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Periodontal maintenance in a specialist periodontal clinic and in general dental practice

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Abstract

Objectives: To monitor the efficacy of periodontal maintenance whether conducted in a specialist periodontology clinic or in the practice of the referring general dentist.

Materials and Methods: Thirty-five subjects with a diagnosis of moderate–severe chronic periodontitis who were referred to the specialist clinic received periodontal non-surgical therapy. Following a 6-month healing phase, subjects were randomly allocated to one of two groups: A ($n = 18$, periodontal maintenance provided within the specialist clinic) or B ($n = 17$, periodontal maintenance provided by the referring general dentist in accordance with written instructions provided by the specialist). All subjects were examined at months 0 (corresponding to 6 months post-completion of non-surgical therapy), 6 and 12. Full-mouth plaque index (PI), % bleeding on probing (%BOP) and probing depth (PD) measurements were recorded. PDs were also recorded at eight test sites which, prior to non-surgical therapy, exhibited PD 5–8 mm, BOP and radiographic alveolar bone loss. Standardized radiographs were exposed at test sites at months 0 and 12, and bone changes assessed using digital subtraction radiography (DSR).

Results: As a result of the non-surgical therapy, statistically significant improvements in all clinical parameters were recorded. In the maintenance period, mean PI increased significantly from months 0 to 12 ($p < 0.05$), but this increase did not differ significantly between groups A and B ($p > 0.05$). No other clinical parameters changed significantly in the maintenance phase of the study. Reductions in %BOP, mouth mean PD and mean test sites PD achieved by the non-surgical therapy were maintained and did not differ significantly whether subjects were allocated to group A or group B ($p > 0.05$). Current smokers had significantly deeper PD than non-smokers and former smokers at all time points ($p < 0.05$), although otherwise, smoking status did not affect the outcomes of the study. DSR analysis identified statistically non-significant, slight, alveolar bone loss in both groups between months 0 and 12.

Conclusion: In the short term, periodontal maintenance can be provided in general dental practice with the same expected outcomes compared with maintenance that is provided in a specialist clinic, providing that general dentists are given specific instructions regarding the maintenance regimen. A strong emphasis on effective plaque control is necessary.

Key words: periodontal disease; periodontal maintenance; smoking; supportive periodontal therapy

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Periodontal maintenance (which can also be referred to as supportive periodontal therapy) is a key part of periodontal treatment and includes clinical monitoring of periodontal status, radiographic review, assessment of plaque control, reinforcement of oral hygiene procedures, and updating of medical and dental histories including, where necessary, assessment of smoking status. Root surface instrumentation may also be undertaken to remove reforming calculus deposits and to disrupt the subgingival biofilm. The goals of periodontal maintenance include prevention or minimization of disease recurrence, prevention or reduction of tooth loss, and increased likelihood of diagnosing and treating recurrent disease and/or other oral diseases in a timely fashion (Cohen 2003). Periodontal maintenance

appointments tend to be scheduled at regular intervals, usually ranging from 2 to 6 months, depending on the clinical needs of the individual patient, continuing for the life of the dentition.

Patients with moderate or severe chronic periodontitis are frequently referred by their general dentist to a specialist periodontal clinic for non-surgical periodontal treatment. Following completion of this treatment, the patient may either be retained within the specialist clinic for periodontal maintenance or sent back to the referring dentist, in which case clear recommendations for an individual patient-specific programme of periodontal maintenance should be provided. It is not known with certainty which option results in better outcomes for the patient. The objective of the present study was to monitor the short-term efficacy of periodontal maintenance whether conducted in a specialist periodontal clinic or in general dental practice.

Materials and Methods

Study cohort

Male and female patients, aged 30 years or older, in good general health with a diagnosis of moderate–severe chronic periodontitis were recruited. Patients were referred from their general dentist to the specialist periodontal clinic for management of their periodontal condition. Prior to receiving non-surgical periodontal therapy, all subjects had a minimum of 16 natural teeth with at least eight or more periodontally involved clinical sites (test sites) demonstrating probing depths (PDs) of 5–8 mm, with clinical loss of attachment (LOA), bleeding on probing (BOP) and radiographic evidence of alveolar bone loss. Subjects were designated as either smokers, non-smokers or former smokers. Exclusion criteria for the study included: pregnancy; chronic use of antibiotics, steroids or non-steroidal anti-inflammatory drugs; significant illness or condition that could affect periodontal status (e.g. diabetes) or influence safe participation in the study; previous periodontal surgery; subgingival periodontal instrumentation within the previous year; any condition requiring the use of prophylactic antibiotics prior to receiving dental treatment.

Study design

This was a 12-month longitudinal study for which ethical approval was obtained from the appropriate Ethics Committee prior to study commencement. Written informed consent was obtained from all study subjects prior to participation.

All subjects received non-surgical periodontal therapy within the specialist periodontal clinic in the Newcastle upon Tyne School of Dental Sciences. Procedures included full-mouth root surface instrumentation (RSI) using both manual and ultrasonic instruments until root surfaces were free of deposits as determined by visual inspection and by use of fine calculus probes. Local anaesthesia was used. Oral hygiene instruction was given as appropriate to each subject. Non-surgical periodontal therapy was completed within a 1-month time frame for all subjects (between months -7 and -6 relative to baseline; Fig. 1), and was undertaken by an experienced dental hygienist.

Following completion of non-surgical therapy, subjects received immediate, post-treatment maintenance therapy (healing phase) over a 6-month period within the specialist clinic. During this time, subjects were seen at 3-month intervals within the specialist clinic (at months -6, -3 and baseline) and received maintenance care including oral hygiene instruction, prophylaxis, and re-instrumentation as deemed clinically appropriate. Then, at baseline (corresponding to 6 months after completing the non-surgical periodontal therapy), subjects were randomly allocated to one of the two groups for long-term, definitive maintenance care:

- group A: periodontal maintenance provided by the dental hygienist in the specialist periodontal clinic,
- group B: periodontal maintenance provided in general dental practice.

The randomization time point was designated month 0 (corresponding to 6 months after completion of non-surgical therapy or 7 months after first presentation at the periodontal clinic). Subjects in group A returned to the specialist clinic at three-monthly intervals for 12 months for periodontal maintenance care. Treatment provided was dependent on the needs of the patient, but typically included further RSI to disrupt subgingival biofilms and remove re-forming calculus, polishing of the teeth, assessment of oral hygiene, and reinforcement of plaque control. Subjects allocated to group B were discharged to their referring general dentist, with written instructions mailed separately to the dentist describing in detail the periodontal maintenance care that each subject required. These instructions covered the frequency and duration of maintenance appointments and described in detail the procedures that should be undertaken at each maintenance appointment.

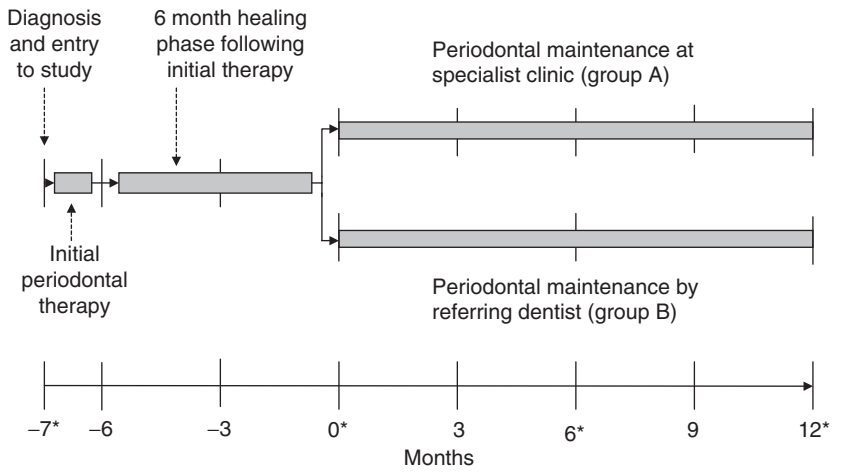

Fig. 1. Schematic of study design. Following diagnosis (month -7), all subjects received full non-surgical periodontal therapy within 1 month and then entered a 6-month healing phase following therapy. At baseline (month 0), subjects were randomized to either group A (periodontal maintenance at the specialist periodontal clinic, $n = 18$) or group B (periodontal maintenance performed by the referring general dentist, $n = 17$). All subjects were evaluated at months 0, 6 and 12. Subjects in group A attended periodontal maintenance appointments at months 0, 3, 6, 9 and 12. *Denotes assessment appointment.

For the purpose of assessment, all subjects (groups A and B) were reviewed at the specialist clinic at 6 and 12 months following the start of the study (corresponding to 12 and 18 months following completion of non-surgical therapy). The clinical and radiographic procedures undertaken at months 0, 6 and 12 are described below. The design of the study is presented in Fig. 1.

Clinical assessments

Clinical measures were obtained for subjects in both groups pre-treatment (i.e. at month −7, prior to non-surgical periodontal therapy) and at months 0, 6 and 12 in the periodontal maintenance phase (corresponding to 6, 12 and 18 months following completion of non-surgical therapy). The presence of plaque was recorded at six sites per tooth using the Silness and Loë plaque index (PI) (Silness & Loe 1964). PDs were recorded at six sites per tooth using a constant force periodontal probe (True Pressure Sensitive probe) with a 20 g probing force (Hunter 1994). BOP was recorded as present if occurring within 30 s of probing, and percent BOP (%BOP) scores were calculated. Eight test sites were designated per subject. All were non-adjacent interproximal sites in the posterior dentition not including pockets around third molars. Test sites demonstrated pre-treatment PD 5–8 mm, BOP and radiographic alveolar bone loss. Sites at the distal aspect of second molars were only eligible if there was an adjacent fully erupted third molar. All measurements were recorded by one calibrated individual (dental hygienist), who was blind to the group allocation.

Radiographic methods

Standardized vertical bite-wing radiographs were exposed at test sites at months 0 and 12 using a cephalostat (Gendex GX-Ceph, Gendex Corp., Milwaukee, WI, USA) (Jeffcoat et al. 1987). A double-packed, ekta speed film (Eastman Kodak Co., Rochester, NY, USA) in a vertical bite wing holder (Rinn Corp., Elgin, IL, USA) was placed in the mouth. An aluminium reference wedge held the film in place and also served as a bite block. Films were exposed for 1 s at 15 mA and 90 kVp, then processed using a standardized procedure, mounted, labelled and analysed by digital subtraction radiography (DSR) to assess bone changes over time (Ellwood et al. 1997). DSR superimposes the images of two radiographs using computer software, and subtracts one from the other, revealing areas of bone gain as lighter areas and areas of bone loss as darker areas against a neutral grey background (Ellwood et al. 1997). Radiographs were scanned and the images created were subtracted using dedicated DSR software (Compare plug-in) which ran within Image Tool® (University of Texas Health Science Center, San Antonio, TX, USA). The macro had the following functions: correction for affine differences in perspective between the two images using a patch minimization process; density normalization using first- or second-order polynomials to match concordant pixels in the paired images; adjustment of contrast and brightness of the image representing the difference between the two images (Rawlinson et al. 1999). Two independent examiners scored the subtraction images using a qualitative ranking system (2 = definite bone gain, 1 = possible bone gain, 0 = no change, −1 = possible bone loss, −2 = definite bone loss). This five-point subjective ranking system has been validated in DSR calibration studies (Ellwood et al. 1998). In addition, identified bone changes were quantified by reference to the aluminium reference wedge bite block within the Image Tool software and bone changes calculated as mm^3 aluminium equivalents (mm^3 Al).

Statistical analyses

The subject was the unit of statistical analysis unless otherwise specified. Full-mouth assessments were based on measurements taken from each evaluative site in the subject's mouth. Test site variables were based on measurements taken from each evaluative test site. Descriptive statistics were calculated and frequency tables were constructed. Two-way repeated measures analysis of variance (ANOVA) using group allocation as factor was used to compare data at successive time points in the two groups. One sample paired *t* tests were conducted to identify significant differences between data recorded across groups at each time point. Analysis of covariance (ANCOVA) was utilized to identify whether statistically significant differences existed between adjusted variables at month 12 in the two groups, using group allocation as factor and baseline data as covariate. ANOVA was used to identify whether significant differences existed between mean clinical data in the smoking subgroups. All tests of significance were two-sided; differences were considered statistically significant when $p < 0.05$. Site-specific analyses included bivariate correlations of attachment change and alveolar bone change measured at test sites.

Results

Thirty-five subjects were enrolled in the study (15 males and 20 females). Thirty-four subjects were Caucasian and one was Asian. Thirteen subjects were non-smokers, nine were former smokers (all had quit at least 10 years prior to study enrollment), and 13 subjects were smokers (smoking an average of 13 cigarettes per day, range 2–25 cigarettes per day). The mean age of the subjects at baseline was 45 years (range 31–66 years). Eighteen subjects were randomized to group A (periodontal maintenance in the specialist periodontal clinic) and 17 subjects were randomized to group B (periodontal maintenance in the practice of the referring general dentist). The demographic characteristics of groups A and B are shown in Table 1, none of which differed significantly between the groups ($p > 0.05$). No statistically significant differences existed between clinical parameters (plaque scores, PDs, %BOP or clinical attachment levels) recorded in the two groups at the pre-treatment stage (month −7) ($p > 0.05$). Compliance with the maintenance programme in the specialist clinic (group A) was high, with all patients attending maintenance appointments with the exception of one patient who failed to return for assessments at months 6 and 12. We are unable to provide data on the compliance of patients in group B, other than reporting that there were two patients who failed to attend for assessment at month 12.

Statistically significant reductions in mean plaque scores were observed between pre-treatment (month −7) and month 0 in both groups: group A, $\Delta = 0.82$, 95% confidence intervals (CI) = 0.62, 1.01 and $p < 0.01$; group B, $\Delta = 0.79$, 95% CI = 0.56, 1.02 and $p < 0.01$. Mean plaque scores recorded at all time points following treatment were statistically significantly lower than those recorded pre-treatment ($p < 0.05$)

(Fig. 2), and did not differ significantly between the two study groups (A and B) at any time point ($p > 0.05$). A tendency was noted for plaque scores to increase in both groups during the maintenance phase, however, and month 12 plaque scores were statistically significantly higher than those observed at month 0 ($p < 0.05$). This increase was seen in both groups and did not differ significantly whether subjects were in group A or B ($p > 0.05$).

Full-mouth mean PD data are shown in Fig. 3. Statistically significant reductions in mouth mean PDs were observed between pre-treatment (month -7) and month 0 in both groups: group A, $\Delta = 0.70$, 95% CI = 0.54, 0.85 and $p < 0.01$; group B, $\Delta = 0.65$, 95% CI = 0.48, 0.83 and $p < 0.01$. At all post-treatment time points, mouth mean PDs were statistically significantly lower than those recorded pre-treatment ($p < 0.05$). During the course of the maintenance phase, no statistically significant changes in mouth mean PDs occurred compared with month 0, nor were there any significant differences between the two study groups at any time point ($p > 0.05$).

Percent BOP data are shown in Fig. 4. Statistically significant reductions in mean %BOP were observed between pre-treatment (month -7) and month 0 in both groups: group A, $\Delta = 27\%$, 95% CI = 20%, 35% and $p < 0.01$; group B, $\Delta = 28\%$, 95% CI = 20%, 35% and $p < 0.01$. At all post-treatment time points, mean %BOP was statistically significantly lower than that recorded pre-treatment ($p < 0.05$). During the course of the maintenance phase, no statistically significant changes in %BOP occurred and there were no significant differences between the study groups at any time point ($p > 0.05$).

At test sites (pre-treatment PDs 5–8 mm), statistically significant reductions in mean PDs were observed between pre-treatment (month -7) and month 0 in both groups: group A, $\Delta = 1.35$, 95% CI = 1.00, 1.71 and $p < 0.01$; group B, $\Delta = 1.26$, 95% CI = 0.87, 1.66 and $p < 0.01$ (Fig. 5). At all post-treatment time points, test site mean PDs were statistically significantly lower than those recorded pre-treatment ($p < 0.05$). During the course of the maintenance phase, no statistically significant changes in test site mean PDs occurred, nor were there any significant differences between the two study groups at any time point ($p > 0.05$).

Smoking status did not influence any of the clinical parameters recorded or the response to treatment ($p > 0.05$) with the exception of mouth mean PDs, which were statistically significantly higher in smokers compared with non-smokers and former smokers at all time points ($p < 0.05$) (Fig. 6). Each of the smoking subgroups demonstrated statistically significant reductions in mouth mean PDs at months 0, 6 and 12 compared with pre-treatment (month -7) ($p < 0.05$).

DSR analysis revealed that during the maintenance phase, there were no statistically significant differences in mean bone change (either calculated as aluminium equivalents or using the categorical bone scoring method) between months 0 and 12 in the two treatment

Table 1. Demographic characteristics of group A (periodontal maintenance in specialist periodontal clinic) and group B (periodontal maintenance in general dental practice)

Characteristic	Group A, $n = 18$	Group B, $n = 17$
Age (years)		
Mean	43	47
Range	32–57	31–66
Gender, *n*		
Male	8	7
Female	10	10
Race/ethnicity, *n*		
White Caucasian	17	17
Asian	1	0
Tobacco use, *n* (%)		
Non-smoker	6	7
Former smoker	4	5
Smoker	8	5

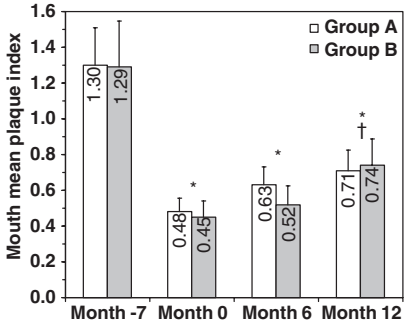

Fig. 2. Full-mouth mean plaque indices (± SEM) by group allocation (group A: periodontal maintenance at the specialist periodontal clinic; group B: periodontal maintenance by the referring general dentist). No statistically significant differences between groups A and B at any time point ($p > 0.05$). *Significant difference from month -7 ($p < 0.01$). †Significant difference from month 0 ($p < 0.05$).

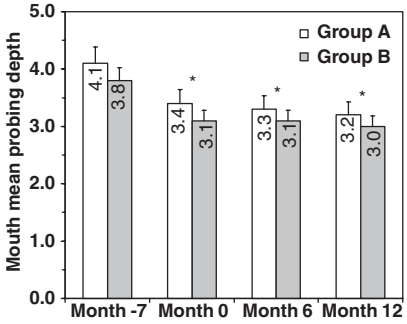

Fig. 3. Full-mouth mean probing depths (± SEM) by group allocation (group A: periodontal maintenance at the specialist periodontal clinic; group B: periodontal maintenance by the referring general dentist). No statistically significant differences between groups A and B at any time point ($p > 0.05$). *Significant difference from month -7 ($p < 0.05$).

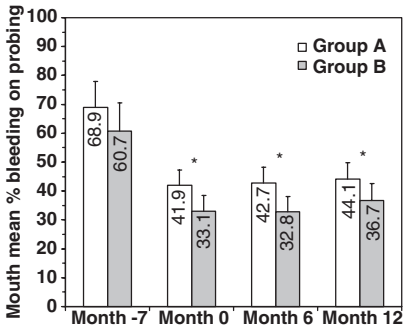

Fig. 4. Full-mouth percent bleeding on probing (%BOP) (± SEM) by group allocation (group A: periodontal maintenance at the specialist periodontal clinic; group B: periodontal maintenance by the referring general dentist). No statistically significant differences between groups A and B at any time point ($p > 0.05$). *Significant difference from month -7 ($p < 0.05$).

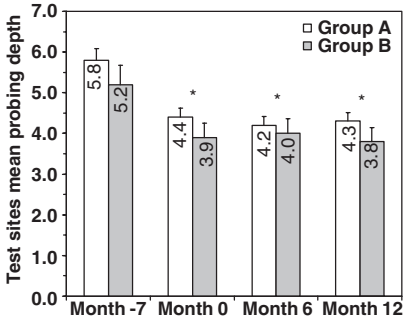

Fig. 5. Test sites mean probing depths (± SEM) by group allocation (group A: periodontal maintenance at the specialist periodontal clinic; group B: periodontal maintenance by the referring general dentist). No statistically significant differences between groups A and B at any time point ($p > 0.05$). *Significant difference from month -7 ($p < 0.05$).

groups ($p > 0.05$). When expressing bone change in mm^3 Al equivalents, both groups demonstrated slight mean bone loss overall: group A, $\Delta = -0.07 \pm 0.10\,mm^3$ Al; group B, $\Delta = -0.01 \pm 0.11\,mm^3$ Al ($p > 0.05$). Representative paired images and the generated subtraction image are shown in Fig. 7. Alveolar bone changes did not vary significantly by smoking status ($p > 0.05$).

Discussion

Periodontal maintenance is an extremely important part of periodontal therapy. It has been reported that patients who comply with periodontal maintenance requirements after completion of non-surgical therapy demonstrate fewer signs of periodontal disease and less disease recurrence (Lindhe & Nyman 1984, Lindhe et al. 1984, Hancock & Newell 2001). Those who are non-compliant or who comply erratically with maintenance programmes tend to be at increased risk for tooth loss during the maintenance phase compared with those patients who adhere to a strict maintenance programme (Checchi et al. 2002). The importance of a life-long commitment to periodontal maintenance should be clearly explained to patients before commencing non-surgical periodontal therapy so that they are aware of their responsibilities in the longer term. The frequency of maintenance appointments should be based on the clinical needs of the individual patient, and typically, recall at three-monthly intervals is appropriate (Cohen 2003). Such a recall interval is consistent with data suggesting that re-colonization of periodontal sites by periodontal pathogens occurs within 3 months of instrumentation of deep pockets (Magnusson et al. 1984). However, the frequency of recall for periodontal maintenance can be increased or decreased based on the particular needs of individual patients.

The procedures that can be undertaken at periodontal maintenance appointments have been well documented (Cohen 2003). However, one consideration for which the evidence base is very weak is whether it is better to perform root surface instrumentation or supragingival prophylaxis at maintenance appointments. A recent systematic review concluded that maintenance regimens of supragingival prophylaxis and subgingival debridement were comparable with respect to clinical outcomes 12 months post-initial non-surgical treatment (Heasman et al. 2002). These authors identified a shortage in publications to address this issue as only 11 studies fit the criteria for the systematic review.

A consideration when receiving referrals from general dentists is how to manage patients following completion of the non-surgical periodontal therapy. There is a temptation for the specialist to retain all treated patients, and undertake to provide periodontal maintenance care for these patients. However, such a strategy may be compromised by insufficient resources in terms of facilities and man-power to provide such care for large numbers of patients. The alternative is to refer patients back to the general dentist for periodontal maintenance to be undertaken in the primary care setting. There are few studies that have addressed this issue, however, and therefore this study was undertaken to compare outcomes over 1 year of periodontal maintenance when conducted either within the specialist clinic or in general dental practice. In this study, all subjects received non-surgical periodontal therapy and then 6 months of periodontal maintenance care within the specialist unit, in compliance with our current treatment protocols. The first 6 months of maintenance therapy are undertaken within our unit to establish that clinical improvements achieved by the non-surgical treatment are stable prior to discharge back to the referring dentist. We consider that the first 6 months of maintenance care are critical for wound healing following non-surgical therapy, and for this reason retain patients within

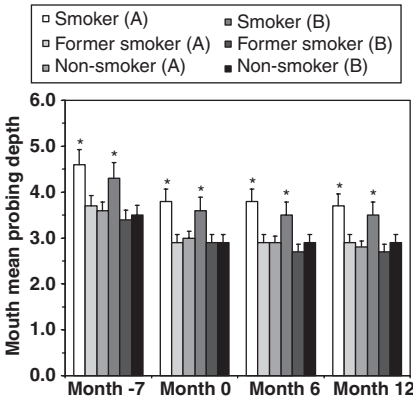

Fig. 6. Full-mouth mean probing depths (PDs) (± SEM) by smoking status and group allocation (group A: periodontal maintenance at the specialist periodontal clinic; group B: periodontal maintenance by the referring general dentist). Within each smoking subgroup, mean PDs were significantly reduced at months 0, 6 and 12 compared with month −7 ($p < 0.05$). *Significantly greater PDs in smokers compared with former smokers and non-smokers at each time point and in each group ($p < 0.05$).

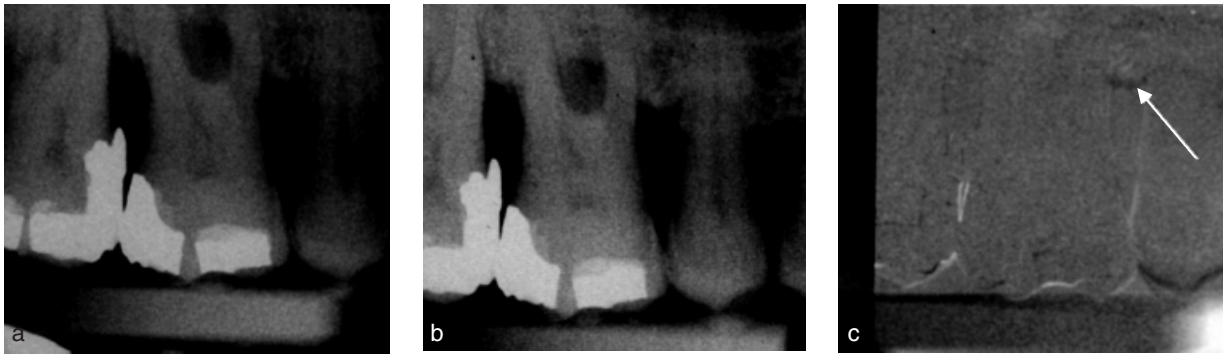

Fig. 7. (a) Representative image obtained from subject at month 0 using cephalostat method and aluminium reference wedge. (b) Same site at month 12. (c) Subtraction image; note the bone loss revealed as a dark area at the alveolar crest at the mesial aspect of the first maxillary molar (arrow).

our unit for the first 6 months of maintenance care.

Plaque scores were significantly reduced in the definitive maintenance phase (months 0–12) compared with pre-treatment (month −7) which is to be expected following a course of periodontal non-surgical therapy including instruction in oral hygiene techniques. As shown in Fig. 2, there was a tendency for plaque scores to gradually increase over time, such that month 12 plaque scores were significantly higher than those observed at month 0 ($p<0.05$). Periodontists are well used to the problems of non-compliance with oral hygiene regimens and it is recognized that even if patients manage to change their oral hygiene habits, it is difficult to maintain the new habits over time (Wilson 1996). The gradual increases in plaque scores observed in this study underscore the importance of repeated motivation in oral hygiene practices. While plaque scores did increase with time, there were no significant differences between the two groups of patients.

The PD reductions were consistent with those that have been reported previously following non-surgical periodontal therapy (Cobb 1996, 2002), and were comparable and maintained in both treatment groups irrespective of the location of the maintenance therapy. The finding that smokers had increased PDs compared with non-smokers and former smokers is also consistent with reports in the periodontal literature. Numerous investigations of the association between smoking and periodontitis conclude that smoking is a major risk factor for periodontitis (Kinane & Chestnutt 2000). Clinical data gathered from epidemiological/cross-sectional studies have shown that smokers with periodontitis are more likely to have bone/attachment loss than non-smokers (Stoltenberg et al. 1993, Wouters et al. 1993) and the magnitude and predictability of clinical improvements following treatment is significantly reduced (Preber & Bergstrom 1990, Ah et al. 1994). In the present study, all smoking subgroups demonstrated statistically significant reductions in PDs as a result of the non-surgical periodontal therapy, and such improvements were maintained during the maintenance phase of treatment. This suggests that even in smokers, a high standard of interventional treatment followed by frequent and effective maintenance visits can achieve a similar degree of reduction in PDs as can be expected in non-smokers, at least in the short-term following non-surgical therapy. Other authors have also reported that smokers and non-smokers can respond equally well to non-surgical periodontal therapy (Pucher et al. 1997). We acknowledge, however, that in the present study, the numbers of patients in each of the smoking subgroups (smokers, former smokers and non-smokers) were small, but nonetheless were balanced between groups, reducing the potential for bias.

The alveolar bone change that occurred during the study was minimal when assessed by DSR. Previous studies have also reported slight bone change in periodontally susceptible patients in the maintenance phase of treatment (Rosling et al. 2001). There were no significant differences in bone changes between the two groups, and furthermore, alveolar bone change did not vary significantly by smoking status, a finding that has been reported previously in other patient populations (Meinberg et al. 2001). However, both the present study and that reported by Meinberg et al. (2001) analysed bone change over 1 year, a relatively short period. It is possible that the influence of smoking on alveolar bone status may take more than 1 year to yield identifiable changes that could be distinguished from alveolar bone status in non-smokers. Further longitudinal studies are indicated to assess the influence of smoking on alveolar bone over longer periods of time in smokers and non-smokers.

A previously reported study also investigated the outcomes of periodontal maintenance when conducted in a specialist clinic compared with discharge back to the referring dentist (Axelsson & Lindhe 1981a). In the test group, patients were given preventive treatment for caries and periodontal disease, oral hygiene instruction and prophylaxis every 2–3 months. Control patients were not involved in any dental health programmes following the initial therapy. All patients were evaluated at 3 and 6 years following initial presentation. This study reported that the preventive programme employed in the test group helped to prevent the progression of periodontal disease and caries with a decrease in the frequency of PDs >3 mm at years 3 and 6 evaluations compared with baseline. However, in the control group, there was an increase in the frequency of PDs >3 mm at the same time points relative to baseline (Axelsson & Lindhe 1981a). This study was different from the present study, however, in that the initial therapy involved only dental prophylaxis and oral hygiene instruction. Furthermore, when patients in the control group were discharged from the specialist clinic, there was no maintenance prescription provided to the referring dentist.

Compliance with the maintenance programme is clearly important in periodontal therapy (Wilson 1996). In an effort to improve compliance in this study, detailed written instructions were provided to the referring dentist, and all patients were retained within the specialist clinic for the first 6 months following completion of non-surgical therapy. Compliance in group B may have been artificially improved in this study compared with normal clinical practice by these procedures, and also by the fact that group B patients returned to the specialist clinic for follow-up assessments after being discharged. This may have resulted in better compliance with oral hygiene practices and also enhanced the professional care rendered by the referring dentist. The importance of both personal and professional care on the long-term outcomes of periodontal therapy has been reported previously (Axelsson & Lindhe 1981b, Becker et al. 1984). Notwithstanding the good clinical outcomes and compliance observed in the present study, it was of relatively short duration, and it is important that future studies are undertaken to evaluate the long-term (i.e. several years) effectiveness of maintenance care in general dental practice compared to a specialist clinic.

In summary, in a cohort of patients with a history of chronic periodontitis, non-surgical therapy resulted in improvements in clinical parameters consistent with those reported previously in the literature. During a 12-month maintenance phase, despite a tendency for plaque control to deteriorate, clinical improvements remained stable whether patients received periodontal maintenance in a specialist periodontal clinic or in the practice of the referring general dentist. Smoking status did not affect these outcomes, although increased PDs were noted at all time points in current smokers. DSR analysis revealed that statistically non-significant slight alveolar bone loss occurred during the maintenance phase

of therapy. These results suggest that, at least in the short term following non-surgical therapy, periodontal maintenance can be provided in either a specialist clinic or in general dental practice, provided that specific written instructions detailing the periodontal maintenance plan are provided to the general dentist.

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