabetes, smoking, cer-

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



tain periodontal bacteria, aging, gender, genetic predisposition, systemic diseases and conditions (immunosuppression), stress, nutrition, pregnancy, HIV infection, substance abuse, and medications. Elimination, alteration, or control of risk factors which may contribute to adult periodontitis should be attempted. Consultation with the patient's physician may be indicated.

2. Instruction, reinforcement, and evaluation of the patient's plaque control should be performed.

3. Supra- and subgingival scaling and root planing should be performed to remove microbial plaque and calculus.

4. Antimicrobial agents or devices may be used as adjuncts. Subgingival microbial samples may be collected from selected sites for analysis, possibly including antibiotic-sensitivity testing.

5. Local factors contributing to chronic periodontitis should be eliminated or controlled. To accomplish this, the following procedures may be considered:

- A. Removal or reshaping of restorative overhangs and over-contoured crowns;
- B. Correction of ill-fitting prosthetic appliances;
- C. Restoration of carious lesions;
- D. Odontoplasty;
- E. Tooth movement;
- F. Restoration of open contacts which have resulted in food impaction;
- G. Treatment of occlusal trauma;
- H. Extraction of hopeless teeth.

6. For reasons of health, lack of effectiveness or non-compliance with plaque control, patient desires, or therapist's decision, appropriate treatment to control the disease may be deferred or declined.

### **Compromised Therapy**

In certain cases, because of the severity and extent of disease and the age and health of the patient, treatment that is not intended to attain optimal results may be indicated. In these cases, initial therapy may become the end point. This should include timely periodontal maintenance.

### **Periodontal Surgery**

In patients with chronic periodontitis with advanced loss of periodontal support, periodontal surgery should be considered. A variety of surgical treatment modalities may be appropriate in managing the patient.

1. Gingival augmentation therapy
2. Regenerative therapy:

- A. Bone replacement grafts;
  - B. Guided tissue regeneration;
  - C. Combined regenerative techniques.
3. Resective therapy:
    - A. Flaps with or without osseous surgery;
    - B. Root resective therapy;
    - C. Gingivectomy.

### **Other Treatments**

1. Refinement therapy to achieve therapeutic objectives.

2. Treatment of residual risk factors should be considered; e.g., cessation of smoking, control of diabetes.

3. Problem focused surgical therapy. This approach may be considered to enhance effective root debridement, to possibly enhance regenerative therapy, to reduce gingival recession, etc. on patients who demonstrate effective plaque control and favorable compliance in their prior dental care.

4. An appropriate initial interval for periodontal maintenance should be determined by the clinician (see on Periodontal Maintenance Parameter, pages 849-850).

### **OUTCOMES ASSESSMENT**

1. The desired outcome of periodontal therapy in patients with chronic periodontitis with advanced loss of periodontal support should include:

- A. Significant reduction of clinical signs of gingival inflammation;
- B. Reduction of probing depths;
- C. Stabilization or gain of clinical attachment;
- D. Radiographic resolution of osseous lesions;
- E. Progress toward occlusal stability;
- F. Progress toward the reduction of clinically detectable plaque to a level compatible with gingival health.

2. Areas where the periodontal condition does not resolve may occur and be characterized by:

- A. Inflammation of the gingival tissues;
- B. Persistent or increasing probing depths;
- C. Lack of stability of clinical attachment;
- D. Persistent clinically detectable plaque levels not compatible with gingival health.

3. In patients where the periodontal condition does not resolve, additional therapy may be required.

- A. Not all patients or sites will respond equally or acceptably;
- B. Additional therapy may be warranted on a site specific basis.



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## Parameter on “Refractory” Periodontitis\*

*The American Academy of Periodontology has developed the following parameter on the treatment of “refractory” periodontitis. Patients should be informed of the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. No treatment is very likely to result in further progression of the disease and eventual tooth loss. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. J Periodontol 2000;71:859-860.*

### KEY WORDS

Disease progression; periodontitis/complications; patient care planning; periodontitis/therapy.

### CLINICAL DIAGNOSIS

#### Definition

“Refractory periodontitis” is not a single disease entity. The term refers to destructive periodontal diseases in patients who, when longitudinally monitored, demonstrate additional attachment loss at one or more sites, despite well-executed therapeutic and patient efforts to stop the progression of disease. These diseases may occur in situations where conventional therapy has failed to eliminate microbial reservoirs of infection, or has resulted in the emergence or superinfection of opportunistic pathogens. They may also occur as the result of a complexity of unknown factors which may compromise the host’s response to conventional periodontal therapy. Such conventional therapy frequently includes most, but not necessarily all, of the following:

1. Patient education and training in personal oral hygiene; behavior modification.
2. Thorough scaling and root planing to remove microbial deposits and eliminate anatomical root features that might act as reservoirs for microbial infection.
3. Use of local and/or systemic antimicrobial agents.
4. Elimination or correction of defective restorations and other local factors that might interfere with oral hygiene efforts or act as retention sites for periodontal pathogens.
5. Surgical therapy.
6. Extraction of severely involved teeth.
7. Occlusal therapy.
8. Periodontal maintenance and re-evaluation.

The “refractory” designation can be applied to all forms of destructive periodontal disease that appear to

be non-responsive to treatment; e.g., refractory chronic periodontitis and refractory aggressive periodontitis.

#### Clinical Features

The primary feature of “refractory” periodontitis is the occurrence of additional clinical attachment loss after repeated attempts to control the infection with conventional periodontal therapy. The diagnosis of “refractory” periodontitis should only be made in patients who satisfactorily comply with recommended oral hygiene procedures and follow a rigorous program of periodontal maintenance. “Refractory” periodontitis is usually diagnosed after the conclusion of conventional active therapy.

This diagnosis is not appropriate for patients who:

1. Have received incomplete or inadequate conventional therapy.
2. Have identifiable systemic conditions that may increase their susceptibility to periodontal infections such as diabetes mellitus, immunosuppressive disorders, certain blood dyscrasias, and pregnancy.
3. Have localized areas of rapid attachment loss which are related to factors such as: root fracture, retrograde pulpal diseases, foreign body impaction, or various root anomalies.
4. Have recurrence of progressive periodontitis after many years of successful periodontal maintenance.

### THERAPEUTIC GOALS

The goal of therapy for “refractory” periodontitis is to arrest or slow the progression of the disease. Due to the complexity and many unknown factors, control may not be possible in all instances. In such cases a reasonable treatment objective is to slow the progression of the disease.

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

## TREATMENT CONSIDERATIONS

Once the diagnosis of “refractory” periodontitis has been made, the following steps may be taken:

1. Collection of subgingival microbial samples from selected sites for analyses, possibly including antibiotic-sensitivity testing.
2. Selection and administration of an appropriate antibiotic regimen.
3. In conjunction with the administration of an antimicrobial regimen, conventional periodontal therapies may be used.
4. Reevaluation with microbiological testing as indicated.
5. Identification and attempt to control risk factors (e.g., smoking).
6. Intensified periodontal maintenance program which may include shorter intervals between appointments with microbiologic testing if indicated (Parameter on Periodontal Maintenance, pages 849-850).

## OUTCOMES ASSESSMENT

1. The desired outcome for patients with “refractory” periodontitis includes arresting or controlling the disease.
2. Due to the complexity and many unknown factors of “refractory” periodontitis, control may not be possible in all instances. In such cases, a reasonable treatment objective is to slow the progression of the disease.

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## Parameter on Mucogingival Conditions\*

The American Academy of Periodontology has developed the following parameter on the identification and treatment of mucogingival conditions. Patients should be informed of the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. The consequences of this option may range from no change in the condition to progression of the defect. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. *J Periodontol* 2000;71:861-862.

### KEY WORDS

Gingival diseases/etiology; gingiva/anatomy and histology; health education, dental; risk factors; patient care planning; disease progression.

### CLINICAL DIAGNOSIS

#### Definition

Mucogingival conditions are deviations from the normal anatomic relationship between the gingival margin and the mucogingival junction (MGJ).

#### Clinical Features

Common mucogingival conditions are recession, absence or reduction of keratinized tissue, and probing depths extending beyond the MGJ. Anatomical variations that may complicate the management of these conditions include tooth position, frenulum insertions and vestibular depth. Variations in ridge anatomy may be associated with mucogingival conditions.

#### Examination

Mucogingival conditions may be detected during a comprehensive or problem-focused periodontal examination. The problem-focused examination should also include appropriate screening techniques to evaluate for periodontal or other oral diseases.

Features of a problem-focused examination that apply to mucogingival conditions:

1. A medical history should be taken and evaluated to identify predisposing conditions that may affect treatment or patient management.
2. A dental history including the chief complaint should be taken and evaluated.
3. Relevant findings from probing and visual exam-

inations of the periodontium and the intraoral soft tissues should be collected and recorded.

4. While radiographs do not detect mucogingival problems, appropriate radiographs may be utilized as part of the examination.

5. Mucogingival relationships should be evaluated to identify deficiencies of keratinized tissue, abnormal frenulum insertions, and other tissue abnormalities.

6. Etiologic factors that may have an impact on the results of therapy should be evaluated.

7. Variations in ridge configuration should also be evaluated.

### THERAPEUTIC GOALS

Mucogingival therapy is defined as non-surgical and/or surgical correction of defects in morphology, position, and/or amount of soft tissue and underlying bone. The goals of mucogingival therapy are to help maintain the dentition or its replacements in health with good function and esthetics, and may include restoring anatomic form and function. A further goal is to reduce the risk of progressive recession. This may be accomplished with a variety of procedures including root coverage, gingival augmentation, pocket reduction, and ridge reconstruction, as well as control of etiologic factors.

Several mucogingival conditions may occur concurrently, necessitating the consideration of combining or sequencing surgical techniques.

### TREATMENT CONSIDERATIONS

1. In order to monitor changes of mucogingival conditions, baseline findings should be recorded.

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



2. Depending on the mucogingival conditions, the following treatments may be indicated:

- A. Control of inflammation through plaque control, scaling and root planing, and/or antimicrobial agents;
  - B. Gingival augmentation therapy;
  - C. Root coverage;
  - D. Crown lengthening;
  - E. Extraction site grafts to prevent ridge collapse;
  - F. Papilla regeneration;
  - G. Exposure of unerupted teeth.
  - H. Frenectomy;
  - I. Surgical procedures to reduce probing depths;
  - J. Tooth movement;
  - K. Odontoplasty.
3. Vestibular depth alteration.

Treatment options for altering vestibular depth may include gingival augmentation and/or vestibuloplasty.

4. Ridge augmentation.

Ridge defects that may need correction prior to prosthetic rehabilitation can be treated by a variety of tissue grafting techniques and/or guided tissue regeneration.

The selection of surgical procedures may depend on the configuration of the defect, availability of donor tissue, and esthetic considerations of the patient.

## OUTCOMES ASSESSMENT

1. The desired outcome of periodontal therapy for patients with mucogingival conditions should result in:

- A. Correction of the mucogingival condition;
- B. Cessation of further recession;
- C. Tissues free of clinical signs of inflammation;
- D. Return to function in health and comfort;
- E. Satisfactory esthetics.

2. Areas where the condition did not resolve may be characterized by:

- A. Persistence of the mucogingival problem;
- B. Persistence of clinical signs of inflammation;
- C. Less than satisfactory esthetics.

3. In patients where the condition did not resolve, additional therapy may be required.

- A. Not all patients or sites will respond equally or acceptably;
- B. Additional therapy may be warranted on a site specific basis.

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## Parameter On Acute Periodontal Diseases\*

The American Academy of Periodontology has developed the following parameter on the treatment of acute periodontal diseases. Patients should be informed about the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. Failure to treat acute periodontal diseases appropriately can result in progressive loss of periodontal supporting tissues, an adverse change in prognosis, and could result in tooth loss. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. *J Periodontol* 2000;71:863-866.

### KEY WORDS

Disease progression; health education, dental; periodontal disease/therapy; patient care planning; risk factors.

### CLINICAL DIAGNOSIS

#### Definition

Acute periodontal diseases are clinical conditions of rapid onset that involve the periodontium or associated structures and may be characterized by pain or discomfort and infection. They may or may not be related to gingivitis or periodontitis. They may be localized or generalized, with possible systemic manifestations.

#### Clinical Features

Acute periodontal infections include:

1. Gingival abscess;
2. Periodontal abscess;
3. Necrotizing periodontal diseases;
4. Herpetic gingivostomatitis;
5. Pericoronal abscess (pericoronitis);
6. Combined periodontal-endodontic lesions.

### GINGIVAL ABSCESS

#### Clinical Diagnosis

**Definition.** A localized purulent infection that involves the marginal gingiva or interdental papilla.

**Clinical features.** Clinical features may include combinations of the following signs and symptoms: a localized area of swelling in the marginal gingiva or interdental papillae, with a red, smooth, shiny surface. The lesion may be painful and appear pointed. A purulent exudate may be present.

#### Therapeutic Goals

The goal of therapy for a gingival abscess is the elimination of the acute signs and symptoms as soon as possible.

#### Treatment Considerations

Treatment considerations include drainage to relieve the acute symptoms and mitigation of the etiology.

#### Outcomes Assessment

1. The desired outcome of therapy in patients with a gingival abscess should be the resolution of the signs and symptoms of the disease and the restoration of gingival health and function.
2. Areas where the gingival condition does not resolve may be characterized by recurrence of the abscess or change to a chronic condition.
3. Factors which may contribute to the nonresolution of this condition may include the failure to remove the cause of irritation, incomplete debridement, or inaccurate diagnosis.
4. In patients where the gingival condition does not resolve, additional therapy may be required.

### PERIODONTAL ABSCESS

#### Clinical Diagnosis

**Definition:** A localized purulent infection within the tissues adjacent to the periodontal pocket that may lead to the destruction of periodontal ligament and alveolar bone.

**Clinical features.** Clinical features may include combinations of the following signs and symptoms: a smooth, shiny swelling of the gingiva; pain, with the area of swelling tender to touch; a purulent exudate;

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and/or increase in probing depth. The tooth may be sensitive to percussion and may be mobile. Rapid loss of periodontal attachment may occur. A periodontal abscess may be associated with endodontic pathosis.

### **Therapeutic Goals**

The goal of therapy for a periodontal abscess is elimination of the acute signs and symptoms as soon as possible.

### **Treatment Considerations**

Treatment considerations include establishing drainage by debriding the pocket and removing plaque, calculus, and other irritants and/or incising the abscess. Other treatments may include irrigation of the pocket, limited occlusal adjustment, and administration of antimicrobials and management of patient comfort.

A surgical procedure for access for debridement may be considered. In some circumstances extraction of the tooth may be necessary. A comprehensive periodontal evaluation should follow resolution of the acute condition.

### **Outcomes Assessment**

1. The desired outcome of therapy in patients with a periodontal abscess is the resolution of signs and symptoms. Resolution of the acute phase may result in partial regaining of attachment that had been lost.

2. Areas where the acute condition does not resolve may be characterized by recurrence of the abscess and/or continued loss of periodontal attachment.

3. Factors which may contribute to non-resolution of the condition may include failure to remove the causes of irritation, incomplete debridement, incomplete diagnosis (e.g., concomitant endodontic pathosis), or the presence of underlying systemic disease.

4. In patients where the condition does not resolve, additional evaluation and therapy may be required.

## **NECROTIZING PERIODONTAL DISEASES**

### **Clinical Diagnosis**

**Definition.** Necrotizing ulcerative gingivitis (NUG) is an acute infection of the gingiva. Where NUG has progressed to include attachment loss, it has been referred to as necrotizing ulcerative periodontitis (NUP).

**Clinical Features.** NUG may include combinations of the following signs and symptoms: necrosis and ulceration of the tips of the interdental papillae or gingival margin; and painful, bright red marginal gingiva which bleed on slight manipulation. The mouth may have a malodor and systemic manifestations may be present. In patients with NUG, there may be increased levels of personal stress, heavy smoking, and poor nutrition. Both NUG and NUP may be asso-

ciated with HIV/AIDS and other diseases where the immune system is compromised.

### **Therapeutic Goals**

The goal of therapy for necrotizing periodontal diseases is the prompt elimination of the acute signs and symptoms.

### **Treatment Considerations**

Treatment considerations include irrigation and debridement of the necrotic areas and tooth surfaces; oral hygiene instructions and the use of oral rinses, pain control, and management of systemic manifestations, including appropriate antibiotic therapy, as necessary. Patient counseling should include instruction on proper nutrition, oral care, appropriate fluid intake, and smoking cessation. A comprehensive periodontal evaluation should follow resolution of the acute condition.

### **Outcomes Assessment**

1. The desired outcome of therapy in patients with necrotizing periodontal diseases should be the resolution of signs and symptoms and the restoration of gingival health and function.

2. Areas where the gingival condition does not resolve may occur and be characterized by recurrence and/or progressive destruction of the gingiva and periodontal attachment.

3. Factors which may contribute to non-resolution include the failure to remove the causes of irritation, incomplete debridement, inaccurate diagnosis, patient non-compliance, and/or underlying systemic conditions.

4. In patients where the condition does not resolve, additional therapy and/or medical/dental consultation may be indicated. These conditions may have a tendency to recur and frequent periodontal maintenance visits and meticulous oral hygiene may be necessary.

## **HERPETIC GINGIVOSTOMATITIS**

### **Clinical Diagnosis**

**Definition.** Herpetic gingivostomatitis is a viral infection (herpes simplex) of the oral mucosa.

### **Clinical Features**

Clinical features may include combinations of the following signs and symptoms: generalized pain in the gingiva and oral mucous membranes, inflammation, vesiculation, and ulceration of the gingiva and/or oral mucosa, lymphadenopathy, fever, and malaise.

### **Therapeutic Goals**

The goal of therapy for herpetic gingivostomatitis is the relief of pain to facilitate maintenance of nutrition, hydration, and basic oral hygiene.

## **Treatment Considerations**

Treatment considerations include gentle debridement and the relief of pain (e.g., topical anesthetic rinses). Patient counseling should include instruction in proper nutrition, oral care, appropriate fluid intake, and reassurance that the condition is self-limiting. The use of antiviral medications may be considered. The patient should be informed that the disease is contagious at certain stages.

## **Outcomes Assessment**

1. The desired outcome in patients with herpetic gingivostomatitis should be the resolution of signs and symptoms.

2. If the condition does not resolve, medical consultation may be indicated.

## **PERICORONAL ABSCESS (PERICORONITIS)**

### **Clinical Diagnosis**

**Definition.** A localized purulent infection within the tissue surrounding the crown of a partially or fully erupted tooth.

**Clinical features.** Clinical features may include signs and symptoms of the following: localized red, swollen, lesions that are painful to touch. Also evident may be a purulent exudate, trismus, lymphadenopathy, fever, and malaise.

### **Therapeutic Goals**

The goal of therapy for a pericoronal abscess is the elimination of the acute signs and symptoms as soon as possible, including the causes of irritation.

## **Treatment Considerations**

Treatment considerations include debridement and irrigation of the undersurface of the pericoronal flap, use of antimicrobials and tissue recontouring, or extraction of the involved and/or opposing tooth. Patients should be instructed in home care.

## **Outcomes Assessment**

1. The desired outcome of therapy in patients with a pericoronal abscess should be the resolution of signs and symptoms of inflammation and infection and the restoration of tissue health and function.

2. Areas where the condition does not resolve may be characterized by recurrence of the acute symptoms and/or spread of infection to surrounding tissues.

3. Factors which may contribute to non-resolution may include the failure to remove the causes of irritation or incomplete debridement. In some cases of pericoronal abscess, trauma from the opposing tooth may be an aggravating factor.

4. In patients where the condition does not resolve, additional therapy may be indicated.

## **COMBINED PERIODONTAL/ENDODONTIC LESIONS (ABSCESSSES)**

### **Clinical Diagnosis**

**Definition.** Combined periodontal/endodontic lesions are localized, circumscribed areas of infection originating in the periodontal and/or pulpal tissues. The infections may arise primarily from pulpal inflammatory disease expressed itself through the periodontal ligament or the alveolar bone to the oral cavity. They also may arise primarily from a periodontal pocket communicating through accessory canals of the tooth and or apical communication and secondarily infect the pulp. In addition, they may arise as a sequela of a fractured tooth.

**Clinical features.** Clinical features may include combinations of the following signs and symptoms: smooth, shiny swelling of the gingiva or mucosa; pain, with the area of swelling tender to the touch; and/or a purulent exudate. The tooth may be sensitive to percussion and mobile. A fistulous track may be present. Rapid loss of the periodontal attachment and periradicular tissues may occur. Facial swelling and/or cellulitis may be present.

### **Therapeutic Goals**

The goal of therapy for combined periodontal/endodontic lesions (abscesses) is the elimination of the signs, symptoms and etiology as soon as possible.

## **Treatment Considerations**

Treatment considerations include establishing drainage by debriding the pocket and/or by incising the abscess. Other treatments may include endodontic therapy, irrigation of the pocket, limited occlusal adjustment, the administration of antimicrobials, and management of patient comfort.

A surgical procedure for access for debridement may be considered. In some circumstances, an endodontic consultation may be required. In other circumstances, extraction of the tooth may be necessary. In any case, a comprehensive periodontal and endodontic examination should follow resolution of the acute condition.

## **Outcomes Assessment**

1. The desired outcome of therapy in patients with a periodontal/endodontic lesion is the resolution of the signs and symptoms.

2. Areas where the acute condition does not resolve may be characterized by recurrence of an

abscess and/or continued loss of periodontal attachment and periradicular tissues.

3. Factors which contribute to non-resolution of the condition may include failure to remove the causes of infection, incomplete debridement, incomplete diagnosis, or the presence of underlying systemic disease.

4. Resolution of the acute phase by management of the multiple etiologic factors may result in partial restoration of the clinical attachment that has been lost. In patients where the condition does not resolve, additional evaluation and therapy is required.

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## Parameter on Aggressive Periodontitis\*

The American Academy of Periodontology has developed the following parameter on the treatment of aggressive periodontitis. Patients should be informed of the disease process, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. Failure to treat aggressive periodontitis appropriately can result in progressive and often rapid loss of periodontal supporting tissues. This may have an adverse effect upon prognosis and could result in tooth loss. Given this information, patients (or their parents or guardians, as appropriate) should then be able to make informed decisions regarding their periodontal therapy. *J Periodontol* 2000;71:867-869.

### KEY WORDS

Disease progression; health education, dental; periodontal diseases/therapy; risk factors; patient care planning.

### CLINICAL DIAGNOSIS

#### Definition

Aggressive periodontitis encompasses distinct types of periodontitis that affect people who, in most cases, otherwise appear healthy. It tends to have a familial aggregation and there is a rapid rate of disease progression. Aggressive periodontitis occurs in localized and generalized forms.

#### Clinical Features

Some secondary features of aggressive periodontitis that are generally, but not universally, present are: 1) amounts of microbial deposits are inconsistent with the severity of periodontal tissue destruction and 2) the progression of attachment and bone loss may be self-arresting.

**Localized aggressive periodontitis** usually has a circumpubertal onset with periodontal damage being localized to permanent first molars and incisors. However, atypical patterns of affected teeth are possible. The disease is frequently associated with the periodontal pathogen *Actinobacillus actinomycetemcomitans* and neutrophil function abnormalities. A robust serum antibody response to infecting agents is frequently detected.

**Generalized aggressive periodontitis** usually affects people under 30 years of age, but patients may be older. There is generalized interproximal attachment loss affecting at least 3 permanent teeth other than

the first molars and incisors. Attachment loss occurs in pronounced episodic periods of destruction. The disease is frequently associated with the periodontal pathogens *Actinobacillus actinomycetemcomitans* and *Porphyromonas gingivalis* and neutrophil function abnormalities. A poor serum antibody response to infecting agents is frequently detected.

#### Therapeutic Goals

The goals of periodontal therapy are to alter or eliminate the microbial etiology and contributing risk factors for periodontitis, thereby arresting the progression of disease and preserving the dentition in comfort, function, and appropriate esthetics and to prevent the recurrence of disease. In addition, regeneration of the periodontal attachment apparatus, where indicated, may be attempted. Due to the complexity of the aggressive periodontal diseases with regard to systemic factors, immune defects, and the microbial flora, control of disease may not be possible in all instances. In such cases, a reasonable treatment objective is to slow the progression of the disease (Parameter on "Refractory" Periodontitis, pages 859-860).

#### Treatment Considerations

In general, treatment methods for the aggressive periodontal diseases may be similar to those used for chronic periodontitis (Parameter on Chronic Periodontitis With Advanced Loss of Periodontal Support, pages 856-858). These methods should include oral hygiene instruction and reinforcement and evaluation of the patient's plaque control; supra- and subgin-

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

gival scaling and root planing to remove microbial plaque and calculus; control of other local factors; occlusal therapy as necessary; periodontal surgery as necessary; and periodontal maintenance.

In addition to the parameters for chronic periodontitis, the following should be considered for patients who have aggressive periodontitis:

1. A general medical evaluation may determine if systemic disease is present in children and young adults who exhibit severe periodontitis, particularly if aggressive periodontitis appears to be resistant to therapy. Consultation with the patient's physician may be indicated to coordinate medical care in conjunction with periodontal therapy. Modification of environmental risk factors should be considered.

2. Initial periodontal therapy alone is often ineffective. However, in the early stages of disease, lesions may be treated with adjunctive antimicrobial therapy combined with scaling and root planing with or without surgical therapy. Microbiological identification and antibiotic sensitivity testing may be considered. In very young patients, the use of tetracyclines may be contraindicated due to the possibility of staining of teeth. Alternative antimicrobial agents or delivery systems may be considered.

3. The long-term outcome may depend upon patient compliance and delivery of periodontal maintenance at appropriate intervals, as determined by the clinician (see Parameter on Periodontal Maintenance, pages 849-850). If primary teeth are affected, eruption of permanent teeth should be monitored to detect possible attachment loss.

4. Due to the potential familial nature of aggressive diseases, evaluation and counseling of family members may be indicated.

### Outcomes Assessment

The desired outcomes of periodontal therapy in patients with aggressive periodontitis should include:

1. Significant reduction of clinical signs of gingival inflammation;
2. Reduction of probing depths;
3. Stabilization or gain of clinical attachment;
4. Radiographic evidence of resolution of osseous lesions;
5. Progress toward occlusal stability;
6. Progress toward the reduction of clinically detectable plaque to a level compatible with periodontal health.

Areas where the periodontal condition does not resolve may occur and be characterized by the presence of:

1. Persistent gingival inflammation;

2. Persistent or increasing probing depths;
3. Progressive loss of clinical attachment;
4. Persistent clinically detectable plaque levels not compatible with periodontal health;
5. Increasing tooth mobility.

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## 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.

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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.

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## Parameter on Occlusal Traumatism in Patients With Chronic Periodontitis\*

*The American Academy of Periodontology has developed the following parameter on occlusal traumatism in patients with chronic periodontitis. Occlusal therapy is an integral part of periodontal therapy. Patients should be informed about the occlusal problem, therapeutic alternatives, potential complications, expected results, and their responsibility in treatment. Consequences of no treatment should be explained. Failure to treat occlusal traumatism appropriately in patients with chronic periodontitis may result in progressive loss of bone and an adverse change in prognosis, and could result in tooth loss. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. J Periodontol 2000;71:873-875.*

### KEY WORDS

Disease progression; dental occlusion; traumatic/diagnosis; periodontium/injury; dental occlusion, traumatic/complications; periodontitis/etiology; patient care planning.

### CLINICAL DIAGNOSIS

#### Definition

Injury to the periodontium may result from occlusal forces in excess of the reparative/adaptive capacity of the attachment apparatus.

Occlusal traumatism affects the supporting structures of the tooth or teeth. The lesion of trauma from occlusion may occur in conjunction with, or independent of, inflammatory periodontal diseases. Although trauma from occlusion and inflammatory periodontal disease may occur concurrently, each condition may be treated separately. The treatment goals and endpoints for each condition may be independent of each other. Occlusal therapy is generally addressed following, or in conjunction with, procedures to resolve the inflammatory lesions.

Occlusal traumatism may occur in an intact periodontium or in a periodontium that has been reduced by inflammatory periodontal disease. In the presence of a reduced periodontium, the effects of occlusal traumatism may be magnified because the resistance to the forces has changed. The presence and degree of tooth mobility should be determined, and a functional evaluation of the occlusion should be performed.

#### Clinical Features

A positive diagnosis of occlusal traumatism can be made if some of the signs and symptoms of an injury can be located in some part of the masticatory system. The following represent clinical features of such an injury, but are not pathognomonic for the condition:

1. Tooth mobility: Increasing displacement may be of greater concern since a stable pattern of mobility may indicate adaptation.
2. Tooth migration.
3. Tooth pain or discomfort on chewing or percussion.
4. Radiographic changes such as widening of the periodontal ligament space, disruption of the lamina dura, radiolucencies in the furcation or at the apex of a tooth that is vital, or root resorption. Just as with mobility, stable radiographic findings may indicate adaptation.
5. Tenderness of the muscles of mastication or other signs or symptoms of temporomandibular dysfunction.
6. Presence of wear facets beyond expected levels for the patient's age and diet consistency.
7. Chipped enamel or crown/root fractures.
8. Fremitus.

These clinical signs and symptoms may be indicative of other pathoses. Therefore, differential diagnoses may be established. Use of supplementary

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diagnostic procedures may be helpful; e.g., pulp vitality tests and evaluation of parafunctional habits.

## THERAPEUTIC GOALS

The goal of therapy in the treatment of occlusal traumatism is to alleviate the etiologic factors and enable patients to maintain a comfortable and functional dentition. In order to achieve this goal, several therapeutic objectives are suggested:

1. Elimination or reduction of tooth mobility.
2. Establish or maintain a stable, reproducible intercuspal position. If the existing relationship is altered through treatment, the new relationship should be physiologically acceptable to the patient.
3. Provide freedom of movement to and from the intercuspal position, including movement in all directions regardless of the initial point of contact.
4. Provide for efficient masticatory function.
5. Develop a comfortable occlusion.
6. Establish an occlusion with acceptable phonation and esthetics.
7. Eliminate or modify parafunctional habits.

## TREATMENT CONSIDERATIONS

Treatment of the symptoms of occlusal traumatism is appropriate during any phase of periodontal therapy. Except in the case of acute conditions, treatment is usually first addressed during initial therapy following efforts to reduce or minimize the inflammatory lesion (see Parameters on Chronic Periodontitis, pages 853-858). Evaluation of occlusal symptoms should continue throughout the course of therapy. Treatment may need to be repeated or revised.

Efforts are directed toward elimination or minimization of excessive force or stress placed on a tooth or teeth. Occlusal therapy may be accomplished through several different approaches. The choice depends on several factors, such as the characteristics of the forces, the underlying cause of these forces, the amount of periodontal support of the remaining teeth, and the function of the remaining dentition.

Treatment considerations for the chronic periodontitis patient with occlusal traumatism may include one or more of the following:

1. Occlusal adjustment;
2. Management of parafunctional habits;
3. Temporary, provisional, or long-term stabilization of mobile teeth with removable or fixed appliances;
4. Orthodontic tooth movement;
5. Occlusal reconstruction;
6. Extraction of selected teeth.

In the absence of clinical signs or symptoms, occlusal adjustment to obtain a conceptualized ideal occlusal pattern provides little or no benefit to the patient. Therefore, prophylactic occlusal adjustment appears to be contraindicated. Occlusal relationships may be evaluated as part of periodontal maintenance.

## OUTCOMES ASSESSMENT

The desired outcome of treatment of occlusal traumatism is that the patient should be able to masticate with comfort, without further damage to the periodontium. This goal is measured by the cessation or stabilization of the presenting signs or symptoms. These results include, but are not limited to, the following:

1. Mobility should either diminish or be absent or may persist if there is reduced periodontal support. A mobility pattern which is stable and allows the patient to function in comfort without danger of further damage is an acceptable end point.
  2. Further migration of the teeth should not occur. The migration which preceded therapy may also resolve from the alteration of the forces generated by the tongue, lips, and cheeks.
  3. Radiographic changes diminish or become stable.
  4. Relief of pain and improved patient comfort.
  5. Relief of premature contacts, fremitus, and occlusal interferences.
  6. Establishment of an occlusion that is stable, functional, physiologic, compatible with periodontal health, and esthetically acceptable.
- If occlusal traumatism does not resolve, the following may occur:
1. Mobility continues to increase.
  2. Tooth migration continues.
  3. Persistence of radiographic changes, such as widening of the periodontal ligament space and periradicular or furcation radiolucencies associated with occlusal traumatism.
  4. Patient pain and discomfort persist.
  5. Premature contacts and occlusal interferences remain.
  6. Parafunctional habits persist.
  7. Temporomandibular dysfunction may worsen.

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## Parameter on Periodontitis Associated With Systemic Conditions\*

The American Academy of Periodontology has developed the following parameter on periodontitis associated with systemic conditions. Patients affected by periodontal disease with concomitant systemic factors should be informed about the significance of the systemic condition(s) to the periodontal disease process. Patients should also be informed of the periodontal disease process, therapeutic alternatives, potential complications, expected results, and their responsibilities in treatment. Consequences of no periodontal treatment should be explained. Failure to treat periodontitis appropriately can result in progressive loss of periodontal supporting tissues, an adverse change in prognosis, tooth loss, and compromise of the dentition. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. *J Periodontol* 2000;71:876-879.

### KEY WORDS

Periodontitis/diagnosis; periodontitis/complications; periodontitis/therapy; risk factors; systemic diseases; disease progression.

### CLINICAL DIAGNOSIS

#### Definition

A number of systemic factors have been documented as being capable of affecting the periodontium and/or treatment of periodontal disease. Systemic etiologic components may be suspected in patients who exhibit periodontal inflammation or destruction which appears disproportionate to the local irritants. The clinician should be aware of systemic conditions and/or drugs that may be contributing factors to periodontal diseases, and of steps necessary to evaluate them. Periodontal therapy may be modified based on the current medical status of the patients. Periodontal organisms may be the source of infections elsewhere in the body. Therefore, those infections may also affect systemic health.

#### Patient Evaluation

1. A comprehensive periodontal evaluation should be performed as described in the Parameter on Comprehensive Periodontal Examination (pages 847-848).
2. Conditions which are suggestive of systemic disorders should be identified:
  - A. Physical disabilities;
  - B. Signs or symptoms of xerostomia, mucocutaneous lesions, gingival overgrowth, excessive gingival hemorrhage, or other indica-

- tors of undetected or poorly-controlled systemic disease;
  - C. Therapeutic drug use;
  - D. Signs or symptoms of smoking, chemical dependency, and other addictive habits;
  - E. History of recent or chronic diseases;
  - F. Evidence of psychological/emotional factors;
  - G. History of familial systemic disease.
3. Request laboratory tests as appropriate.
  4. Referral to or consultation with other health care providers should be made and documented when warranted.

### THERAPEUTIC GOALS

The therapeutic goal is to achieve a degree of periodontal health consistent with the patient's overall health status. The treatment outcome of periodontal therapy in the patient with contributing systemic factors may be directly affected by the control of the systemic condition. The systemic and psychological status of the patient should be identified to reduce medical risks that may compromise or alter the periodontal treatment.

### TREATMENT CONSIDERATIONS

Patients with systemic conditions that contribute to progression of periodontal diseases may be successfully treated using established periodontal treatment techniques (see Parameters on Chronic Periodontitis, pages 853-858). However, the systemic/psychological status

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of the periodontal patient may alter the nature of therapy rendered and may adversely affect treatment outcomes.

## **METABOLIC CONDITIONS**

### ***Diabetes Mellitus***

Patients with undiagnosed or poorly-controlled Type 1 (insulin dependent) diabetes mellitus or Type 2 (non-insulin dependent) diabetes mellitus may be particularly susceptible to periodontal diseases. Conversely, most well-controlled diabetic patients can maintain periodontal health and will respond favorably to periodontal therapy. Treatment considerations for patients with periodontitis associated with diabetes should include:

1. Identification of signs and symptoms of undiagnosed or poorly controlled diabetes mellitus.
2. Consultation with the patient's physician as necessary.
3. Consideration of diagnosis and duration of diabetes; level of glycemic control; and medications and treatment history.
4. Recommendation that diabetic patients take medication as prescribed and maintain an appropriate diet on the day of periodontal therapy.
5. Consideration of adjunctive systemic antibiotics for periodontal procedures if the diabetes is poorly controlled.
6. Attempts to reduce stress/anxiety.
7. Preparation to diagnose and manage medical emergencies associated with diabetes.

### ***Pregnancy***

Hormonal fluctuations in the female patient may alter the status of periodontal health. Such changes may occur during puberty, the menstrual cycle, pregnancy, or menopause. Changes may also be associated with the use of oral contraceptives. The most pronounced periodontal changes occur during pregnancy. Treatment considerations for pregnant patients with periodontal disease include:

1. Consultation with the patient's physician as necessary.
2. Consideration of postponement of periodontal treatment during the first trimester.
3. Performance of emergency periodontal treatment at any time during pregnancy.
4. Consideration of deferral of periodontal surgery until after parturition.
5. Performance of periodontal maintenance as needed.
6. Administration of antibiotics and other drugs with caution.

7. Use of local anesthesia in preference to general anesthesia or conscious sedation.

## **DRUG-INDUCED DISORDERS**

Drugs can be a contributing etiologic factor in periodontal diseases. Drugs such as anticonvulsants, calcium channel blocking agents, and cyclosporin may be associated with gingival enlargement. Oral contraceptives may be a contributing factor in alterations of gingival tissues. In addition, drugs can cause xerostomia, osteoporosis, lichenoid reactions, and other hypersensitivity reactions. Treatment considerations for patients affected by drug-induced periodontal disease may include:

1. Consultation with patient's physician as necessary.
2. When possible, baseline periodontal evaluation prior to initiation or modification of drug therapy.
3. Modification of the drug regimen prescribed in consultation with the physician if gingival enlargement or other adverse drug reactions or side effects occur.
4. Surgery as necessary to eliminate gingival enlargement. Patients should be informed that gingival enlargement may recur if drug therapy can not be modified or if adequate plaque control is not achieved and maintained.

## **HEMATOLOGIC DISORDERS/LEUKEMIA**

Hemorrhagic gingival enlargement with or without necrosis is a common early manifestation of acute leukemia. Patients with chronic leukemia may experience similar but less severe periodontal changes. Chemotherapy or therapy associated with bone marrow transplantation may also adversely affect the gingiva. Considerations for patients with hematologic disorders and periodontal disease should include:

1. Coordination of treatment with the patient's physician.
2. Minimization of sites of periodontal infection by means of appropriate periodontal therapy prior to the treatment of leukemia and/or transplantation.
3. Avoidance of elective periodontal therapy during periods of exacerbation of the malignancy or during active phases of chemotherapy.
4. Consideration of antimicrobial therapy for emergency periodontal treatment when granulocyte counts are low.
5. Monitoring for evidence of host-versus-graft disease and of drug-induced gingival overgrowth following bone marrow transplantation.
6. Periodontal therapy, including surgery, for patients with stable, chronic leukemia.

## IMMUNE SYSTEM DISORDERS

Some forms of periodontal disease may be more severe in individuals affected with immune system disorders. Patients infected with human immunodeficiency virus (HIV), may have especially severe forms of periodontal disease. The incidence of necrotizing periodontal diseases may increase in the patient with acquired immunodeficiency syndrome (AIDS). Patients who have received organ transplants, are undergoing cancer treatment, or have certain autoimmune diseases may be taking immunosuppressing medications. Special considerations for immune system disorder patients with periodontal disease include:

1. Consultation and coordination of treatment with patient's physician as necessary.
2. Controlling associated mucosal diseases and acute periodontal infections.
3. Administration of systemic or local medications (for example, antibiotics) only if indicated and administered in a manner that avoids opportunistic infections and adverse drug interactions.

## OUTCOMES ASSESSMENT

The predictability of the outcome may be enhanced through close medical/dental coordination.

A satisfactory outcome of therapy in patients with systemic disorders may include:

1. Significant reduction of clinical signs of gingival inflammation;
2. Reduction of probing depths;
3. Stabilization or gain of clinical attachment;
4. Reduction of clinically detectable plaque to a level compatible with gingival health;
5. Control of acute symptoms.

Due to the complexity of systemic factors, control of periodontal diseases may not be possible. In such instances, a reasonable treatment objective is to slow the progression of the periodontal disease. Progression of the disease may be characterized by the presence of:

1. Persistent inflammation/infection of the gingival tissues;
2. Persistent or increasing probing depths;
3. Lack of stability of clinical attachment;
4. Persistent clinically detectable plaque levels not compatible with gingival health;
5. Radiographic evidence of progressive bone loss.

In patients where the periodontal condition does not resolve, additional therapy may be required as well as further evaluation of the patient's systemic condition.

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## Parameter on Systemic Conditions Affected by Periodontal Diseases\*

The American Academy of Periodontology has developed the following parameter on systemic conditions affected by periodontal diseases. It is well known that systemic conditions may affect the onset, progression, and treatment of such diseases (see Parameter on Periodontitis Associated With Systemic Conditions, pages 876-879). The concept of periodontal diseases as localized entities affecting only the teeth and supporting apparatus is increasingly being questioned. Periodontal diseases may have widespread systemic effects. While these effects may be limited in some individuals, periodontal infections may significantly impact systemic health in others, and may serve as risk indicators for certain systemic diseases or conditions. As part of the approach to establishing and maintaining health, patients should be informed of the possible effects of periodontal infection on their overall well-being. Given this information, patients should then be able to make informed decisions regarding their periodontal therapy. *J Periodontol* 2000;71:880-883.

### KEY WORDS

Infection/complications; periodontal diseases/complications; risk factors; systemic diseases; periodontium/physiopathology.

### CLINICAL DIAGNOSIS

#### Definition

The role of local infections in generalized disease is well established (for example, in oral-derived bacteremia and infective endocarditis). While much information is available concerning the potential effects of systemic conditions and diseases on the periodontium, less is known about the consequences of a diseased periodontium on systemic health. The periodontium may serve as a reservoir of bacteria, bacterial products, and inflammatory and immune mediators which can interact with other organ systems remote from the oral cavity. Periodontal infections may increase the risk for certain conditions by contributing to disease pathogenesis or by serving as a source of infective organisms.

#### Patient Evaluation

1. A comprehensive periodontal evaluation should be performed as described in the Parameter on Comprehensive Periodontal Examination (pages 847-848).
2. The medical history should be evaluated for existing systemic diseases or conditions, medications, and risk factors for systemic diseases.

3. Other health care providers may be consulted as indicated by the patient's systemic health status, periodontal condition, and proposed treatment. Any consultation should be documented.

### THERAPEUTIC GOALS

The therapeutic goals are to diagnose periodontal infections which may impact on the patient's systemic health; to inform the patient of possible interactions between the patient's periodontal disease and systemic condition; and to establish periodontal health which may minimize potential negative influences of periodontal infections.

Research and clinical experience indicate that periodontal infections may have an impact on the following diseases or conditions:

1. Diabetes mellitus;
2. Pregnancy;
3. Cardiovascular diseases.

Preliminary evidence suggests that periodontal infections may also be associated with pulmonary disease and other remote site infections.

### TREATMENT CONSIDERATIONS

#### Diabetes Mellitus

Periodontitis may adversely affect glycemic control in diabetes. It may also be associated with an increased

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risk of cardiovascular complications associated with diabetes. Periodontal treatment, especially in patients with severe periodontitis and poorly controlled diabetes, may result in improvement in glycemic control. Treatment considerations for patients with diabetes mellitus include:

1. Diagnosis of the patient's periodontal condition.
2. Consideration of consultation with the patient's physician to advise of the presence of periodontal infection and proposed treatment.
3. Consideration of diagnosis and duration of diabetes; level of glycemic control; medications and treatment history; and risk factors for periodontitis which may influence diabetic complications.
4. Education of the patient regarding the possible impact of periodontal infection on glycemic control.
5. Periodontal therapy and patient motivation to establish and maintain periodontal health. Consideration may be given to the use of systemic antibiotics in conjunction with mechanical therapy (see Parameter on Periodontitis Associated With Systemic Conditions, pages 876-879).

### **Pregnancy**

Women with periodontitis may have an increased risk for pre-term low birth weight delivery. Treatment considerations for pregnant patients include:

1. Diagnosis of the patient's periodontal condition.
2. Consideration of consultation with the patient's physician to advise of the presence of periodontal infection and proposed treatment.
3. Consideration of gestational period; status of pregnancy; and risk factors for periodontitis which may influence pregnancy outcomes.
4. Education of the patient regarding the possible impact of periodontal infection on pregnancy outcome.
5. Periodontal therapy and patient motivation to establish and maintain periodontal health (see Parameter on Periodontitis Associated With Systemic Conditions, pages 876-879).

### **Cardiovascular Diseases**

**Coronary artery disease.** Individuals with periodontal disease may have significantly increased risk of coronary heart disease and related events such as angina pectoris and myocardial infarction. Periodontal pathogens may contribute to atherogenic changes and thromboembolic events in the coronary arteries. Similar processes may occur in other arteries. For example, periodontal disease may increase the risk of cerebral ischemia and non-hemorrhagic stroke.

**Infective endocarditis.** While bacteremias may occur in individuals with a healthy periodontium, they may be intensified in patients with periodontitis.

Treatment considerations for patients at risk for or with existing cardiovascular diseases include:

1. Diagnosis of the patient's periodontal condition.
2. Consideration of consultation with the patient's physician to advise of the presence of periodontal infection and proposed treatment. The American Heart Association guidelines should be followed for patients at risk for infective endocarditis.
3. Consideration of diagnosis and status of cardiovascular disease; treatment and medications; and risk factors for periodontitis which may influence coronary artery disease.
4. Education of the patient regarding the possible impact of periodontal infection on the cardiovascular system.
5. Periodontal therapy and patient motivation to establish and maintain periodontal health (see Parameter on Periodontitis Associated With Systemic Conditions, pages 876-879).

### **OUTCOMES ASSESSMENT**

The desired outcome of therapy is to prevent adverse systemic consequences of existing periodontal infection via:

1. Knowledge of the patient's medical history and systemic status, the periodontal condition, and the possible interactions between oral and systemic health or disease.
2. Reduction of clinically detectable plaque and periodontal pathogens to a level compatible with periodontal health.
3. Reduction of clinical signs of gingival inflammation.
4. Reduction of probing depths.
5. Stabilization or gain of clinical attachment.
6. Control of acute periodontal infections.
7. Addressing the risk factors for periodontal disease as they affect the systemic condition.

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