



PERIODONTAL AND PERI-IMPLANT MAINTENANCE - A REVIEW

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ARTICLE INFO

Article History:

Received 8th June, 2016

Received in revised form 11th

July, 2016 Accepted 6th

August, 2016 Published online 28th

September, 2016

Key words:

Periodontal Disease, Maintenance
Therapy, Plaque Control

ABSTRACT

Research has provided evidence that chronic inflammatory periodontal diseases are treatable. As a result of advances in knowledge and therapy, the great majority of patients retains their dentition over their lifetime with proper treatment, reasonable plaque control, and continuing maintenance care. However, there are some situations when traditional therapy is not effective in arresting the disease. In these instances the progression of the disease may be slowed, but eventually the teeth may be lost. 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 maintenance therapy 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, periodontal maintenance therapy becomes the most decisive aspect of dental treatment.

This article gives an overview of the significance of periodontal maintenance therapy in maintaining the integrity of the periodontium.

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INTRODUCTION

The goal of periodontal treatment is to maintain the natural dentition in functional health and comfort throughout the life time. This goal is not completely met in clinical practice, because it requires perfect plaque control.¹ An important area of periodontal therapy that is often overlooked and frequently not appreciated is supportive periodontal treatment. Supportive periodontal treatment is the phase of periodontal treatment during which periodontal diseases and conditions are monitored and etiologic factors reduced or eliminated.² The maintenance and recall phase of periodontal therapy was named "supportive periodontal therapy"³ at the 3rd world workshop in clinical periodontics in 1989. This term expresses the essential need for the therapeutic measures to facilitate the patient's own efforts to control periodontal infection.⁴ However periodontal maintenance is the preferred term for those procedures formerly referred to as supportive periodontal therapy or periodontal recall, and includes maintenance of dental implants.⁵ Supportive periodontal treatment in most cases is initiated after completion of active periodontal treatment and continued at regular intervals for the life of the dentition.

It can also be used in other phases of treatment. This program of SPT is tailored specific to individual patient's needs.⁶ Supportive periodontal treatment is an integral part of

periodontal care. Regular supportive periodontal treatment visits serve as a positive feedback mechanism between the patient and the therapist, with the purpose of ensuring that the patients have the opportunity to maintain their dentitions in a healthy status for the longest possible time. The monitoring done during this stage is essential, since it indicates when additional active care is needed. The emphasis should be to modify and monitor a behavioural pattern consistent and congruent with better plaque control to foretell recurrence. This stage of therapy is also important because the average patient over time will alternate between active therapy and supportive periodontal therapy. This is a result of the constant examination and reappraisal performed at supportive periodontal treatment visits and is needed to control the chronic natures of periodontal diseases.⁶ A stable periodontium is more a rule than exception after treatment when proper supportive periodontal treatment is provided.⁷

The Need For Supportive Periodontal Treatment

The overall goal of dentistry is the maintenance of dentition in health and function for a life time. Periodontal therapy, including maintenance, is often required to achieve that goal. Gingivitis left untreated may lead to periodontitis.⁸ This progression can be prevented or limited by either optimal personal oral hygiene (Loe et al., 1965; Suomi et al., 1971)

and/or periodic maintenance care under the supervision of a dentist (Ramfjord *et al.*, 1982).

Possibility of future attachment loss. The fact gingivitis may progress to periodontitis and it cannot be accurately predicted when or even whether, gingivitis may lead to periodontitis, dictates the need for monitoring and professional removal of plaque and its related products in patients treated for this periodontal disease⁹.

This monitoring and therapy are provided during supportive periodontal therapy. Patients with a history of periodontitis usually require periodic supportive periodontal therapy since personal supragingival plaque control alone has not been shown to control attachment loss in them.

Over the years, many clinical studies have shown that to maintain the results achieved with the active phase of periodontal therapy, patients need to be followed with frequent recalls. Retrospective studies¹⁰ have stressed that with good maintenance, periodontal patients can retain their dentitions for a long period of time. Furthermore, prospective longitudinal studies have shown that stability of results obtained with surgical and non-surgical therapy was achieved on the basis of regular recall program. As with many chronic infections, there is a need to control the levels of infection and of recurrent infections after a course of successful active therapy which may require regular professional as well as personal oral hygiene for a lifetime for most patients

Patients At Risk For Periodontitis Without Supportive Periodontal Treatment

Patients who are not maintained in a supervised recall program subsequent to active treatment show obvious signs of periodontal disease with increased probing depth, bone loss and tooth loss⁹. Tooth loss is three times as common in patients who do not report for recall than in patients who do. The more often patients present for recommended supportive periodontal treatment visits the less likely they are to lose teeth¹¹. Patients with inadequate supportive periodontal treatment after successful regenerative therapy have a 50% increase in probing attachment loss as compared to those with regular recalls (Cortellini, 1994).

Untreated periodontitis susceptible patients showed continuous loss of periodontal attachment and teeth (Loe *et al.*, 1986; Becker *et al.*, 1979). Periodontitis susceptible patients not receiving supportive periodontal therapy after periodontal surgical intervention continued to have loss of attachment at a rate of 1mm per year (Nyman *et al.*, 1977). This was 3 to 5 times higher than that which would occur for untreated but periodontitis susceptible patients (Loe *et al.*, 1978,1986). Further evidence for the likely recurrence of periodontal disease when patients are not subjected to proper maintenance care has been provided by the study of Kerr *et al* (1981)¹²

where 45% of the patients had complete reinfection five years after successful treatment.

These studies provide evidence to the fact that periodontal treatment is ineffective in maintaining periodontal health if supportive maintenance care is denied or omitted.⁴

Compliance in Periodontitis

In periodontitis, there is always a hindrance because most of the disease are chronic and most patients do not find them

particularly threatening, but the fact that compliance and its effect can be measured in many situations is very helpful. When patients comply with suggested periodontal treatment schedules, the vast majority keep their teeth over long periods of time¹³. Compliance with these appointments can be measured directly; the patients either come in, or they do not. In addition, patients who clean their teeth will lose less periodontal support than those who do not¹⁴. It is also possible to measure home care efficiency, by examining for bacterial plaque and efficacy, by detecting bleeding on probing, increased probing depth or attachment loss. Various studies¹⁵ done in compliance with suggested oral hygiene regime have shown that the average patient does not brush as instructed or as frequently. Only a very small minority of patients uses dental floss regularly and systematically. Part of the answer to the problem would be careful, detailed and continuing instruction in oral hygiene, followed by positive feedback and reinforcement. But patients must come in so that instructions can be reinforced, and there is some evidence that if they are present for supportive periodontal treatment, they may not need to be perfect cleaners anyway.

Several studies¹⁶ done in compliance with supportive periodontal treatment schedules have shown that the high dropout rate occurred in the first year, suggesting that a patient is more likely to remain compliant for the first year of a recommended supportive periodontal treatment program. It has been concluded that compliance with supportive periodontal treatment is generally poor and many patients stop treatment during the first year of therapy. It has also been concluded that well maintained patients complying with supportive periodontal treatment schedules lose significantly less teeth than non-compliers. Patient compliance seems to be more dependent upon patient attitudes and personality¹⁷

Failure To Comply – Why? ¹⁸

1. The behavior of these non-compliant patients is characterized by denial and negligent attitude towards their illness.
2. Fear of dental treatment is a major reason for non-compliance.
3. Perceived indifference or indifferent behavior on the dentist's part has also been cited as the reason for non-compliance.
4. Economic problems are another factor that keeps patients from complying
5. Lack of satisfaction on the patient's part also contributes to non-compliance.

Frequency and Efficacy of Supportive Periodontal Treatment

Numerous studies have shown that less attachment loss occurs and fewer teeth are lost when patients maintain regular supportive periodontal treatment intervals¹⁴, compared with patients seen less often are not at all. Some individuals may lose teeth despite maintaining a regular supportive periodontal treatment schedule¹⁰. This group of individuals often benefits from additional diagnostic procedures such as microbial analysis and antibiotic regimens. Some studies¹⁹ say that despite irregular supportive periodontal treatment visits there was no increase in the progression of disease. However most of these patients maintained good oral hygiene. For patients who do not have attachment loss but only gingivitis, supportive periodontal treatment twice years will suffice¹.

Numerous clinical studies suggest that for patients with a history of periodontitis the frequency of supportive periodontal treatment visits should be less than six months. Intervals of 2 weeks, 2-3 months, 3-4 months, and 4-6 months have been studied. These studies indicate that most patients with a history of chronic periodontitis should be seen at least four times a year, since that interval will result in a decreased likelihood of progressive disease as compared with patients seen less frequently²⁰. Specific microorganism is associated with periodontitis²¹. The subgingival population of these bacteria is suppressed following root planing used during supportive periodontal treatment but may return to pretreatment levels days to months later. The average time to return to baseline levels is between 9 and 11 weeks, but it may vary dramatically in different patients²². To prevent reestablishment of suspected pathogens, supportive periodontal treatment intervals of 3 months or less appear to be required.

The body of evidence, which is now available, indicates that it is advantageous if supportive periodontal treatment visits are performed every 3 months. This interval should however be individualized for each patient and should be modified based on ongoing clinical studies. Sites that have experienced a previous attachment loss are most likely to need active therapy in the future and may involve surgical or non-surgical treatment.

Factors to Be Considered In Determining The Recall Interval Include The Following⁷

Severity of the Disease

The more severe the disease, the more frequently the patient may need to be seen.

Effectiveness of Home Care

The better the home care, the less frequently the patient needs to be recalled.

Age of the Patient

When there is an equal degree of destruction, a younger patient needs to be seen more frequently to achieve a stable result over a long period of the life span than an older patient.

Degree of Control of Inflammation Achieved

When the results approach closer to total health the less frequently the patient has to be recalled. But in many cases, where there is severe destruction, the results may not near total health. In these cases the goal of treatment to achieve health should be as ideal as possible and the recall should be more frequent.

Host Response

Host-bacterial interaction plays a significant role in maintenance. In patients where systemic factors may be negatively affecting the host response, the recall interval should be reduced, to try to restore the host-bacterial balance by better controlling plaque accumulation.

Since the core of maintenance visit is re-evaluation, every time the professional assesses the condition and establishes the further course of action, he may very well reduce or increase the recall interval, according to the evaluation. Although guidelines can be given, the recall maintenance regimen must be customized for each patient after thorough evaluation of the results of therapy.

Classification of Post-Treatment Patients.

The first year following periodontal therapy is important for the following reasons.

- To indoctrinate in the patient a pattern of recall visits to reinforce oral hygiene technique.
- It may take several months to accurately evaluate the result of some periodontal surgical procedures; consequently some areas may have to be retreated because the results may not be optimal.
- The first year patient often has etiologic factors that may have been overlooked and that may be more amenable to treatment at this early stage.

For these reasons, the recall interval for first year patients should not be longer than 3 months. Maintenance patients are categorized into several classes depending on several characteristics for their periodontal recall schedule based on Merin's classification²³ into class A, B and C.

Class A patients who show well maintained results for 1 year or more should be recalled once in 3-4 months. Class C patients who generally show poor results for 1 year or more should be recalled once in 3-4 months. Class C patients who generally show poor results following periodontal therapy should be recalled once in 1-3 months.

Class A recall patients should be maintained by the general dentist, whereas class C patients should be maintained by the specialist. Class B patients can alternate recall visits between the general dentist and the specialist.

Sequence of Supportive Periodontal Treatment Visits

Periodic recall visits form the foundation of a meaningful long-term prevention program.

Periodontal care at each recall visit comprises of three parts as follows²⁴ The time required for a recall visit for patients with multiple teeth in both arches is approximately one hour (Schallhorn and snider, 1981).

Part I Examination (approximately 17 minutes)

- Medical
- Oral pathologic examination
- Oral hygiene status
- Gingival changes
- Mobility changes
- Occlusal changes
- Dental caries
- Restorative prosthetic status.

Part II Treatment (approximately 35 minutes)

- Oral hygiene reinforcement
- Scaling and polishing
- Chemical irritation

Part III Schedule for next appointment (approximately 1 minute)

- Schedule for next recall visit
- Schedule for further periodontal treatment
- Schedule/refer for restorative or prosthetic treatment.

Peri Implant Maintenance

The long-term success of implants depends on adequate supportive periodontal treatment visits. A small percentage of

the implants ultimately fail²⁵ and the majority that fail, do so soon after placement²⁶. Excessive plaque accumulation, bleeding on probing, increased pocket depth, suppuration, radiographic bone loss, retrograde wear and broken restoration may be early indicators of future implant failure and hence periodic supportive periodontal treatment visits allows for early intervention to salvage an ailing implant. Plaque, bacterial infection and traumatic occlusal forces are the primary causes of implant failure²⁷. Failing implants have been associated with "Actinobacillus-actinomycetemcomitans"(Agribactor), "Prevotella-Intermedia and "Porphyromonas gingivalis". Spirochetes and Fusobacteria have also been related to failing implants and poor oral hygiene facilitates the establishment of anaerobic bacteria. Presence of plaque on the implant may progress to peri-implantitis with bone resorption²⁸. Several studies have shown that the development of a peri-implant infection progressed at a similar rate as the development of a periodontitis lesion (Lang *et al.*, 1993).

The Supportive Periodontal Treatment Visit²⁹

The long-term health of implant supported prostheses depends on the proper maintenance therapy and should include the following.

- Update of the patient's medical and dental history
- Questioning patients, to determine whether they have experienced some discomfort or difficulty in functioning masticating or speaking.
- External head and neck examination and intraoral examination should be conducted.
- Examining implants and peri-implant tissues and recording.
- ✓ Plaque indices score.
- ✓ Bleeding on probing, (plastic periodontal probes should be used) probing depths and suppuration.
- ✓ Examination of prosthetic abutments. This may necessitate removal of prosthesis on a periodic basis(when screw retained).
- ✓ Occlusal examination.
- ✓ Checking for wear of the prosthesis.
- ✓ Examining for loosening screws or abutment cylinders.
- ✓ Locating abutment screws, abutments or implants.
- ✓ To remove any excessive occlusal force.
- ✓ To evaluate patient complaints in the area of the implant, Check for cement washout.
- ✓ Evaluating implant stability manually and with periometer devices.
- ✓ Periodic radiographic examination to monitor bone levels and bone density. Vertical bitewings or peri-apical radiographs once a year or panoramic radiographs may also be helpful.
- ✓ Reinforcing oral hygiene using toothbrushes, gauze, interproximal nylon-coated brushes and dental floss. In addition, irrigation devices may be suggested for effective daily plaque removal around implants. Instrumenting the implant restoration to remove plaque and calculus. Metal and ultrasonic Scalers are contraindicated since they can scratch the abutment surface. Plastic/Teflon coated scalers produce the least amount of surface alteration. Polishing with rubber cup and a flour of pumice provides a smooth surface.

- ✓ Subgingival irrigation with either tetracycline capsules dissolved in warm saline water, or Betadine or chlorhexidine 0.2% non diluted, may be recommended if the implant is failing or if there is inflammation. (Dennison *et al.*, 1994).Setting maintenance intervals a patient with both teeth and implants should see the periodontist as often as necessary to keep the periodontium and peri-implant tissues healthy. Totally edentulous patients with implants should be seen ever quarterly a year.

Recurrence of Periodontal Disease

Lesions may recur occasionally. This may be due to inadequate plaque control, or failure to comply with recommended supportive periodontal treatment schedules on the part of the patient. However, it is the dentist's responsibility to teach, motivate and control the patient's oral hygiene technique and the patient's failure is the dentist's failure. Surgery should not be undertaken unless the patient has shown proficiency and willingness to cooperate by performing his or her part of therapy³⁰

Symptoms and Causes of Recurrence

Symptoms

Causes

Increased mobility

- ❖ Increased inflammation.
- ❖ Poor oral hygiene.
- ❖ Subgingival calculus.
- ❖ Inadequate restoration.
- ❖ Deteriorating or poorly designed prosthesis.
- ❖ Systemic disease modifying host response to plaque accumulation.

Recession

- ❖ Due to faulty tooth brush also cause abrasions.
- ❖ Inadequate keratinized gingival.
- ❖ Frenum pull
- ❖ Orthodontic therapy

Increased mobility with no change in pocket depth and no radiographic change

- ❖ Occlusal trauma due to lateral occlusal interference
- ❖ Bruxism.
- ❖ High restoration.
- ❖ Poorly designed and worn-out prosthesis.
- ❖ Poor crown to root ratio.

Increased pocket depth with no radiographic change

- ❖ Poor oral hygiene
- ❖ Infrequent recall visits
- ❖ Subgingival calculus
- ❖ Poorly fitting partial denture
- ❖ Mesial inclination into edentulous space
- ❖ Failure of new attachment surgery
- ❖ Crooked teeth
- ❖ Grooves in teeth
- ❖ New periodontal disease.

Increased pocket depth with

- ❖ Poor oral hygiene
- ❖ Subgingival calculus

Increased radiographic bone Loss

- ❖ Infrequent recall visits
- ❖ Inadequate or deteriorating restorations
- ❖ Poorly designed prosthesis
- ❖ Inadequate surgery
- ❖ Systemic disease modifying host response to plaque
- ❖ Crooked teeth
- ❖ Grooves in teeth
- ❖ New periodontal disease

Retreatment

With periodontal diseases, therapist controls or arrest disease progression rather than curing the disease. As periodontal disease tends to be “episodic”, the retreatment aspect of patient care becomes a significant part of practice³¹. Good oral hygiene and adequate supportive care to reduce the rate of relapse but does not eliminate it. Dentists must rely on the early recognition of periodontal breakdown and institute prompt therapy.

The clinical signs of breakdown are the same as those encountered before the original treatment. They are:

- i) Periodontal pockets that bleed or show exudate when gently probed.
- ii) Periodontal pockets that get progressively deeper.
- iii) Alveolar bone loss (diagnosed by comparing radiographs obtained at different times)
- iv) Increased tooth mobility; and
- v) Presence of plaque, gingivitis and subgingival calculus.

Recurrence of periodontal disease can occur due to inadequate oral hygiene and therapy. Recurrence can occur in isolated areas, a segment of the dentition, whole dentition and can occur with rapid decline. Effort should be made to avoid surgery in the treatment of recurrent periodontitis, particularly if the patient originally was treated with surgery. Patients resent additional surgery; even when they at the original therapy were informed of this possibility of a second surgery³². The recurrent periodontal disease cannot be totally prevented. Not with present knowledge, but the occurrence and severity can be lessened with proper supportive periodontal treatment.

CONCLUSION

The need for and efficacy of supportive periodontal treatment appear to be adequately documented to the extent that periodontal treatment without maintenance is considered to be of questionable value in achieving periodontal health³³. Irrespective of the type of active periodontal therapy performed, in the absence of sufficient maintenance care, the results thus obtained cannot be sustained over a long period of time and the periodontal health of the patient inevitably deteriorates. It is the combination of periodic professional monitoring, debridement of teeth, fluoridation, detailed and uncompromising construction of individual home care techniques by the dental team and ensuring optimal daily plaque control by a well informed, trained and motivated patient that determines, almost exclusively the long term success of dental therapy³⁴. Although definitive treatment in itself is far from a panacea, supportive periodontal treatment makes it easier for both the compliant patient and the health professional charged with accomplishing debridement at the professional level to help control the circumstances that lead to inflammatory periodontal diseases³⁵.

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