

Chapter 10 Supportive Periodontal Therapy

INTRODUCTION

“Supportive periodontal therapy (SPT)” is a term suggested by the 3rd World Workshop of the American Academy of Periodontology (AAP, 1989). It refers to the phase of treatment concerned with maintenance of patients following active periodontal therapy and includes maintenance of dental implants. This therapy has also been referred to as periodontal maintenance (Cohen, 2003). Such maintenance or supportive therapy is important to assess long-term success of periodontal therapies, prevent recurrence or continued progression of disease, and importantly, to facilitate timely interception and adequate treatment when recurrent disease becomes apparent. Implicit in the phrase is the understanding that the patient’s own efforts to control periodontal disease are key, and that therapeutic measures from the dental team are necessary to maintain these in the long term.

This maintenance entails regular recall of patients at chosen intervals. The clinician would normally conduct an update of the medical and dental histories, extraoral and intraoral soft tissue examination, dental examination, periodontal evaluation, implant evaluation, radiographic review, removal of bacterial plaque and calculus from supragingival and subgingival regions, selective root planing or implant debridement if indicated, polishing of teeth, and a review of the patient’s plaque removal efficiency (AAP, 2001).

In general terms, supportive periodontal therapy is considered a necessary condition of successful long-term management of periodontal disease after initial treatment. Teleologically, this maintenance is designed to control, over the longer term, the causes of periodontal disease. Historically, supportive periodontal therapy has largely focused on the control of bacterial plaque (Loe et al., 1965; Lindhe et al., 1975). As our understanding of the pathogenesis of periodontitis has grown substantially over recent decades, the importance of elements of host susceptibility in general, specific risk factors such as smoking and diabetes, and the individual composition of microbial flora has become evident. This has important implications for the scope of supportive periodontal therapy.

While maintenance of adequate plaque control remains important, it is clear that in supportive periodontal therapy, individual patients may require more or less maintenance than others, depending on their risk profile. Furthermore, risk

factor modification and maintenance should be an integral part of supportive periodontal therapy (see Chapter 3). Inherent in the therapy, therefore, is the need to assess risk to patients on an individual basis. Otherwise, application of standardized protocols for treatment may permit supervised neglect and reinfection in some patients or overtreatment with poor cost effectiveness or unnecessary adverse effects in others. Although there is general agreement on these principles, evidence-based protocols for determining adequate recall intervals are lacking (Needleman et al., 2005).

INDICATIONS

Supportive periodontal therapy follows initial periodontal therapy. Initial therapy normally comprises a cause-related therapeutic phase, i.e., plaque control measures, smoking cessation therapy, and removal of local plaque retentive factors. This is often followed by a corrective phase comprising surgical and non-surgical periodontal management. Clearly, where initial cause-related therapy or corrective therapy has been unsuccessful, these elements may either require revisitation or treatment planning may need to reflect a more aggressive management of the periodontally involved dentition. Where therapy has been successful in controlling active disease, however, the patient enters the maintenance phase, SPT. Thus, SPT is an integral part of any periodontal therapy and should always follow initial non-surgical or surgical therapy.

TECHNIQUE

Risk Assessment

No single technique or recall interval for SPT is appropriate for every patient; therefore, each patient must be assessed on an individual basis and therapy prescribed accordingly. Such prescriptions should assess an individual’s risk, and that is an important element of the treatment planning process. In principle it has been demonstrated that such an approach can produce stable results in long-term longitudinal studies (Axelsson et al., 1991).

A number of factors contribute to a patient’s overall risk. It is useful to consider all factors simultaneously. Lang and Tonetti (2003) have developed a functional diagram to evaluate the risk of disease progression. They consider the following as important factors:

- Percentage of bleeding on probing sites
- Prevalence of residual pockets greater than 4 mm
- Loss of teeth from a total of 28
- Loss of periodontal support relative to patient age
- Systemic and genetic conditions
- Environmental factors, e.g., smoking

Each factor has its own scale describing risk as low, medium, or high.

It should be noted that for some of the risk factors, particularly the genetic factors, there is insufficient evidence to support their use in a clinical prediction tool. Furthermore, the contribution of each of these risk factors or risk factor domains is arbitrarily weighted to yield an overall risk score and the method has not been validated prospectively. Nevertheless, the proposal of such risk assessment tools illustrates the growing interest and need to individualize supportive periodontal therapy and at the very least, these tools may have value for patient motivation. However, in the absence of a validated tool, risk assessment during supportive periodontal therapy remains a matter of clinical judgment. While such a scale may be useful for patient motivation, decision making based on such risk assessment remains a matter of clinical judgment.

Measuring Baseline Values

A baseline measure of periodontal health should be recorded when the patient completes active periodontal therapy (Claffey, 1991). This should include details of the level of clinical attachment under such optimal circumstances. Continuous monitoring of such measurements over time can provide an indication of further attachment loss and thus active disease. Normally, baseline health values should be measured three months after initial periodontal therapy. It appears that after this time limited amelioration is possible (Becker et al., 2001).

Treatment Considerations

The American Academy of Periodontology offers guidance on SPT with its position paper on periodontal maintenance (Cohen, 2003). It includes a detailed checklist of items which may be included in a maintenance visit. With limited evidence available for appropriate management, such guidelines are to an extent anecdotal or based on evidence of limited quality. In the absence of clear evidence-based protocols for treatment it would appear reasonable to follow such guidelines as the considered opinion of an expert group. A précis of this guidance is presented below (see Box 10.1). Sensibly, the academy has suggested that the clinician's judgment should guide adaptation of such protocols to individual cases.

BOX 10.1. Example of an Ordinary Periodontal Supportive Therapy Appointment

A. Review and update of medical and dental history

B. Clinical examination

Intra- and extraoral examination.

C. Dental examination

General restorative, occlusal factors and mobility.

A detailed periodontal examination to include probing depths, bleeding on probing, levels of plaque and calculus, and any local factors such as furcation involvement and purulent exudates.

Gingival recession and attachment levels where indicated.

An examination of dental implants where present should include restorations present and an assessment of peri-implant tissues.

Where appropriate, good quality radiographs should be exposed when diagnostic yield is anticipated. Radiographs should never be exposed as routine and should always be reported appropriately.

D. Measurement of changes in baseline periodontal status

An assessment of stability or disease progression should be made based on the clinical findings.

E. Assessment of adequacy of plaque control

F. Treatment

Professional mechanical plaque removal.

Oral hygiene instruction and other behavioral modification, e.g., smoking cessation, maintenance visits.

Root planing where appropriate.

Occlusal adjustment.

Antimicrobial therapy and root desensitization.

Surgical intervention or discontinuation of SPT as appropriate.

G. Communication

Detailed advice should be given to the patient about the nature, progress, or stability of her periodontal disease status and the necessity for further treatment.

Referral to appropriate colleagues for aspects of treatment plan.

H. Planning

Further treatment planning should be on a case-by-case basis and is normally based on careful risk assessment and clinical judgment.

Recall Intervals, Duration, and Setting

The clinician should set recall intervals based on her risk assessment for each patient. The American Academy of Periodontology (Cohen, 2003) suggests that these should normally be about three months apart. This is a relatively arbitrary figure, however. Given that patients undergoing SPT have undergone cause-related and corrective periodontal therapy in the first instance, their risk should be regarded as moderate to high. Therefore, this recall interval may be reasonable. As time progresses, the clinician may reassess the patient's risk as lower and a longer time to recall may be more appropriate. Thus, the clinician's judgment on a case-by-case basis is the most important arbiter of setting such intervals.

The time spent on a recall visit appointment should be a matter of clinical judgment. Again, this should be based on risk assessment of the patient, previous maintenance needs, modifying factors such as systemic disease or smoking, plaque control, and patient motivation. Such visits may vary from 15 minutes to an hour in duration, depending on the patient's needs.

Recall appointments need not necessarily be with a periodontist at every stage. When risk is low to medium, such visits may be more cost-effectively managed by a patient's general dental practitioner.

Risk Factor Modification

Some of the risk factors for periodontal disease progression are lifelong and immutable. The periodontist cannot change a patient's genetic susceptibility to periodontal disease or previous loss of teeth and periodontal support. Additionally, a proportion of patients will have chronic lifelong diseases, e.g., diabetes, that will render them periodontally susceptible. There may be few risk factors, in fact, that can be changed by SPT recalls. In the main, these are bacterial colonization and smoking habits.

Good supragingival plaque control is an effective method of preventing periodontal disease (Axelsson and Lindhe, 1981). Indeed, supragingival plaque control can itself effect change on the subgingival flora to that of a less pathogenic nature (Hellstrom et al., 1996). Oral hygiene instruction and continued motivational reinforcement should therefore be an important element of SPT. Supra- and subgingival deposits of plaque and calculus should be removed. There is little evidence to support the use of specific clinical signs or diagnostic tests such as bleeding on probing to determine which sites benefit from reinstrumentation (Renvert et al., 2002). Clearly, bleeding on probing in itself is not an indication for mechanical subgingival debridement during SPT visits. It has been shown that such treatment in shallow sites, can, in fact result in attachment loss (Claffey and Egelberg, 1995).

Smoking cessation therapy should be considered an important facet of periodontal risk control. Smoking cessation therapy has been shown by Preshaw et al. (2005) in a longitudinal cohort study of 49 smokers over a 12-month period to be a successful intervention in an SPT setting, with 20% of the cohort successfully remaining stopped. The study also demonstrated a significant reduction in probing pocket depths for those who stopped smoking. Although intervention studies on the periodontal benefits of a smoking cessation intervention in the dental setting are scarce, epidemiological studies on the association between smoking and periodontitis consistently show lower periodontitis prevalence or incidence and better treatment outcomes among non-smokers compared to current smokers (Heasman et al., 2006).

EVIDENCE-BASED OUTCOMES

Many studies report on the value of SPT in the management of periodontal disease, particularly the use of professional mechanical plaque removal (PMPR) to this end. In general terms, narrative reviews of such research are positive about the value of PMPR in controlling further disease (Cohen, 2003; Renvert and Persson, 2004). However, variable quality of research and its reportage along with heterogeneity of study design renders clinical decision making on the basis of available evidence difficult. The heterogeneity of studies additionally renders meta-analysis of these clinical trials inappropriate.

A number of good quality systematic reviews relevant to SPT are available in the current literature (Needleman et al., 2005; Beirne et al., 2007). The Cochrane systematic review by Beirne et al. updates a previous review from 2005 (Beirne et al., 2005) on the value of routine scaling and polishing for the prevention of periodontal disease. This review was designed to answer several questions: Is routine scaling and polishing (SP) at regular intervals beneficial or harmful for periodontal health? Is there a difference between providers (dentist or dental hygienist) on periodontal health?

Robust search strategies and inclusion and exclusion criteria yielded nine randomized, controlled trials suitable for inclusion in the review. All were regarded as being at high risk of bias. Two split-mouth studies provided data for comparing SP vs. no SP. One study (Glavind, 1977), which involved 28 patients undertaking SPT, found no statistically significant differences for plaque, gingivitis, and attachment loss between experimental and control units at each time point during a year-long trial. The second study (Lembariti, 1998) involved 136 Tanzanian adolescents with high existing levels of calculus and who had not received any dental intervention for at least five years. This study reported statistically significant differences in calculus and gingivitis (bleeding) scores between treatment and control units at six, 12, and 22 months (in favor of scale and polish units) following a single

scale and polish provided at baseline to treatment units. Improvements in periodontal health were small following SP and were negligible following oral hygiene instruction in a cohort of the group. For this group, however, no pockets greater than 4 mm were present when high levels of calculus were present. Therefore, the participants could be regarded as low risk and the results should be seen in this context.

The authors of the study also question the value of such short-term interventions, which appear to be common in the developing world. The value of longer term PMPR vs. no measures cannot be gleaned from such short-term trials. The systematic review also revealed that clinical trials of routine scale and polish that were provided at different time intervals provided some statistically significant differences in favor of scaling and polishing more frequently: two weeks vs. six months, two weeks vs. 12 months (for the outcomes of plaque, gingivitis, pocket depth, and attachment change), and three months versus 12 months (for the outcomes of plaque, calculus, and gingivitis). No evidence was available to compare the effects of routine scaling and polishing by dentists vs. PCD delivery.

Problematic in the review is the definition of the term routine scale and polish. This is not a precisely defined intervention in periodontal disease management. The term oral prophylaxis is often used in the United States and has been defined as "the removal of plaque, calculus and stain from exposed and unexposed surfaces of the teeth by scaling and polishing as a preventive measure for the control of local irritational factors" (AAP, 1992). Within the review, routine scale and polish was defined as scaling, polishing, or both of the crown and root surfaces of teeth to remove local irritational factors (plaque, calculus, debris, and staining), that did not involve periodontal surgery or any form of adjunctive periodontal therapy such as the use of chemotherapeutic agents or root planing. The definition, therefore, included both supragingival and subgingival scaling. Clinical trials were therefore excluded on the basis of involving antimicrobial therapy and/or surgical therapy or root planing. The review must therefore be viewed in this context. These elements might not be unreasonable additions to an SPT regime, though it may be argued that they represent a return to initial cause-related therapy.

In contrast, the systematic review by Needleman et al. (2005) was relatively more inclusive than the review of Beirne et al. (2007). This study evaluated the differences between PMPR and no PMPR and between different types of PMPR. Randomized controlled trials (RCT), controlled clinical trials (CCT), and cohort studies with comparison groups were considered as suitable for inclusion within the review. However, data were stratified according to study type. An initially stringent definition of PMPR (supragingival plaque removal by a healthcare professional) was relaxed somewhat after initial screening of articles. This included subgingival

instrumentation not intended to comprise scaling and polishing. An exhaustive literature search yielded 39 articles (representing 32 trials) suitable for inclusion in the review. With this review, heterogeneity of studies meant that meta-analysis was not possible.

The authors drew the following conclusions from the study:

- A limited body of evidence of treatment in adults suggests that PMPR, particularly if combined with oral hygiene instruction (OHI), may be more effective than no treatment in terms of the outcomes of interest. The outcomes assessed in studies were surrogate endpoints of periodontal disease prevention, including the reduction of plaque, gingival bleeding/inflammation, and pocket depth, and the maintenance of attachment levels.
- There was no clear evidence to suggest that PMPR with OHI was more successful than OHI alone. It is uncertain whether professionally delivered plaque removal on a regular basis is important to primary or secondary prevention of periodontal diseases.
- Data from clinical trials provided conflicting evidence on the benefit of PMPR for prevention of secondary and tertiary periodontal disease. Some trials revealed a significant benefit on recorded outcomes. Interestingly, this did not include tooth loss, which is arguably the most significant outcome that should be measured in trials of periodontal therapy. Other studies contradictorily suggest no difference between interventions and controls.

With regard to specific PMPR interventions, the authors made the following conclusions:

- Rubber cup polishing and air polishing showed no evidence of differences in efficacy outcomes. However, bleeding and gingival trauma were greater with air polishing, though this effect was only temporary.
- When rubber cup polishing was combined with PMPR, there were clinical benefits and patient satisfaction was greater.
- The review concludes that there are benefits to periodontal health with more frequent scaling intervals. This concurs with the review by Beirne et al. (2007), although the ideal frequency of such SPT cannot be determined from existing evidence.

It is important to note that this systematic review excluded studies that specifically included subgingival debridement, which is an important limitation because SPT would typically include subgingival debridement of active sites. Furthermore, only four of the studies that were included specifically dealt with supportive periodontal therapy, i.e., investigated the effects of PMPR in patients previously treated for periodon-

titis (Axelsson and Lindhe, 1981; Glavind, 1977; Nyman et al., 1975; Westfelt et al., 1983). Three of these four studies compared PMPR in SPT to no PMPR/SPT. One study failed to show any short-term (11 months) benefits of PMPR/SPT in terms of plaque levels, bleeding scores, or attachment levels (Glavind, 1977). However, two longer term studies indicated benefits of PMPR/SPT with regard to plaque levels, bleeding scores, probing pocket depth, and attachment levels after two to six years (Axelsson and Lindhe, 1981; Nyman et al., 1975). Only one study compared different frequencies of PMPR/SPT (two-, four-, or 12-week intervals). Although no statistical analysis of the data was provided, increased frequency of PMPR/SPT was associated with benefits in probing depth levels but increased attachment loss.

AUTHOR'S VIEWS/COMMENTS

The value of professional supragingival mechanical plaque removal as part of supportive periodontal therapy is currently unclear when the available evidence is considered. In particular, supragingival PMPR without oral hygiene instruction appears to be of very limited value indeed. In addition, the ideal frequency of recall intervals again is unclear. However, lack of robust evidence must not be mistaken for evidence for lack of effect. Hence, this lack of evidence does not necessarily mean that PMPR in SPT or more frequent PMPR/SPT is inappropriate, but is an indictment of the quality of evidence that supports it.

This is by no means a trivial problem. From a public health perspective SPT may be an expensive intervention:

- Approximately 13 million scale and polishes were provided in 1999-2000 for National Health Service (NHS) patients in England. The gross cost of this intervention to the NHS was around £122 million (Do, 2000).
- A survey of preventive recommendations by general dental practitioners in western New York state revealed that 86% of respondents would recommend scaling and polishing every six months for low-risk patients of all ages (Frame et al., 2000).

It appears sensible to limit such treatment, particularly when it is funded from the public purse, to where there is good evidence for health gain and cost effectiveness. Funding of high-quality research trials to investigate SPT and its efficacy therefore appear to be a priority for periodontal researchers and clinicians alike. Such studies should be meticulously designed to contribute to future systematic reviews or meta-analyses, with adequate power and longevity of follow up. Studies should be conducted in the most relevant environment, i.e., primary care. Outcomes of interest, such as tooth loss, quality of life, and economic analysis, should be reported rather than reliance on simpler surrogate endpoints. From a

practical clinical perspective it appears that current research evidence should be regarded with caution when designing SPT programs for individual patients and that above all the clinician's judgment should supplant other considerations when making decisions about care.

REFERENCES

- AAP. 1989. Clinical periodontics: 3rd World workshop: Discussions.
- AAP. 2001. Periodontology AAo. *Glossary of Periodontal Terms*, 4th ed. Chicago: American Academy of Periodontology.
- AAP. 1992. Periodontology AAo. *Glossary of Periodontal Terms*, Chicago: American Academy of Periodontology.
- Axelsson P, Lindhe J, Nystrom B. 1991. On the prevention of caries and periodontal disease. Results of a 15-year longitudinal study in adults. *J. Clin. Periodontol.* 18, 182-9.
- Axelsson P, Lindhe J. 1981. The significance of maintenance care in the treatment of periodontal disease. *J. Clin. Periodontol.* 8, 281-94.
- Becker W, Becker BE, Caffesse R, Kerry G, Ochsenbein C, Morrison E, et al. 2001. A longitudinal study comparing scaling, osseous surgery, and modified Widman procedures: results after 5 years. *J. Periodontol.* 72, 1675-84.
- Beirne P, Forgie A, Worthington HV, Clarkson JE. 2005. Routine scale and polish for periodontal health in adults. *Cochrane Database Syst. Rev.* CD004625.
- Beirne P, Worthington HV, Clarkson JE. 2007. Routine scale and polish for periodontal health in adults. *Cochrane Database Syst. Rev.* CD004625.
- Claffey N. 1991. Decision making in periodontal therapy. The re-evaluation. *J. Clin. Periodontol.* 18, 384-9.
- Claffey N, Egelberg J. 1995. Clinical indicators of probing attachment loss following initial periodontal treatment in advanced periodontitis patients. *J. Clin. Periodontol.* 22, 690-6.
- Cohen RE. 2003. Position paper: periodontal maintenance. *J. Periodontol.* 74, 1395-401.
- Do H. 2000. *Modernising NHS dentistry—implementing the NHS plan*. In: Health Do, editor. HMSO; 2000.
- Frame PS, Sawai R, Bowen WH, Meyerowitz C. 2000. Preventive dentistry: practitioners' recommendations for low-risk patients compared with scientific evidence and practice guidelines. *Am. J. Prev. Med.* 18, 159-62.
- Glavind L. 1977. Effect of monthly professional mechanical tooth cleaning on periodontal health in adults. *J. Clin. Periodontol.* 4, 100-6.
- Heasman L, Stacey F, Preshaw PM, McCracken GI, Hepburn S, Heasman PA. 2006. The effect of smoking on periodontal treatment response: a review of clinical evidence. *J. Clin. Periodontol.* 33, 241-53.
- Hellstrom MK, Ramberg P, Krok L, Lindhe J. 1996. The effect of supragingival plaque control on the subgingival microflora in human periodontitis. *J. Clin. Periodontol.* 23, 934-40.
- Lang NP, Tonetti MS. 2003. Periodontal risk assessment (PRA) for patients in supportive periodontal therapy (SPT). *Oral Health Prev. Dent.* 1, 7-16.
- Lembariti BS, van der Weijden GA, van Palenstein Helderma WH. 1998. The effect of a single scaling with or without oral hygiene instruction

- on gingival bleeding and calculus formation. *J. Clin. Periodontol.* 25, 30–3.
- Lindhe J, Hamp SE, Loe H. 1975. Plaque induced periodontal disease in beagle dogs. A 4-year clinical, roentgenographical and histometrical study. *J. Periodontol. Res.* 10, 243–55.
- Loe H, Theilade E, Jensen SB. 1965. Experimental Gingivitis In Man. *J. Periodontol.* 36, 177–87.
- Needleman I, Suvan J, Moles DR, Pimlott J. 2005. A systematic review of professional mechanical plaque removal for prevention of periodontal diseases. *J. Clin. Periodontol.* 32, Suppl. 6, 229–82.
- Nyman S, Rosling B, Lindhe J. 1975. Effect of professional tooth cleaning on healing after periodontal surgery. *J. Clin. Periodontol.* 2, 80–6.
- Preshaw PM, Heasman L, Stacey F, Steen N, McCracken GI, Heasman PA. 2005. The effect of quitting smoking on chronic periodontitis. *J. Clin. Periodontol.* 32, 869–79.
- Renvert S, Persson GR. 2002. A systematic review on the use of residual probing depth, bleeding on probing and furcation status following initial periodontal therapy to predict further attachment and tooth loss. *J. Clin. Periodontol.* 29, Suppl 3, 82–9; discussion 90–1.
- Renvert S, Persson GR. 2004. Supportive periodontal therapy. *Periodontol.* 2000. 36, 179–95.
- Westfelt E, Nyman S, Socransky S, Lindhe J. 1983. Significance of frequency of professional tooth cleaning for healing following periodontal surgery. *J. Clin. Periodontol.* 10, 148–56.

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ebrary40c186c1bfcac4812cdad68df8343f65
ebrary40c186c1bfcac4812cdad68df8343f65
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