J Clin Periodontol 2005; 32: 375–382 doi: 10.1111/j.1600-051X.2005.00690.x

Journal of Clinical Periodontology

Interest in periodontology and preferences for treatment of localized gingival recessions

A survey among Swiss dentists

C.-A. Zaher[1], J. Hachem[1], M. A. Puhan[2] and A. Mombelli[1]

[1]School of Dental Medicine, University of Geneva, Geneva, Switzerland; [2]Horten Centre, University of Zurich, Zurich, Switzerland

Zaher C-A, Hachem J, Puhan MA, Mombelli A. Interest in periodontology and preferences for treatment of localized gingival recessions. A survey among Swiss dentists. J Clin Peridontol 2005; 32: 375–382. doi: 10.1111/j.1600–051X.2005. 00690.x. © Blackwell Munksgaard, 2005.

Abstract

Objectives: The purpose of this study was to evaluate the views, knowledge and preferences of a large sample of practising dentists in periodontics, focusing specifically on the treatment of gingival recessions, and to compare the findings with the current evidence available in the dental literature.

Methods: We conducted a cross-sectional postal survey of 3780 dentists, representing the majority of all dentists working in Switzerland. The questionnaire consisted of 17 questions, most of them giving the possibility of multiple choices of answers. The demographic profile, interests and satisfaction in periodontics were associated with the choice of treatment options offered for the management of six clinical situations.

Results: One thousand two hundred and one dentists sent back the questionnaire within three months and were thus included in the analysis. In general, the interest and the satisfaction in periodontics were moderate to high (6–7 on an analogue scale from 1 to 10). Specialists in periodontics indicated a significantly higher interest and satisfaction in periodontics than the general dentists ($p < 0.001$), and practitioners working in urban areas indicated a slightly higher interest ($p = 0.027$) and satisfaction (0.047) than their colleagues established in a rural setting. The predominant indication of root coverage procedures was aesthetics (90.7%). The region in which dentists worked was the only significant predictor for choosing ''no treatment'' of buccal recessions: dentists from the German-speaking part were significantly less inclined to surgically treat gingival recessions than their colleagues from the French or Italian part. For those who opted for therapy, a free tissue graft was generally the favourite option, followed by a connective tissue graft and a coronally advanced flap. Throughout, only a small fraction of the dentists considered using a guided tissue regeneration procedure. The relative odds for not extracting teeth with severe periodontal disease were higher if the dentist was a specialist than a generalist. Satisfaction in practicing periodontics also positively strengthened the inclination towards keeping severely compromised teeth.

Conclusions: Aesthetic concerns were the predominant indication for root coverage procedures. Further research should therefore include aesthetic aspects as primary clinical outcome variables. Specific training of dentists and their satisfaction in periodontics influenced treatment decisions. Specialists involved in continuing education should inform practicing dentists more efficiently on the potential and usefulness of periodontal therapy for saving and maintaining periodontally compromised teeth.

Key words: connective tissue; gingival recession; graft; guided tissue regeneration; resorbable/non-resorbable membranes

Accepted for publication: 25 August 2004

In subjects who exercise oral home care and have regular dental check-ups, gingival recession is the predominant periodontal lesion before 40 years (Heitz-Mayfield et al. 2003), and sites with recession seem to be susceptible for additional apical displacement of the gingival margin (Serino et al. 1994). Several procedures have been proposed for the treatment of buccal gingival recessions and three systematic reviews have assessed their efficacy by evaluating some quantitative aspects of treatment outcomes. The first review (Roccuzzo et al. 2002) included the coronally advanced flap, the lateral positioned flap, the free gingival graft, the connective tissue graft, guided tissue regeneration (GTR) with resorbable and non-resorbable membranes. Combining the results of six clinical trials (Jepsen et al. 1998, Trombelli et al. 1998, Zucchelli et al. 1998, Borghetti et al. 1999, Rosetti et al. 2000, Tatakis & Trombelli 2000), a significant advantage of connective tissue grafts over GTR was demonstrated by meta-analysis in terms of reducing recession (Roccuzzo et al. 2002). Overall it was concluded that all procedures were effective in reducing gingival recessions, with a slight advantage of connective tissue graft over- GTR. The second review (Oates et al. 2003), published after the completion of the present survey, compared connective tissue graft with GTR and came to the same conclusions. An additional review (Al-Hamdan et al. 2003) also evaluated data from currently available studies on root coverage procedures to repair gingival recession. GTR-based root coverage was found to successfully repair gingival recession defects, but conventional mucogingival surgery resulted in statistically better root coverage and width of keratinized gingiva. The patient's desire to improve esthetics is often mentioned as a major motive for intervention. Yet, in reviewing the pertinent literature, it can be noted that esthetic aspects have not been analysed in comparative studies and could therefore not be taken into consideration for the above-mentioned conclusions. Other justifications include dental hypersensitivity, problems in controlling plaque formation due to an unfavourable contour of the gingival margin, and the expectation that this will prevent further progression. While studies have documented favourable clinical results and their relative stability over time, treatments have not been compared to no therapy or a sham intervention, and thus the evidence for an advantage of surgical interventions in controlling these factors is limited.

Little is known about the knowledge transfer from research to clinical practice. It is essential to learn about possible gaps between research and practice in order to adapt continuing education and to ensure that researchers include questions that are relevant to practising dentists. The purpose of this study was therefore to evaluate the views, knowledge and preferences of a large sample of practicing dentists in periodontology, focusing specifically on the treatment of gingival recessions, and to compare the findings with the current evidence available in the dental literature.

Material and Methods

Study design and participants

We conducted a cross-sectional postal survey of 3780 dentists practising in Switzerland. This sample included all members of the Swiss Society of Odontology and the Swiss Dental Society, and represented the majority of all dentists working in this country (over 95%). We sent a structured questionnaire in German (2631), French (982) or Italian (167) according to the respective region to the 3780 dentists in summer 2003 and waited for the return of the questionnaire for a period of 3 months. We did not send any reminder. All questionnaires returned within the three months were included in the analysis.

Questionnaire

The questionnaire consisted of 17 questions, most of them giving the possibility of multiple choices of answers. The first questions (1–5) addressed the profile of the dentist. More specifically, we asked about the dentist's age, years since graduation, working area (urban *versus* rural area), specialty (general dentistry, periodontics, orthodontics, prosthodontics, maxillofacial surgery or other), and favourite professional subjects (oral surgery, aesthetic dentistry, implantology, endodontics, orthodontics, periodontics or prosthodontics). In addition, we recorded the number of subscriptions to dentistry journals.

Three questions (6–8) addressed the interest and satisfaction in periodontics: reading of specific periodontology journals (yes or no), interest in periodontics on a numerical scale from 1 (no interest) to 10 (high interest), and satisfaction in practising periodontics, again on a numerical scale from 1 (no satisfaction) to 10 (high satisfaction).

Questions 9–11 asked the dentists about their knowledge in the classification and etiology of gingival recessions as well as about the general indication of procedures for root coverage (dental hypersensitivity, aesthetics, prevention of further progression of a recession, occlusal stability, preservation of tooth vitality or others).

Questions 12–14 presented photographs of three clinical cases with buccal gingival recessions at different stages (see Figs 1–3) and offered a choice of the

Fig. 1. Buccal Miller class I recessions on upper lateral incisor, canine and first bicuspid (no radiographical signs of bone loss).

Fig. 2. More advanced buccal Miller class I recession on a lower lateral incisor (no radiographical signs of bone loss).

Fig. 3. Buccal Miller class III recession on lower canine with radiographic signs of bone loss.

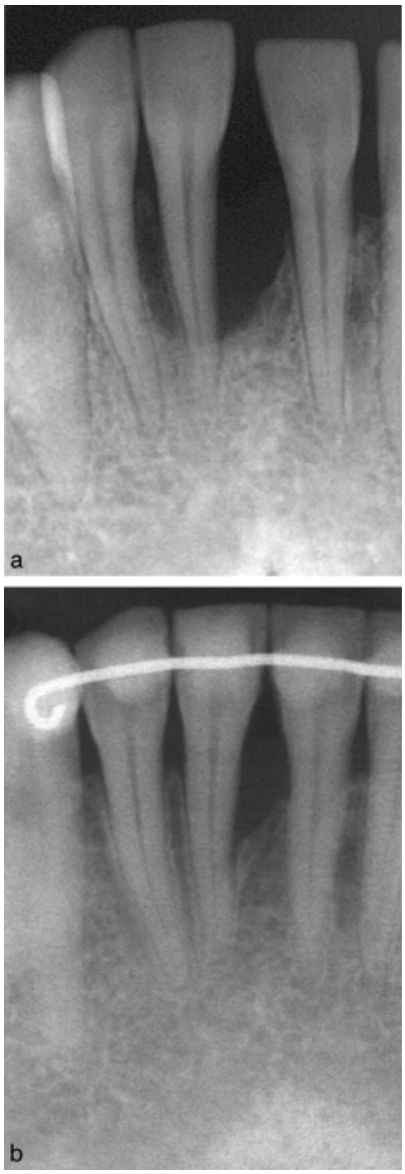

Fig. 4. (a) Advanced localized periodontal lesion on a mandibular incisor. All teeth are vital. (b) Same case 14 years after periodontal and orthodontic therapy.

following procedures (1) no treatment, (2) change of toothbrush, (3) change of brushing technique, (4) occlusal adjustment, (5) nightguard (occlusal splint), (6) referral to specialist, (7) coronally advanced flap, (8) free tissue graft, (9) connective tissue graft, (10) GTR with resorbable barrier membrane, (11) guided tissue regeneration with non-resorbable barrier, (12) application of tissue stimulating agent and (13) other procedures. Multiple answers were possible.

Three radiographs from patients with severe periodontal disease (Figs 4a, 5a and 6a) were shown finally, inviting the dentists to indicate their treatment choice. For the case with an advanced localized periodontal lesion on a vital mandibular incisor, shown in Fig. 4a, the following treatment options were offered (question 15): extraction and replacement with bridge, extraction and replacement with implant, root canal treatment, root planing, local antibiotics, flap surgery, bone graft, others. For the two cases with advanced periodontal disease, involving non-vital multirooted teeth, with furcation involvements, endodontic and restorative complications, shown in Figs 5a and 6a, the dentists were simply asked if they considered periodontal therapy a reasonable treatment option or not (yes, no, perhaps; questions 16 and 17). All teeth shown on these radiographs have a record of successful therapy and continue to be maintained perfectly for 14 (Fig. 4b) and 15 years (Figs 5b and 6b), respectively. This, however, was not indicated to the practitioners; Figs 4b, 5b, 6b were not shown in the questionnaire.

Statistical analysis

To describe the data we calculated medians, interquartile (IQR) and full ranges (min–max) for continuous measures and proportions for binary data.

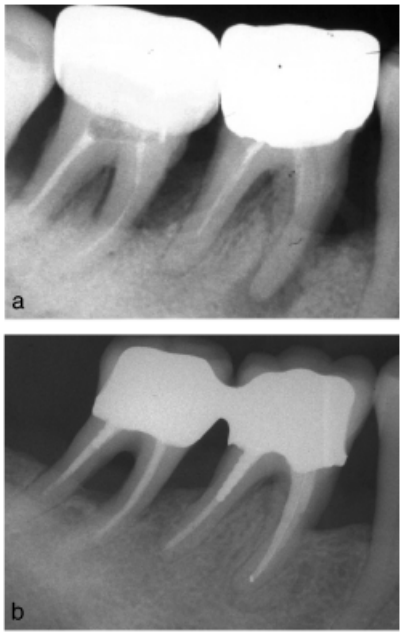

Fig. 5. (a) Advanced periodontal lesions involving non-vital multirooted teeth. (b) Same case 15 years after comprehensive periodontal, endodontic and prosthodontic therapy.

Fig. 6. (a) Advanced periodontal lesions involving non-vital multirooted teeth. (b) Same case 15 years after comprehensive periodontal, endodontic and prosthodontic therapy.

Table 1. Characteristics of respondents ($n = 1201$)

Age* (IQR; min–max)	45 (38–53; 26–76)
Years since graduation* (IQR; min–max)	18 (12–27; 1–49)
Number of respondents per region (% of all respondents)	
German-speaking part	868 (72.3)
French-speaking part	269 (22.4)
Italian-speaking part	64 (5.3)
Number of respondents per area (% of all respondents)	
Urban area	717 (59.7)
Rural area	474 (39.5)
No answer	10 (0.8)
Number of respondents per specialty† (% of all respondents)	
General dentistry	1014 (84.4)
Orthodontics	169 (14.1)
Periodontics	61 (5.1)
Prosthodontics	57 (4.7)
Maxillofacial surgery	13 (1.1)
Others	71 (5.9)
No answer	14 (1.2)
Favorite professional subjects† (% of all respondents)	
Esthetic dentistry	664 (55.3)
Prosthodontics	575 (47.9)
Oral surgery	457 (38.1)
Implantology	454 (37.8)
Endodontics	379 (31.6)
Periodontics	314 (26.1)
Orthodontics	187 (15.6)
No answer	41 (3.4)
Number of subscriptions to dentistry journals* (IQR; min–max)	2 (1–3; 0–25)

*Values are medians, IQR, Interquartile range; min—max, full range.
†Multiple answers were possible.

Table 2. Interest and satisfaction in periodontics on a numerical scale from 1 (no satisfaction) to 10 (high satisfaction)

Number of respondents reading periodontology journals (% of all respondents)	432 (36.5)
Interest in periodontics* (IQR; min–max)	
All dentists ($n = 1109$)	7 (6–8; 1–10)
General dentists ($n = 1001$)	7 (6–8; 1–10)†
Specialists in periodontics ($n = 34$)	10 (9–10; 3–10)†
Specialists in orthodontics ($n = 74$)	5.25 (4–7; 1–10)†
Satisfaction in periodontics* (IQR; min–max)	
All dentists ($n = 1072$)	6 (5–7; 1–10)
General dentists ($n = 993$)	6 (5–7; 1-10)†
Specialists in periodontics ($n = 33$)	8 (8–10; 6–10)†
Specialists in orthodontics ($n = 46$)	3.5 (2–6; 1–8)†

*Values are medians, IQR, interquartile range, min–max, full range.
†Statistically significant differences between all three groups, $p < 0.001$.

Because data differed significantly from a normal distribution as assessed using the Kolmogorov–Smirnov test and normal quantile–quantile plots, non-parametric tests were used for formal testing of differences between subgroups (Mann–Whitney *U*-test and Kruskal Wallis test) or for correlations (Spearman rank correlation coefficient).

We formulated several a priori hypotheses about associations of the dentists' profile and their interests in periodontics with the treatment options they would choose for the six clinical situations (Figs 1–6). We first tested our hypothesis using logistic regression with the answer (yes/no) as the dependent variable and each profile variable as the independent variable. We then built multiple logistic regression models including all significant predictor variables in order to obtain dentist profiles that would be associated to the answers given. Where only one or two of our variables were significantly predictive, we analysed the subgroups using non-parametric tests.

As an example, we hypothesized that higher interest in periodontics was negatively associated with ''no treatment'' and that specialists opted for ''no treatment'' less often. For ''referral to specialists'', we analysed only the data from the general dentists because only they are confronted with this option. We also hypothesized that general dentists with

Table 3. Respondents preferences to treat gingival recessions as presented in the three cases (all dentists)

Treatment	Number of respondents (%)		
	case 1	case 2	case 3
No treatment	529 (44.0)	281 (23.4)	47 (3.9)
Change of toothbrush	587 (48.9)	603 (50.2)	491 (40.9)
Change of brushing technique	943 (78.5)	969 (80.7)	758 (63.1)
Occlusal adjustment	49 (4.1)	99 (8.2)	66 (5.5)
Nightguard (occlusal splint)	24 (2.0)	20 (1.7)	10 (0.8)
Referral to specialist	25 (2.1)	155 (12.9)	571 (47.5)
Coronally advanced flap	67 (5.6)	153 (12.7)	202 (16.8)
Free tissue graft	28 (2.3)	248 (20.6)	403 (33.6)
Connective tissue graft	44 (3.7)	194 (16.2)	342 (28.5)
Guided tissue regeneration with resorbable barrier	4 (0.3)	11 (0.9)	112 (9.3)
Guided tissue regeneration with non-resorbable barrier	0 (0.0)	2 (0.2)	24 (2.0)
Application of tissue stimulating agent	3 (0.2)	17 (1.4)	53 (4.4)
Other procedures	40 (3.3)	64 (5.3)	65 (5.4)

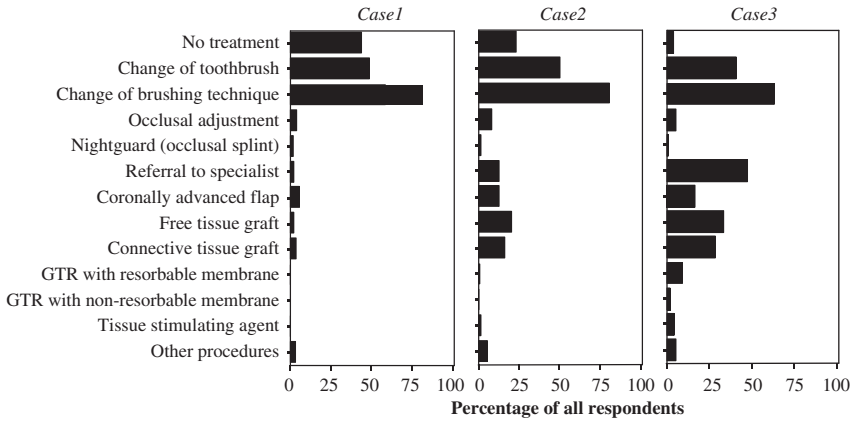

Fig. 7 Treatment options selected by the respondents for the therapy of the gingival recessions presented Figs 1–3 (all dentists).

Table 4. Preferences of all dentists grouped per to treat gingival recessions as presented in the three cases

Treatment	Percentage of respondents								
	case 1			case 2			case 3		
	German	French	Italian	German	French	Italian	German	French	Italian
No treatment	45.6	42.4	29.7	25.8	19.0	9.4	4.8	1.5	1.6
Referral to specialist	2.0	2.2	3.1	10.8	20.4	9.4	44.2	60.2	39.1
Coronally advanced flap	6.3	3.7	3.1	13.4	9.7	17.2	18.7	12.6	9.4
Free tissue graft	2.8	1.5	0.0	21.7	19.3	12.5	35.8	26.8	31.3
Connective tissue graft	4.5	1.9	0.0	19.2	7.1	12.5	32.6	16.0	25.0
Guided tissue regeneration with resorbable barrier membrane	0.5	0.0	0.0	1.0	0.7	0.0	10.0	5.9	14.1
Guided tissue regeneration with non-resorbable barrier	0.0	0.0	0.0	0.2	0.0	0.0	2.2	1.9	0.0

less years since graduation would more likely refer a patient to a specialist and that dentists with low interest in periodontics and from rural areas (where less specialists may be available to refer patients to) would refer less often. To explore whether interest, satisfaction and specialization in periodontics was associated with the tendency to keep the teeth shown in Figs 4a, 5a, 6a, we formulated the hypothesis that dentists with high interest and satisfaction, as well as specialists, would try to keep those teeth and treat them periodontally. With regard to preferences for specific surgical procedures, we hypothesized that younger dentists would choose connective tissue grafts more often and free tissue grafts less often than their older colleagues.

All statistical analyses were performed with SPSS for Windows version 10.0 (SPSS Inc., Chicago, IL, USA).

Results

Overall, 1201 of 3780 dentists sent back the questionnaire (31.8%); the return rate was 32.9% for the German-speaking dentists, 27.4% for the French-speaking dentists and 38.3% for the Italian-speaking dentists. The characteristics of the dentists are summarized in Table 1. Median age was 45 years (IQR 38–53) and median years of experience since graduation was 18 years (IQR 12–27 and full range 1–49 years). 72.3% were German-speaking, 22.4% French-speaking and 5.3% Italian-speaking dentists; 59.7% were practising in an urban area. The majority (84.4%) were general dentists; 14.1% had specialized in orthodontics and 5.1% in periodontics. The 61 periodontists sending back the questionnaire represented 77% of all actively practising, board-certified periodontists in the country. The favourite professional subjects were aesthetic dentistry (55.3%), followed by prosthodontics (47.9%), oral surgery (38.1%) and implantology (37.8%). Only 26.1% indicated a special interest in periodontics.

Table 2 shows the dentists' interests and satisfaction in periodontics. 36.5% of all dentists read specific periodontology journals. In general, the interest and the satisfaction in periodontics were moderate to high (7, IQR 6–8 and 6, IQR 5–7, respectively). The German-speaking dentists indicated the highest interest, and the Italian-speaking dentists indicated the highest degree of satisfaction in periodontics, but the differences between language groups did not reach statistical significance ($p = 0.07$ for interest and $p = 0.15$ for satisfaction). Not surprisingly, specialists in periodontics indicated a significantly higher interest and satisfaction in periodontics than the general dentists ($p < 0.001$) and, in turn, the general dentists had significantly higher interest and

satisfaction in periodontics than specialists in orthodontics ($p < 0.001$). Dentists working in urban areas indicated a slightly higher interest ($p = 0.027$) and satisfaction (0.047) in periodontics than their colleagues in rural areas. A high correlation could be demonstrated between interest and satisfaction ($r = 0.66$).

23.1% of the respondents knew that the gingival recessions could be classified according to an index proposed by Miller (1985). 63.7% admitted that they had forgotten, 7.6% gave a wrong and 5.7% no answer at all. The major causes of gingival recessions were thought to be the following: 91.5% of all respondents considered traumatic tooth brushing, 63.0% considered the position of the tooth in the dental arch, and 33.5% considered plaque accumulation as a major cause of gingival recessions (multiple answers were possible). Trauma from occlusion was indicated by 33.5% of the respondents, overhanging restorations by 28.1% and combined endodontic/periodontal lesions by 8.7% of all respondents.

The three predominant answers to the question regarding the indications of root coverage procedures were aesthetics (90.7%), stopping the progression of the recession (67.1%), and tooth hypersensitivity (57.7%). The preservation of pulp vitality (3.1%), occlusal stability (2.1%) and other reasons (2.6%) were infrequently mentioned.

Table 3 and Fig. 7 show the preferences of the dentists for treatment options for the three clinical situations presented in Figs 1–3. For all three situations, the respondents frequently recommended a change of toothbrush (48.9%, 50.2%, 40.9%, respectively) and a change of brushing technique (78.5%, 80.7%, 63.1%, respectively). The proportion of dentists opting for no treatment was 44.0% for case 1 and 23.4% for case 2, but only 3.9% for case 3. For case 1, all additional options for intervention were infrequently selected and were therefore not analysed further. For the problem presented in Fig. 2, a referral to a specialist was an option for 12.9% of dentists. To correct this condition, the respondents would have chosen the three surgical procedures as follows: 20.6% free tissue graft, 16.2% connective tissue graft, 12.7% coronally advanced flap. For case 3, referral to a specialist was considered by 47.5% of all respondents. For 33.6% a free tissue graft was a treatment option, 28.5% chose the connective tissue graft and 16.8% the coronally advanced flap. Throughout, only a small fraction of the dentists considered using a GTR procedure, and the use of non-resorbable membranes for such a treatment was particularly out of favour. In addition, only very few dentists would see an indication for the application of a tissue-stimulating agent.

The region in which dentists worked was the only significant predictor for choosing ''no treatment'' in all three cases: dentists from the German-speaking part were significantly less inclined to treat in all three cases than their colleagues from the French or Italian part ($p = 0.38$ for case 1, $p = 0.02$ for case 2 and $p = 0.28$ for case 3). Besides the region, the interest in periodontics was the only other significant predictor for therapy, but not in the way we had anticipated, and only for case 3: with every point increase on a scale from 0 to 10, the odds of choosing ''no treatment'' increased by 1.3 (adjusted $B = 0.25$, $p = 0.005$). Also contrary to our expectation, we did not observe any association of years since graduation with an inclination to treat.

For case 3, every additional 5 years of experience of a general dentist was associated with increased odds of 5.1 (adjusted $B = 0.02$, $p = 0.003$) for referring the patient. Higher interest was associated with less referral (adjusted $B = -0.34$, $p < 0.001$). The region (German, French or Italian part) and urban or rural area of practice showed no significant association with the option to refer cases 2 or 3 to a specialist ($p = 0.13$ and 0.64, respectively). We found a similar negative association of interest with referral for case 2 ($B = -0.21$, $p < 0.001$), whereas for years of experience, there was no significant association.

The hypothesis that dentists who graduated after 1990 chose connective tissue grafts more often and free tissue grafts less often than those who graduated earlier was rejected.

For the vital mandibular incisor with an advanced localized periodontal lesion (Fig. 4), 24.6% of all dentists selected extraction and replacement with a bridge and 32% selected extraction and replacement by an implant. 2.4% saw an indication for a devitalization, 36.7% for root planing, 30% for local antibiotic therapy, 29.1% for a flap surgery, 35.2% for a bone graft and 17.2% suggested another treatment option (multiple answers were possible). The relative odds for not extracting the tooth were 2.8 times higher if the dentist was a specialist than a generalist (adjusted $B = 1.02$, $p = 0.002$). Satisfaction in practising periodontics also positively strengthened the inclination towards keeping the tooth (adjusted $B = 1.09$, $p = 0.016$).

Only 6.6% dentists were confident that periodontal therapy was meaningful for the lower molars shown in Fig. 5, with advanced periodontal disease, complicated by furcation involvements, the presence of endodontic problems and ill-fitting crowns. 33.7% dentists were not sure and 58.2% of them opted against a periodontal treatment in this situation. Again, a high level of satisfaction in practising periodontics significantly influenced the tendency to perhaps or surely go for periodontal therapy (adjusted $B = 0.1$, $p = 0.003$). Being specialists in periodontics did not reach statistical significance as a predictor in this case (adjusted $B = 0.48$, $p = 0.08$). For the situation shown radiographically in Fig. 6, 66.9% of all dentists responded that they would not consider a periodontic treatment, 27.6% were not sure and 3.7% would consider treating. For this case, being a specialist was significantly predictive for choosing therapy (adjusted $B = 0.98$, $p < 0.001$) and satisfaction was also associated positively with periodontal treatment (adjusted $B = 0.11$, $p = 0.002$).

Discussion

At the time the survey was conducted the systematic review by Roccuzzo et al. (2002) was published, but the articles by Oates et al. (2003) and Al-Hamdan et al. (2003) were not yet available. All three reviews concluded that gingival recessions could be reduced successfully with several methods, and that connective tissue grafts had a slight advantage over GTR involving the placement of a resorbable or non-resorbable barrier. The most frequently mentioned motive for root coverage procedures in our survey was aesthetics: over 90% of the dentists considered aesthetics as an indication, ranking it first among all potential reasons for intervention. If aesthetics is the most frequent reason to perform root-covering procedures, then the aesthetic outcome should also be the paramount aspect to be evaluated scientifically. Differences between procedures in inducing changes of gingival

colour and contour may be more consequential than vertical gain from an aesthetic point of view. Such aspects have not been analyzed in comparative studies, and could therefore not be evaluated in systematic reviews.

One may speculate that the significant relationship between the interest in periodontics and the tendency to opt for ''no treatment'' as well as the significant association of years in practice with the increased general practitioners' preference for referral, shown in our survey, may be because of a higher awareness of risks for negative aesthetic effects. For further interpretation of the percentage figures of dentists opting for no treatment (Fig. 1: 44.0%, Fig. 2: 23.4%, Fig. 3: 3.9%), one should bear in mind that studies evaluating procedures for the treatment of recessions have hardly ever included negative controls. Since initial benefits and stability over time have not been compared to no therapy or a sham intervention, the responses probably reflect experiences and opinions prevailing among periodontal teachers. The significant impact of the region for choosing ''no treatment'' (respondents from the German-speaking part were less inclined to treat than their French- or Italian-speaking colleagues) may mirror language- and region-specific patterns of exposure to views expressed in continuing education. In this context, it may be worthwhile to recall the results of a reassessment of sites with keratinized gingiva deemed inadequate, but left untreated during 18 years (Freedman et al. 1992, 1999), indicating that areas with small amounts of keratinized tissue may remain stable.

Mechanical trauma, induced by tooth brushing, is considered the dominant factor for the development of recessions. This view has been supported by multiple association studies, is reflected in major textbooks (Wennstrom & Pini Prato 2003), and was the predominant opinion also of the respondents in our survey. Many respondents considered malposition of the tooth in the dental arch important as well, and this also corresponds to the general consensus.

The present study revealed a poor acceptance of, and/or low confidence in GTR procedures to treat recession problems. Non-resorbable barriers, introduced in the early 1990s for this indication (Pini Prato et al. 1992), appeared to be particularly unpopular among the respondents of our survey. To correct the conditions shown in Figs 2 and 3, free tissue grafts were the first, connective tissue grafts the second, and coronally advanced flaps the third choice. Although discussed already in the first volume of Journal of Clinical Periodontology (Edel 1974), connective tissue grafts (Langer & Langer 1985, Nelson 1987) seem to have become popular in Switzerland only in recent years. Our hypothesis therefore, that, younger dentists (graduated after 1990) would choose connective tissue grafts more often and free tissue grafts less often than their older colleagues, could, however, not be substantiated.

Three radiographs from patients with severe periodontal disease (Figs 4a, 5a and 6a) were shown finally to probe to what extent dentists today are inclined to keep and treat teeth with a serious periodontal problem. Our survey documents the poor confidence and perceived utility of periodontal therapy for severely compromised teeth. The teeth presented in Figs 4a, 5a and 6a have actually been treated successfully 14 and 15 years ago, and are perfectly functional today (see Figs 4b, 5b and 6b). Maintenance care is provided by a periodontist in private practice. A study analysing the residual periodontal attachment in extracted teeth (Splieth et al. 2002) concluded that the threshold for periodontal extractions seems to be too low and undifferentiated, which calls for an improvement in knowledge of periodontal diagnosis and treatment. Our survey confirmed the hypothesis that dentists with special training and/or a high degree of satisfaction in periodontics were more inclined to try periodontal treatment. If dentists were periodontists or indicated a high satisfaction in practicing periodontics the odds for not extracting teeth with severe periodontal disease increased significantly, indicating that the selection of the ''right'' dentist is crucial if a patient wants to keep severely compromised teeth.

Our study showed that the most important indication for treatment of gingival recessions was aesthetics. This is, however, not reflected in clinical trials. Further research should include clinical outcomes such as aesthetics that are relevant for patients and dentists. In addition, specialists involved in continuing education should inform practising dentists more efficiently on the potential of periodontal therapy for saving and maintaining periodontally compromised teeth.

Acknowledgements

The authors thank Dr Bertrand Dubrez, SSO/SSP board-certified periodontist, Lausanne, Switzerland, for the contribution of the radiographs shown in Figs 4–6.

Many thanks also to the colleagues who took the time to fill out and return the questionnaire, and to the family members and office staff of CZ for support and technical assistance.

Reference

Al-Hamdan, K., Eber, R., Sarment, D., Kowalski, C. & Wang, H. L. (2003) Guided tissue regeneration-based root coverage: meta-analysis. *Journal of Periodontology* **74**, 1520–1533.

Borghetti, A., Glise, J. M., Monnet-Corti, V. & Dejou, J. (1999) Comparative clinical study of a bioabsorbable membrane and subepithelial connective tissue graft in the treatment of human gingival recession. *Journal of Periodontology* **70**, 123–130.

Edel, A. (1974) Clinical evaluation of free connective tissue grafts used to increase the width of keratinised gingiva. *Journal of Clinical Periodontology* **1**, 185–196.

Freedman, A. L., Green, K., Salkin, L. M., Stein, M. D. & Mellado, J. R. (1999) An 18-year longitudinal study of untreated mucogingival defects. *Journal of Periodontology* **70**, 1174–1176.

Freedman, A. L., Salkin, L. M., Stein, M. D. & Green, K. (1992) A 10-year longitudinal study of untreated mucogingival defects. *Journal of Periodontology* **63**, 71–72.

Heitz-Mayfield, L. J., Schatzle, M., Loe, H., Burgin, W., Anerud, A., Boysen, H. & Lang, N. P. (2003) Clinical course of chronic periodontitis. II. Incidence, characteristics and time of occurrence of the initial periodontal lesion. *Journal of Clinical Periodontology* **30**, 902–908.

Jepsen, K., Heinz, B., Halben, J. H. & Jepsen, S. (1998) Treatment of gingival recession with titanium reinforced barrier membranes versus connective tissue grafts. *Journal of Periodontology* **69**, 383–391.

Langer, B. & Langer, L. (1985) Subepithelial connective tissue graft technique for root coverage. *Journal of Periodontology* **56**, 715–720.

Miller, P. D. , Jr. (1985) A classification of marginal tissue recession. *International Journal of Periodontics and Restorative Dentistry* **5**, 8–13.

Nelson, S. W. (1987) The subpedicle connective tissue graft. A bilaminar reconstructive procedure for the coverage of denuded root surfaces. *Journal of Periodontology* **58**, 95–102.

Oates, T. W., Robinson, M. & Gunsolley, J. C. (2003) Surgical therapies for the treatment of gingival recession. A systematic review. *Annals of Periodontology* **8**, 303–320.

Pini Prato, G., Tinti, C., Vincenzi, G., Magnani, C., Cortellini, P. & Clauser, C. (1992) Guided tissue regeneration versus mucogingival surgery in the treatment of human buccal gingival recession. *Journal of Periodontology* **63**, 919–928.

Roccuzzo, M., Bunino, M., Needleman, I. & Sanz, M. (2002) Periodontal plastic surgery for treatment of localized gingival recessions: a systematic review. *Journal of Clinical Periodontology* **29** (Suppl. 3), 178–194; discussion 195–176.

Rosetti, E. P., Marcantonio, R. A., Rossa, C., Jr., Chaves, E. S., Goissis, G. & Marcantonio, E., Jr. (2000) Treatment of gingival recession: comparative study between subepithelial connective tissue graft and guided tissue regeneration. *Journal of Periodontology* **71**, 1441–1447.

Serino, G., Wennstrom, J. L., Lindhe, J. & Eneroth, L. (1994) The prevalence and distribution of gingival recession in subjects with a high standard of oral hygiene. *Journal of Clinical Periodontology* **21**, 57–63.

Splieth, C., Giesenberg, J., Fanghanel, J., Bernhardt, O. & Kocher, T. (2002) Periodontal attachment level of extractions presumably performed for periodontal reasons. *Journal of Clinical Periodontology* **29**, 514–518.

Tatakis, D. N. & Trombelli, L. (2000) Gingival recession treatment: guided tissue regeneration with bioabsorbable membrane versus connective tissue graft. *Journal of Periodontology* **71**, 299–307.

Trombelli, L., Scabbia, A., Tatakis, D. N. & Calura, G. (1998) Subpedicle connective tissue graft versus guided tissue regeneration with bioabsorbable membrane in the treatment of human gingival recession defects. *Journal of Periodontology* **69**, 1271–1277.

Wennstrom, J. L. & Pini Prato, G. (2003) Mucogingival therapy – periodontal plastic surgery. In: Lindhe, J., Karring, T. & Lang, N. P. (eds). *Clinical Periodontology and Implant Dentistry*, 4th edition, pp. 576–649. Oxford: Blackwell-Munksgaard.

Zucchelli, G., Clauser, C., De Sanctis, M. & Calandriello, M. (1998) Mucogingival versus guided tissue regeneration procedures in the treatment of deep recession type defects. *Journal of Periodontology* **69**, 138–145.

Address:
Andrea Mombelli
School of Dental Medicine
University of Geneva
19 rue Barthèlemy-Menn
CH-1211 Geneva 4
Switzerland