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## RESEARCH ARTICLE

### SUPPORTIVE PERIODONTAL TREATMENT – AN OVERVIEW

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#### ABSTRACT

Supportive periodontal therapy is the means by which proper maintenance and care can be given to the patient. Numerous studies have indicated that periodontal therapy in the absence of a carefully designed maintenance program invariably results in the relapse of the disease condition. Accordingly, periodontal care provided without a maintenance program deal with significant patient management and disease management issues. Hence supportive periodontal treatment forms an integral part of periodontal therapy, with all treatment accomplishments channeled into achieving a healthy periodontal status that can be effectively maintained. In this regard, supportive periodontal therapy becomes the most decisive aspect of dental treatment. This article gives an overview of the significance of supportive periodontal therapy in maintaining the integrity of the periodontium.

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## INTRODUCTION

Periodontitis is an inflammatory disease which can be efficiently treated with non surgical and surgical techniques, however periodic maintenance is major important factor in maintaining the periodontal health after the therapy. From the periodontal perspective "SUCCESS" would mean long term preservation of teeth following periodontal therapy as against short lived goal of elimination of disease. H. Loe *et al.*, explained the biofilm accumulation leading to inflammation of gingiva and after plaque removal there was restoration of gingival health (Loe, 1965). Similarly Lindhe *et al.*, in 1975 explained the concept of periodontitis characterised by loss of connective tissue attachment, resorption of alveolar bone, and periodontitis is always preceded by gingivitis but all gingivitis cases do not develop periodontitis. Host defence mechanism or susceptibility for diseases vary from individual to individual. Hence, Prevention of initiation and recurrence of periodontal disease requires removal of cause of gingival inflammation and maintenance of healthy gingival tissue (Lindhe, 1975).

Periodontal treatment includes (Lindhe, 2008):

- Systemic evaluation of the patient's health.
- A cause related therapeutic phase with, in some cases
- A corrective phase involving periodontal surgical procedures.
- Maintenance phase.

### Phases of periodontal treatment (Newman, 2012)

#### Preliminary phase

Treatment of emergencies such as dental or periapical or periodontal abscesses. Extraction of hopeless teeth and provisional replacement if needed.

#### Non surgical phase (phase 1 therapy)

##### Plaque control and patient education

- Diet control.
- Removal of calculus and root planning.
- Correction of restorative and prosthetic irritational factors.
- Excavation of caries and restoration.
- Antimicrobial therapy.
- Occlusal therapy.
- Minor orthodontic therapy.
- Provisional splinting and prosthesis.

#### Evaluation of response to non surgical phase Surgical phase(phase 2 therapy)

- Periodontal therapy, including placement of implants
- Endodontic therapy

### Restorative phase (phase 3 therapy)

- Final restorations
- Fixed and removable prosthodontics appliances
- Evaluation of response to restorative procedures
- Periodontal examination

Although, the phases of treatment in this model have been numbered, the recommended sequence does not follow the numbers. Phase I, or the nonsurgical phase, is directed to the elimination of the aetiologic factors of gingival and periodontal diseases. When successfully performed, this phase stops the progression of dental and periodontal disease. Immediately after completion of phase I therapy, the patient should be placed on the maintenance phase (phase IV) to preserve the results obtained and prevent any further deterioration and recurrence of disease. While on the maintenance phase, with its periodic evaluation, the patient enters into the surgical phase (phase II) and the restorative phase (phase III) of treatment. These phases include periodontal surgery to treat and improve the condition of the periodontal and surrounding tissues. This may include regeneration of the gingiva and bone for function and aesthetics, placement of implants, and restorative therapy (Fig. 1).

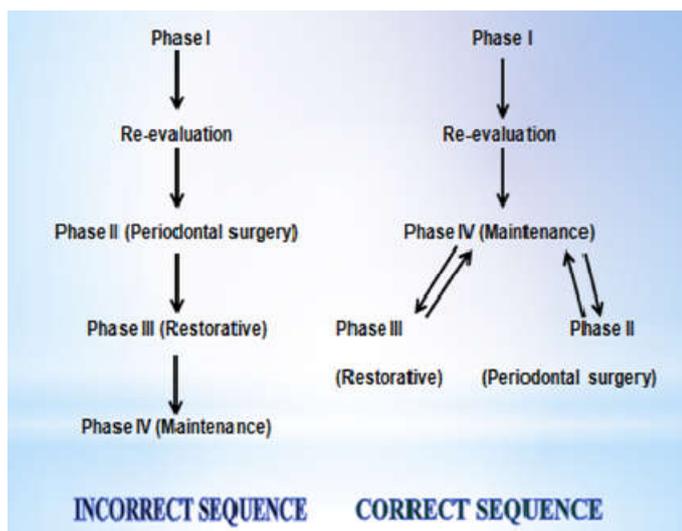


Figure 1.

Thus in 1989 the 3<sup>rd</sup> world workshop of American Academy of Periodontology renamed the last phase as “Supportive Periodontal Therapy”. As the term expresses the essential need for therapeutic measures to support the patient’s own efforts to control periodontal infections and to avoid reinfection. In 2003 the AAP position paper termed it as “Periodontal Maintenance”. According to glossary of periodontal terms it is defined as an extension of periodontal therapy and is performed at selected intervals to assist the periodontal patient in maintaining oral health. Clinical trials on the long-term effects of treatment of periodontitis have clearly demonstrated that post therapeutic professional maintenance care is an integral part of the treatment. A longitudinal Study conducted by Axelsson and Lindhe 1980<sup>5</sup> in patients with periodontitis following SPT resulted in the establishment of clinically healthy gingiva and shallow pockets and also results in re-growth of alveolar bone (Ramfjord et al<sup>5</sup>) and other study conducted by William Becker, Burton E Becker and Lawrence E. Berg 1984<sup>7</sup> on patients with periodontitis were treated and

for various reasons not participated in the SPT and found that there was high incidence of tooth loss, worsening of the health status of furcations, no reduction of probing depth and also a significant loss of alveolar bone was observed. A retrospective study conducted by L. Checchi in 2002 on 92 patients who diagnosed with chronic adult periodontitis and observed over a mean period of 6.7 years, the risk for tooth loss was calculated for patient who do not return for regular maintenance and stated that 5.6 times greater risk for tooth loss than compliant patients (Checchi *et al.*, 2002). This project the importance of SPT in patients after periodontal therapy.

### The aims of Supportive Periodontology Therapy (AAP 1998) (American Academy of Periodontology, 1998).

- preventing or minimising recurrence and progression of
- periodontal disease in people who have been previously treated
- for gingivitis, periodontitis, or peri-implantitis
- reducing the incidence of tooth loss by monitoring the
- dentition, including any prostheses used to replace natural teeth
- increasing the probability of identifying and treating, in a
- timely manner, other diseases or conditions found within the
- oral cavity.

According to the American Academy of Periodontology (AAP) in order to fulfil these objectives, SPT should include: (American Academy of Periodontology, 2000; American Academy of Periodontology, 2003).

- An update of the medical and dental history;
- Examination of extraoral and intraoral soft tissues;
- Dental examination and radiographic review;
- Evaluation of the patient’s oral hygiene performance;
- Periodontal evaluation and risk assessment;
- Supragingival and subgingival removal of bacterial plaque and calculus;
- Re-treatment of disease when indicated (AAP 2000; AAP 2003)

**Biologic basis for periodontal maintenance:** Tooth loss in some periodontal patients has been shown to be inversely proportional to the frequency of periodontal maintenance.<sup>12</sup> Since patients rarely are completely effective in removing plaque, adherence to a periodontal maintenance program reduces the risk of future attachment loss.

**Periodontal treatment without maintenance:** An inadequate control of bacterial plaque by the part of the patient and / or the professional predispose to the recurrence of the disease. A few studies have shown that bone loss continues if the periodontal patient is treated but not maintained or receiving “Traditional Dental care” Nyman et al (1977) reported that lack of maintenance call results in disease recurrence showing that surgical periodontal treatment “per se” cannot guarantee the maintenance of periodontal support (Nyman, 1977).

**Maintenance after periodontal treatment:** In a Pioneer study on this subject, Suomi et al (1971) found a mean annual loss of 0.03 mm of periodontal support is well maintained patients,

whereas those receiving only one oral examinations and no further reinforcement in oral hygiene, showed on annual mean loss of 0.1 mm of periodontal support.

**Treatment Considerations (American Academy of Periodontology):** The following items may be included in a 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. Intraoral examination and recording of results:

- Oral soft tissue evaluation
- Oral cancer evaluation

3. Dental examination and recording of results:

- Tooth mobility, fremitus, and occlusal factors
- Coronal and root caries assessment
- Restorative and prosthetic factors, such as defective restorations
- Other tooth-related problems, such as open contacts or malpositioned teeth

4. Periodontal examination and recording of results:

- Probing depths
- Bleeding on probing
- General levels of plaque and calculus
- Evaluation of furcations
- Exudate
- Other signs of disease progression
- Microbial testing if indicated
- Gingival recession
- Attachment levels if indicated

5. Examination of dental implants and peri-implant tissues and recording of results:

- Probing depths
  - Bleeding on probing
  - Examination of prosthesis/abutment components
  - Evaluation of implant stability
  - Occlusal examination
  - Other signs and symptoms of disease activity (e.g., pain, suppuration)
  - Radiographic examination
- Radiographs should be current, based on the diagnostic needs of the patient, and should permit appropriate evaluation and interpretation of the status of the oral structures, including teeth, periodontium, and dental implants. Radiographs of diagnostic quality are necessary for these purposes.
  - The judgment of the clinician, as well as the prevalence or degree of disease progression, may help determine the need, frequency, and number of radiographs.
  - Radiographic abnormalities should be noted.

- D. Assessment of disease status or changes by reviewing the clinical and radiographic examination findings, compared to baseline

### Assessment of personal oral hygiene

#### Treatment

- Removal of subgingival and supragingival plaque and calculus
- Behavioral modification:
  - Oral hygiene reinstruction
  - Adherence to suggested PM intervals
  - Counseling on control of risk factors (e.g., smoking, nutrition, stress)
- Selective scaling or root planing, if indicated
- Occlusal adjustment, if indicated
- Use of systemic antibiotics, local antimicrobial agents, or irrigation procedures, as necessary
- Root desensitization, if indicated
- Surgical therapy (or discontinuation of periodontal maintenance and treatment of recurrent disease), if indicated
- Communication
  - Informing the patient of current status and need for additional treatment if indicated
  - Consultation with other health care practitioners who may be providing additional therapy or participating in the PM program, or whose services may be indicated

#### Planning

- For most patients with a history of periodontitis, visits at 3-month intervals may be required initially.
- Based on evaluation of clinical findings and assessment of disease status, PM frequency may remain the same, be modified, or the patient may return to mechanical, chemical, surgical, and/or non-surgical treatment.

### Factors affecting frequency (Newman, 2006)

For most patients with gingivitis but no previous attachment loss, supportive periodontal treatment twice a year will suffice. For patients with a previous history of periodontitis studies suggest the frequency of STP should be less than 6 months. Patients with previous history of chronic periodontitis should be at least 4 times a year, because that interval will result in a decreased likelihood of progressive disease. Microorganisms level after scaling and root placing return to baseline between 9 and 11 weeks. If the clinician wishes to prevent re-establishment of suspected pathogens, SPT intervals of 3 months or less appear to be required. Compliance with suggested SPT intervals can affect the success of treatment. All this data goes to suggest that it is advantages if SPT visits are performed every 3 months. However, this interval should be individualized.

### Parts of Supportive Periodontal Therapy (Schallhorn, 1981)

### There are 4 parts of SPT namely:

- Preventive SPT
- Trial SPT
- Compromise SPT
- Post treatment SPT

**Preventive SPT:** Intended to prevent inception of disease in those who currently do not have periodontal pathology (eg patients at high risk for development of periodontal or peri-implant problems because of systemic disease or dexterity problems that prevent practicing hygiene).

**Trial SPT:** designed to maintain border line periodontal conditions over a period to further assess the need for corrective therapy for problems such as –

- inadequate attached gingiva,
- gingival architectural defects, or
- furcation defects, while maintaining period throughout the balance of the mouth.

**Compromise SPT:** designed to slow the progression of disease in patients for whom periodontal corrective therapy is indicated, but cannot be implemented for reasons of health, economics, inadequate oral hygiene, or other considerations, or when recalcitrant defects persist after corrective treatment. This type also includes situations in which periodontal or peri-implant defects persist after corrective therapy attempts (eg: patients with moderate chronic periodontitis or periimplantitis who cannot undergo treatment because of current gastric cancer treatment).

**Post treatment SPT:** designated to prevent the recurrence of disease and maintain the periodontal health achieved during therapy. Transfer of the patient from active treatment status to a maintenance program is a definitive step in total patient care that requires time and effort on the part of the dentist and staff.

### Maintenance Recall Program (Newman, 2012)

#### Part I: Examination (Approximate time: 14 minutes)

- Patient greeting
- Medical history changes
- Oral pathologic examination
- Oral hygiene status
- Gingival changes
- Pocket depth changes
- Mobility changes
- Occlusal changes
- Dental caries
- Restorative, prosthetic, and implant status

#### Part II: Treatment (Approximate time: 36 minutes)

- Oral hygiene reinforcement
- Scaling
- Polishing
- Chemical irrigation or siteplacement

#### Part III: Report, Cleanup, and Scheduling (Approximate time: 10 minutes)

- Write report in chart.
- Discuss report with patient.
- Clean and disinfect operatory.
- Schedule next recall visit.
- Schedule further periodontal treatment.
- Schedule or refer for restorative or prosthetic treatment.

**Compliance and its role in periodontal therapy:** Compliance (also called adherence and therapeutic alliance) has been defined as “the extent to which a person’s behavior coincides with medical or health advice”.<sup>16</sup> Compliance with appointments can be measured directly – the patients either come in, or they do not. In addition, the patients who clean their teeth will lose less periodontal support than those who do not. It is also possible to measure home care efficiency (by examining for bacterial plaque) and efficacy (by detecting bleeding upon probing, increased probing depth or attachment loss).

**Compliance with suggested supportive periodontal treatment schedules:** The study to evaluate the patient compliance was done by Wilson 1984, 961 patients were followed up for eight years, the results showed that only 16% of patients complied for maintenance therapy, 34% never returned and around 49% were erratic (Wilson, 1984). (Fig.2)

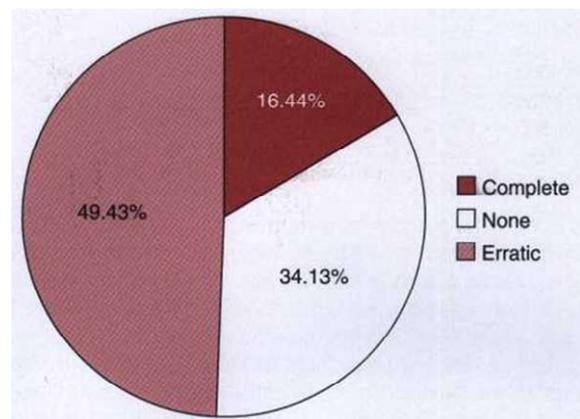


Figure 2.

### Why do patients fail to comply? (Bakdash, 1994)

- It has been suggested that non-compliance with health care recommendations is an indirect self destructive behavior (Farberow N; 1986). The behavior of these non-compliance patients is characterized by denial and negligent attitudes towards their illness.
- Lack of pertinent information
- Fear of dental treatment is a major reason for non-compliance several approaches have been suggested to diminish this concern—

Use of relaxation and symbolic modeling. Group education or videotapes. Changing the behavior of dentists toward patients.

Economic problems: In groups with lower socioeconomic status, monetary rewards have been shown to improve compliance (Iwata B et al 1981).

### Possible methods of improving compliance (Bakdash, 1994)

- **Simplify:** the simpler the required behavior, the more likely it is to be carried out.

- Accommodate more the suggestions fit the patients' needs, the more likely they are to comply.
- Remind patient of appointments

### Communication is a key factor. Factors that influence breakage of appointments

- Absence of perceived need for visit.
- Absence of designated dental therapist who will treat the patient
- Age
- Race
- Psychosocial problems
- Percentage of previous non-cancelled appointments.

Keep records of compliance : Communication with the patient should be initiated as quickly as possible when non-compliant behavior is noted. The sooner the patient is contacted after missing the appointment, the more likely they are to keep their new appointments.

**Inform:** Put what is to be said in writing and give a copy to the patient. Telling the patient the causes of the diseases process and their role in its treatment improves compliance.

**Provide positive reinforcement:** No one enjoys criticism, but the reinforcement and constructive guidance can be helpful.

7. Identify potential non-compliers; discuss the problems that this may create for the patient before therapy begins. Then track these patients closely.

**Ensure the dentists involvement:** In some cases, dentists are more likely to encourage compliance than the dental hygienists.

### Spt In Daily Practice

The recall hour should be planned to meet the patients' individual needs. It consists of 4 different sections. (Fig.3)

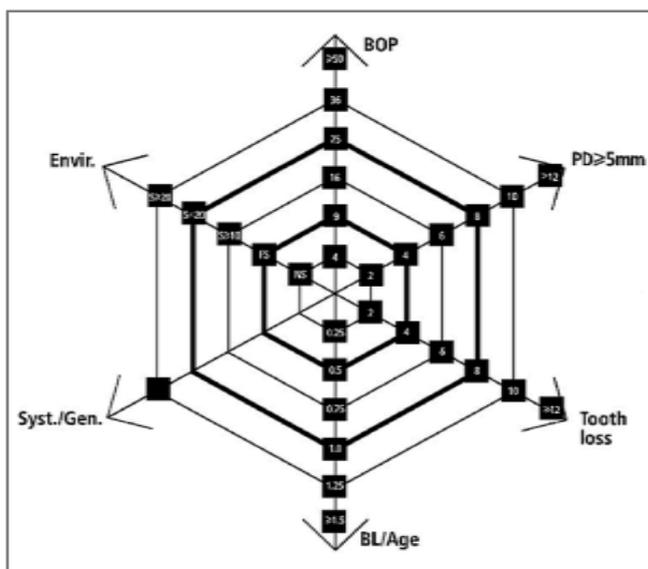


Figure 3.

- Examinations, re-evaluation and diagnosis (ERD).
- Motivation, reinstruction and instrumentation (MRI)
- Treatment of reinfected sites (TRS).
- Polishing of the entire dentition, application of fluorides and determination of future SPT (PFD).

**Examination, re-evaluation and diagnosis (ERD):** Since patients on SPT may experience significant changes in their health status and the use of medications, an update of the information on general health is appropriate. Changes in the health status and medications must be noted. After assessment of the subjects' risk factors, the tooth site – related risk factors are evaluated. The diagnostic procedure usually includes the following.

- Oral hygiene and plaque situations.
- The determination of sites with bleeding on probing, indicating persistent inflammation. (Flow chart no.1 )
- Scoring pocket probing depth and clinical attachment level. (Flow chart no.2)
- Inspection of reinfected sites with pus formation., microbiological evaluation (Flow chart no.3)
- Evaluation of existing reconstructions, including vitality checks for abutment teeth.
- Exploration for carious lesions. Occasionally, conventional dental radiographs are obtained. (Table no. 1)

**Motivation, reconstructions and instrumentation (MRI):** When informed about the results of the diagnostic procedures, the patient maybe motivated either in a confirmatory way in case of low scores (bleeding and plaque) or in a challenging fashion in case of high scores, since encouragement usually has a greater impact on future positive developments than negative criticism, every effort should be made to acknowledge the patients performance. Patients who have experienced a relapse in their adequate oral hygiene practices need to be further motivated; “standard lecturing” should be replaced by an individual approach. Only those sites will be instrumented during SPT visits which exhibit signs of inflammation and / or active disease progression.

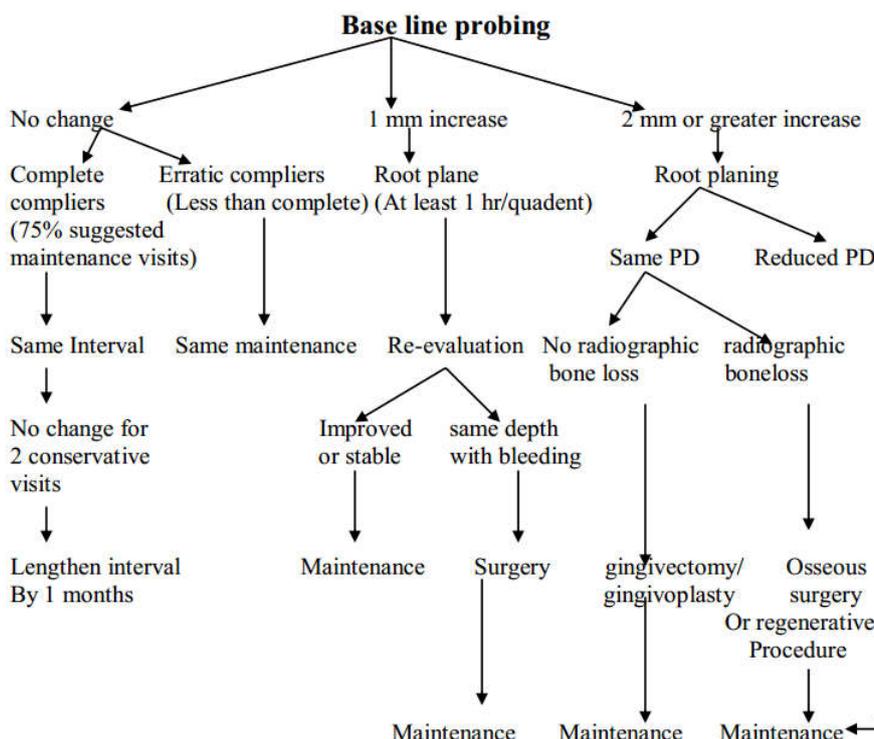
**Treatment of Reinfected sites (TRS):**Single sites, especially furcation sites or sites with difficult access, may occasionally be reinfected and demonstrate suppuration. Such sites require a through instrumentation under anesthesia, the local application of antibiotics with control release devices or even open debridement with surgical access. It is evident that such therapeutic measures may be too time consuming to be performed during the routine recall hour, and hence, it may be necessary to reschedule the patient for on other appointment. Omission of thoroughly retreating such sites or only performing incomplete root planning during SPT may result in continued loss of probing attachment. Generalized re-infections are usually the result of inadequate SPT. High bleeding on probing percentages call for more intensive care and frequent SPT visits. Polishing fluorides, determination of recall interval (PFD). The recall hour is concluded with polishing the entire dentition to remove all remaining soft deposits and stains. Following which fluorides should be applied in high concentration in order to replace the fluorides, which have been removed by instrumentation from superficial layer of the teeth. The determination of future SPT visits must be based on the patients risk assessment.

**Periodontal Risk Assessment for Patients with Spt:** The patient's risk assessment for recurrence of periodontitis may be evaluated on the basis of a number of clinical conditions whereby no single parameter displays a more paramount role. The entire spectrum of risk factors and risk indicators ought to be evaluated simultaneously.

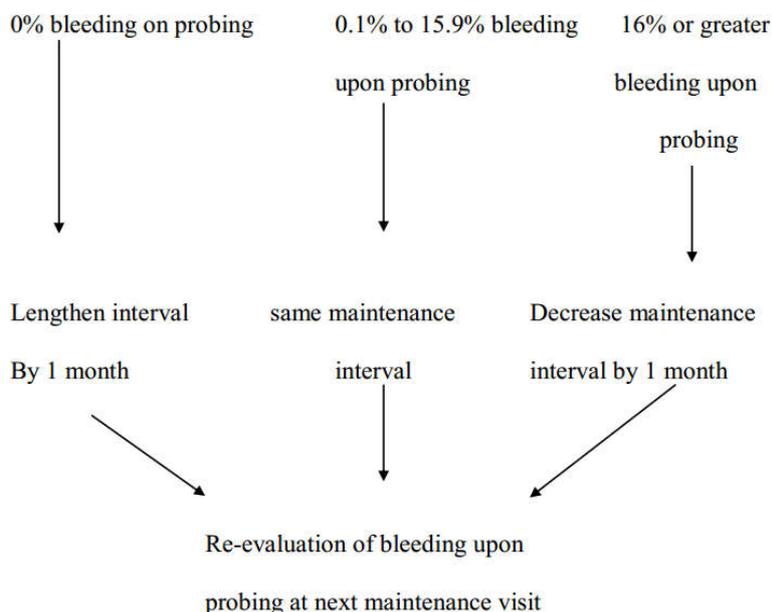
**Table 1. Radiographic examination of SPT recall patients**

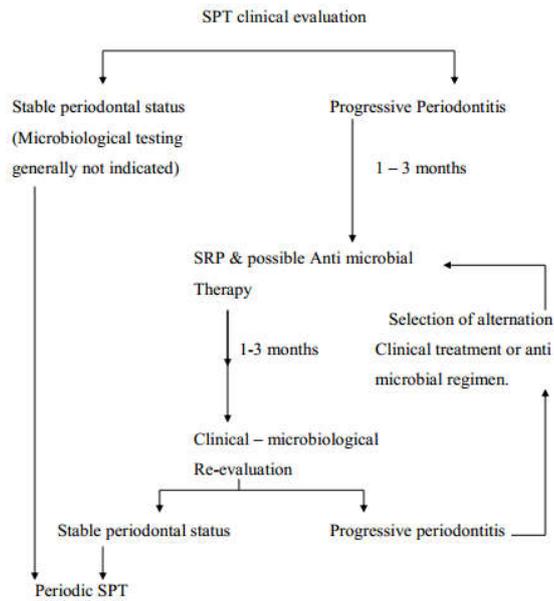
Patient condition	Type of examination
* Patient with clinical caries or high risk factors for caries	Posterior bitewing examination at 12 to 18 month intervals.
* Patient with no clinical caries as high risk factors for caries.	Posterior bite wing examination at 24 to 36 month intervals.
* Patients with periodontal disease not under good control	Periapical and / or vertical bitewings of problem areas every 12 to 24 months full mouth series every 3 to 5 years.
	Bitewing examination every 24 to 36 months; full mouth series every 5 years.
* Patients will history of periodontal treatment with disease under good control.	Periapical or vertical bitewing at 6, 12 and 36 months after prosthetic placements, then every 36 months unless clinical problems arise
* Patients with root form dental implants	Full mouth series if a current set is not available. If a full mouth series has been taken within 24 months, then radiographs of implants and periodontal problems areas should be taken
*Transfer periodontal or important maintenance patients.	

**Therapy decisions based on probing depth**

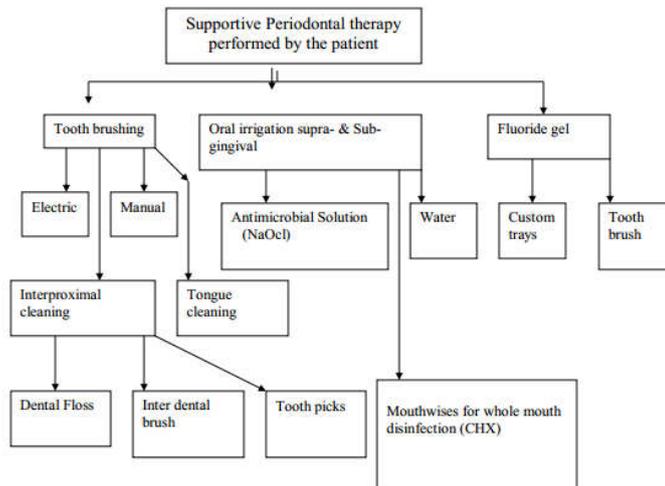


**Maintenance bleeding chart**

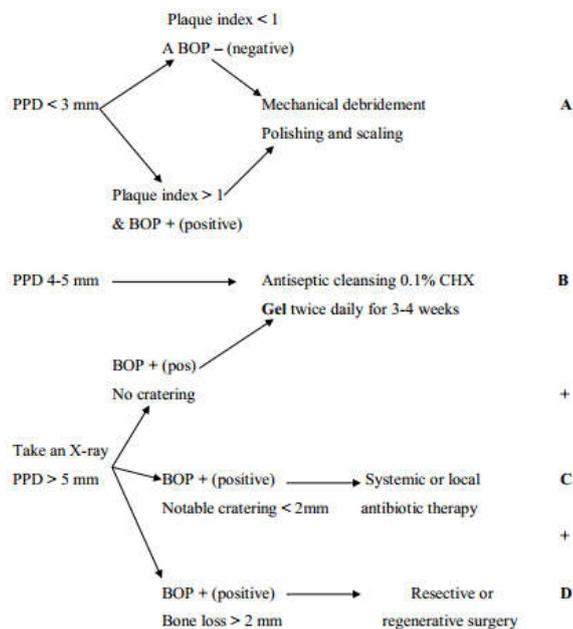




Flow chart no. 3 of microbiological testing in SPT patients



Flow chart no.4 supportive therapy by patient



Flow chart no. 5. SPT in implants patients

For this purpose, a functional diagram has been constructed including the following aspects:

- Percentage of bleeding on probing.
- Prevalence of residual pockets greater than 4 mm (3mm).
- Loss of teeth from a total of 28 teeth.
- Loss of periodontal support in relation to the patient's age.
- Systemic and genetic conditions.
- Environmental factors, such as cigarette smoking.

Each parameter has its own scale for minor, moderate and high risk profiles. A comprehensive evaluation of the functional diagram will provide an individualized total risk profile and determine the frequency and complexity of SPT visits.

**Low periodontal risk (PR) patient:** all the parameters within the low risk categories or at the most one parameter in the moderate risk category.

**Moderate PR risk patient:** at least two parameters in moderate category, but at the most one parameter in high risk category.

**High PR risk patient:** at least two parameters in the high risk category (Lang, 2003).

**SPT for patients with implants:** Known as the *cumulative interceptive supportive therapy (CIST)* (Wingrove, 2011; Adell, 1990). Depending on the clinical and eventually the radiographic diagnosis, protocols for preventive and therapeutic measures designed to intercept the development of peri-implant lesions. This system of supportive therapy is cumulative in nature and includes four steps, which should not be used as single procedures, but rather as a sequence of therapeutic procedures with increasing anti-infective potential depending on the severity and extent of the lesion.

**The 4 steps are**

#### **Mechanical debridement, CIST protocol A**

- Antiseptic therapy, CIST protocol A & B
- Antibiotic therapy, CIST protocol A + B
- Antibiotic therapy, CIST protocol A + B + C
- Regenerative or resective therapy, CIST protocol A+B+C+D.

**Patients Role in Supportive Periodontal Therapy:** The least expensive way to manage periodontal disease is through self-care; however, the effectiveness of patients' preventive efforts is questionable. To improve self-care measures, dental professionals must communicate effectively with patients and reinforce the need for preventive periodontal therapy. (Flow chart no.4)

**Future directions (American Academy of Periodontology, 2000):** As the results of further research become available for predicting disease activity, PM schedules may be better adapted to the needs of each patient. Specific areas of advancement may include more accurate and less expensive methods for disease diagnosis, including documentation of clinical attachment levels, improved imaging technology and microbiological assessment, and evaluation of host factors including gingival crevicular fluid components.

## **Conclusion**

Periodontal treatment success, including both nonsurgical and surgical therapy, is dependent on appropriate maintenance. Periodontal maintenance therapy also applies to dental implants, as they have been shown to be susceptible to peri-implant disease. In addition, long-term control of periodontal inflammation may reduce the risk of several systemic diseases and conditions. It is the general practitioner's responsibility to evaluate each patient's dental history and prescribe appropriate periodontal and peri-implant maintenance care, as well as to identify when conventional treatment is failing and to execute a prompt and appropriate solution, which includes use of adjunctive agents, surgery, or referral to a periodontist. The keys to success include consistent reminders sent to the patients on the importance of longterm maintenance in preventing periodontal or peri-implant disease progression, as well as early identification and treatment of inflammatory and biomechanical problems to minimize their impact. This will maximize the likelihood of maintenance of natural teeth and dental implants in health, comfort, function, and esthetics for the duration of the patient's life (Armitage, 1996; Kaufman, 2000).

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