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Schröen, Ola ; Sahrman, Philipp ; Roos, Malgorzata ; Attin, Thomas ; Schmidlin, Patrick R

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OLA SCHRÖEN¹
PHILIPP SAHRMANN¹
MALGORZATA ROOS²
THOMAS ATTIN¹
PATRICK R. SCHMIDLIN¹

¹ Clinic for Preventive Dentistry,
Periodontology and Cariology,
Centre for Dental and Oral
Medicine and Maxillofacial Surgery,
University of Zurich, Switzerland
² Biostatistics Unit, ISPM, University
of Zurich, Hirschengraben 84,
8001 Zurich, Switzerland

Corresponding author
PD Dr. Patrick R. Schmidlin
Plattenstrasse 11
8032 Zürich, Switzerland
Tel. +41 44 634 08 46
Fax +41 44 634 43 08
E-mail:
patrick.schmidlin@zzm.uzh.ch
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A survey on regenerative surgery performed by Swiss specialists in Periodontology with special emphasis on the application of enamel matrix derivatives in infrabony defects

Keywords: periodontitis, regeneration, GTR, enamel matrix protein, Emdogain, survey

Summary This survey aimed to evaluate the common practice of regenerative periodontal surgery with special regard to the use of enamel matrix derivatives (EMD, Emdogain®) by board-certified specialists in periodontology and non-certified, but active members of the Swiss Society of Periodontology (SSP).

A cross-sectional postal survey of 533 dentists, representing all members of the SSP practising in Switzerland, was conducted. The questionnaire consisted of three sections, assessing: 1) general personal information regarding the practice setting and education, 2) general questions regarding periodontal surgery practices and 3) specific questions regarding the use of EMD. The information obtained was compared and differences between specialists and non-specialists were calculated. P-values smaller than 5% were considered significant.

Sixty-nine percent of the specialists answered the questionnaire, compared to only 37.4% of the non-specialists (overall: 42.4%). In general, specialists performed surgeries more frequently, and presented a significantly higher percentage of EMD users than the non-specialists. The application guidelines were followed in general. Some differences were observed in application and selection criteria. The subjective perception of clinical success varied greatly among clinicians. Residual pockets were reported to be present in approximately one third of the defects after therapy. In conclusion, this survey revealed that EMD was used on a regular basis by dentists performing periodontal therapy. In addition, the answers by both groups generally corresponded well with the current available literature.

Introduction

Non-surgical and surgical periodontal therapy leads to a recovery of the periodontal tissues by reparative wound healing (CATON & ZANDER 1979). Materials and techniques are available now, which aim to stimulate regeneration of the original tissues. In the 1980s, occlusive membranes were introduced to impede apical migration of the epithelium and to provide space

and time for cells of the periodontal ligament, cementum and bone to reform original tissue structures. This technique became known as guided tissue regeneration (GTR) (GOTTLOW ET AL. 1986, PONTORIERO ET AL. 1987). There is evidence of effectiveness, especially when dealing with infrabony and furcation defects (CORTELLINI & TONETTI 2000). In the 1990s, enamel matrix derivatives (EMD; Emdogain®, Straumann, Basel, Switzerland) became commercially available. They allow for regenerative

procedures without necessarily applying membranes and/or filler materials (SCULEAN ET AL. 2007). Several original articles have compared their usage to classical flap procedures and open debridement and have evaluated the additional benefit in the clinical outcomes (CORTELLINI & TONETTI 2000, ESPOSITO ET AL. 2005, NEEDLEMAN ET AL. 2006, TU ET AL. 2008). These studies underline that EMD may exhibit a measurable positive clinical effect in combination with surgical treatment of periodontally diseased teeth when treating infrabony defects and furcations, provided that correct indications are pursued and the patients' compliance is adequate. Still, there is little information available concerning the acceptance, application modalities and outcome of EMD use outside of university clinic and research environments.

The purpose of this study was therefore to evaluate the range of application, frequency of utilization and subjective outcomes in the use of EMD during routine clinical practise among the Swiss specialists in periodontology (SP), and to compare their professional attitude to the non-specialist (NSP) but active members of the Swiss Society of Periodontology (SSP).

Materials and Methods

Study design and participants

A cross-sectional postal survey was designed by two of the authors (OS, PRS) and sent in October 2008 to the 533 dentists registered as members of the SSP. Within this association two member categories exist: board-certified specialists, with a primary emphasis on periodontitis treatment in private practice or university clinics, and non-specialists, who actively follow and are engaged in current periodontal treatment modalities. Both groups represent dentists with a special interest in periodontology and proven continuing education in periodontology as requested by the society. All addressees were asked to respond within three months. A reminder telephone call was made after two months. All questionnaires, returned within three months, were included in the analysis.

Questionnaire

The questionnaire was subdivided into three sections. Most of the questions were posed in a multiple-choice format.

The first section addressed the profile of the dentist and his practice. Questions addressed the dentist's age and gender as well as the number of years with working experience, the working area (urban, suburban or rural area), and whether dental hygienists were employed.

In the second section, general questions regarding periodontal treatment were asked concerning the number of patients with moderate and severe periodontitis, the number of surgical

periodontal treatments performed per month and the number of regenerative surgical procedures performed by the dentists. Furthermore, we asked questions concerning general surgical techniques.

The third section dealt with specific questions regarding the use of EMD, e.g. patient- and site-dependent indications for the use of EMD and additional regenerative materials, intra- and postoperative regimes and treatment outcomes. Moreover, we asked for an estimate of the patients' acceptance regarding EMD and the number of rejections to EMD use by the patients and their reasons why.

Statistical analysis

The following descriptive statistics: median, IQR (interquartile range), minimum, maximum and relative frequencies were computed.

The Mann-Whitney-U-Test was applied in order to examine the differences between SP and NSP regarding continuous variables such as age and experience.

The Fisher-Exact-Test and Chi2-Test were used for the detection of dependence between the SP and NSP regarding the discrete features.

The multiple logistic regression was applied in order to find out which features are common to SP. First, we evaluated the features that were significant in the univariate analyses using a univariate logistic regression. The univariate ORs (odds ratio) with the respective 95% CIs (confidence interval) were calculated. A square-root-transformation was applied to the number of surgeries per month. For the final multiple model we calculated the ORs with the corresponding 95% CIs and conducted a ROC (receiver operating characteristic) analysis. AUC (area under the curve) estimates allowed for distinction between the specialist group and the generalist group.

The evaluation was carried out using StatView Version 5.0.1 (Abacus Concepts, Berkeley, CA, USA) as well as SPSS Version 17 (SPSS, Chicago, IL, USA). Analysis results showing p-values smaller than 5% were considered statistically significant.

Results

A total of 226 of the 533 dentists queried answered the questionnaire (42.4%). The return rate was 69.6% for the SP and 37.4% for the NSP.

Median age of the SP was 48 years, whereas the median age of the NSP was 53 years ($p=0.001$). There were (significantly) more men than women in both groups (84 and 86%, respectively). Median working experience of the SP was 20 years compared to 25 years of the NSP ($p=0.006$). Seventy-seven percent of the SP worked in urban locations, compared to 58% of the

Tab. I General questions relating to practitioner and practice

	Specialists (n = 64)	P	Non-specialists (n = 162)
Age (years)	Median = 48 (IQR = 14); 30–73	0.0010	Median = 53 (IQR = 12); 29–72
Sex: Men	84%	0.6746	86%
Women	16%		14%
Working experience (years)	Median = 20 (IQR = 13); 6–49	0.0060	Median = 25 (IQR = 10); 2–46
Location of the practice: Rural	12%	0.0255	19%
Suburban	11%		23%
Urban	77%		58%
Employment of a Dental Hygienist	63%	0.0066	43%

NSP group. Sixty-three percent of the SP employed a dental hygienist, in contrast to 43% in the NSP active member category (Tab. I).

The answers concerning aspects of general periodontal surgery are summarized as follows (Tab. II): SP performed significantly more periodontal surgeries than NSP and reported that periodontitis patients in their practice have a greater need for surgery ($p < 0.0001$). There was a tendency that SP perform more regenerative surgical procedures than NSP ($p = 0.0390$). Both groups reported the use of similar instruments to clean contaminated surfaces. Rotary instruments were more frequently applied by SP (78%, $p = 0.0033$). Chlorhexidine, as a disinfectant, was used more frequently by NSP ($p = 0.0009$). In contrast, more SP used EDTA (ethylenediaminetetraacetic acid) for chemical conditioning of the root surface than NSP ($p < 0.0001$). All other disinfectants and/or conditioners were used in comparable small amounts.

Table III provides information regarding more specific questions concerning the use of EMD and other potential regenerative materials: eighty-three percent of the SP, as compared to 48% of the other dentists, used commercially available EMD ($p < 0.0001$). Sixty-one percent of the SP and 34% of the other dentists used EMD without fillers ($p = 0.0003$). EMD, in combination with bone fillers, were used more frequently by SP ($p = 0.032$).

The primary indication for applying EMD in infrabony defects was the presence of 3-wall defects for both groups of dentists. In 2-wall and 1-wall defects, EMD was more frequently applied by NSP ($p = 0.0152$).

More than 70% of both groups indicated that EMD does not replace other regenerative procedures, especially when using

membranes. The most often indicated reason for usage was "easier to use" (17%), followed by "less postoperative morbidity" (12%) and the prospect of "better results" (6%).

The median limit for plaque scores still acceptable for regenerative procedures using EMD was considered 20%, with a maximum of 30% for both groups. In principle, smoking was considered a contraindication in 28% in both groups, whereas smoking up to ten cigarettes per day was tolerated by more than 50% of the therapists. About 20% of the dentists prescribed antibiotics after regenerative surgery with EMD. In almost every case, analgesics and antiseptics were provided for postoperative care.

The percentage of cases with EMD showing no effect in terms of radiographic bone fill was 20% for the SP and 23% for the NSP group, respectively. The percentage of cases which showed complete radiographic healing was 30% for the SP and 50% for the NSP group, respectively. The persistence of periodontal pockets deeper than 3 mm after the use of EMD was 30% and 50%, respectively. These values showed no statistically significant difference ($p > 0.05$).

The multiple logistic regression analysis (AUC=0.878, $p < 0.001$) revealed that the members of the SP category had a larger need for periodontal surgery, OR=1.02 with 95% CI (1.001, 1.033), conducted more periodontal surgeries per month, OR=3.8 with 95% CI (2.3, 6.1), and used EMD more frequently, OR=2.8 with 95%CI (1.09, 7.4), than the NSP.

Discussion

This survey was undertaken in Switzerland among a group of 226 SP and NSP. It revealed that EMD were widely used within

Tab. II General questions relating to periodontal surgery

	Specialists	P	Non-specialists
Overall need for periodontal surgery (% of cases)	Median = 40 (IQR = 49); 5–95	<0.0001	Median = 11 (IQR = 25); 1–100
Overall periodontal surgeries performed per month (N)	Median = 8 (IQR = 8); 0–60	<0.0001	Median = 2 (IQR = 3); 0–20
Percentage of regenerative techniques (% of cases)	Median = 10 (IQR = 30); 1–100	0.0390	Median = 10 (IQR = 40); 0–100
Debridement methods (%)			
Manual instruments	98%	0.6758	97%
Ultrasonic instruments	75%	0.1209	85%
Rotary instruments	78%	0.0033	56%
Oscillating instruments	16%	0.1562	25%
Blasting instruments	13%	>0.9999	12%
Brushes/rubber cups	21%	0.1360	31%
Laser	6%	0.5994	9%
Rinsing methods (%)			
None	9%	0.5687	6%
Sterile NaCl	61%	0.5487	56%
Chlorhexidine	41%	0.0009	66%
Sodiumhypochlorite	0%	0.1085	5%
H ₂ O ₂	13%	0.2451	19%
EDTA	53%	<0.0001	23%
Iodine	13%	0.4493	8%
Citric acid	5%	0.7623	7%

Tab. III Specific questions relating to the use of regenerative materials and techniques

	Specialists	P	Non-specialists
Regenerative materials			
Overall regenerative procedures using EMD	83%	<0.0001	48%
EMD without filler	61%	0.0003	34%
EMD in combination with a filler	39%	0.0320	24%
Use of additional membranes	25%	0.1836	38%
Special flap technique (e.g. papilla preservation, etc.)			
	91%	<0.0001	56%
Periodontal dressing			
	23%	0.3789	16%
Indications for EMD in vertical defects (%)			
One-wall	Median = 1 (IQR = 25); 0–100	0.1371	Median = 15 (IQR = 50); 0–100
Two-wall	Median = 20 (IQR = 46); 0–100	0.0152	Median = 50 (IQR = 46); 0–100
Three-wall	Median = 50 (IQR = 70); 0–100	0.1308	Median = 50 (IQR = 70); 0–100
Does EMD replace GTR? (%)			
No	85%	0.0598	70%
If "yes", why?			
Easier	17%	0.3854	25%
Better results	6%	0.5233	11%
Less postoperative morbidity	12%	0.2329	21%
Better cost/benefit	4%	0.3093	9%
Minimally required plaque score (%)			
	Median = 20 (IQR = 5); 7–30	0.386	Median = 20 (IQR = 6); 0–30
"Doesn't matter"	4%	0.0663	15%
EMD/GTR in smokers (%)			
No	28%	>0.9999	28%
Yes, <10 cigarettes per day	52%	0.4666	60%
Yes, 10–20 cigarettes per day	17%	0.3005	11%
Yes, >20 cigarettes per day	6%	0.3992	3%
Use of antibiotics (%)			
	19%	>0.9999	20%
Bacteriological testing	4%	0.2002	11%
Post-operative care (%)			
Ice	48%	0.3636	58%
Analgesics	90%	0.4263	85%
Antiseptics	87%	>0.9999	85%
Routine parameters before & after			
Recessions	69%	0.7035	65%
Probing depths	100%	0.1445	95%
Furcations	92%	0.1836	82%
Tooth mobility	63%	0.3326	72%
Vitality test	53%	0.1980	65%
X-ray	86%	0.5665	91%
Patient acceptance of Emdogain (%)			
How many patients reject treatment with Emdogain?	Median = 20 (IQR = 20); 1–50	0.5213	Median = 20 (IQR = 19); 2–40
Estimated success rate (%)			
Failure (no radiographic bone fill)	Median = 20 (IQR = 20); 0–80	0.1493	Median = 23 (IQR = 20); 0–75
Success (complete bone fill)	Median = 30 (IQR = 50); 0–100	0.1110	Median = 50 (IQR = 40); 0–100
Residual pockets	Median = 30 (IQR = 30); 5–100	0.3392	Median = 30 (IQR = 35); 5–100
Personal estimate of patient acceptance			
Scale 1–10 (1: absolutely unsatisfied, 10: absolutely satisfied)	Median = 8 (IQR = 2); 2–10	0.9525	Median = 7 (IQR = 1), 2–10

both groups of dentists and that SP used it significantly more frequently than NSP. The results achieved with EMD showed a broad variability: in 30% of the SP cases and 50% of the NSP

cases, a complete bone fill as measured on radiographs was indicated, but in about one fifth of the treated cases, the users of both groups stated that there was no radiographic bone gain

after application of EMD. However, the survey disclosed a great range of these values in both groups, SP and NS. This finding suggests that the technique might still be sensitive for different clinical settings. The result matches well with the conclusions of a recent meta-analysis on the topic; ESPOSITO ET AL. (2005), though reporting an overall benefit of EMD application, highlight an explicit interstudy and intrastudy heterogeneity of the clinical outcomes. A general translation of the good results among all users cannot necessarily be expected. However, these mixed subjective results of clinical success correspond well to the values of residual pockets reported in recent articles (HAURI ET AL. 2008, SCHMIDLIN ET AL. 2009). Furthermore, recent publications showed that the probability of residual pocketing over 3 mm with GTR was on average 57% and with the use of EMD 74%. Using the cut-off value of 5 mm, the probability was reduced to 8% and 17%, respectively (HAURI ET AL. 2008, SCHMIDLIN ET AL. 2009). Remarkably, the most frequently reported motive for EMD usage was not the prospect of a better outcome but the ease of application.

Concerning the clinical success of EMS application, the survey failed to reveal significant differences between reported treatment outcomes of SP and NSP. On the one hand, this may suggest that EMD are not markedly technique-sensitive, since they seem to provide the same results in both experienced hands as well as those presumably less schooled. On the other hand, it should be kept in mind that SP are trained to treat more complex and severe cases, which are usually referred by NSP to a specialist practice.

Concerning the irrigation protocol, a significant difference between the two groups was only observed in the use of chlorhexidine ($p=0.0009$). This antiseptic was used by 41% of the SP group, whereas 66% of the NSP relied on chlorhexidine during routine surgical procedures. The topical application of antiseptics in periodontal pockets as an adjunctive to mechanical debridement has been suggested (ROSLING ET AL. 1983, SHILOAH ET AL. 1993) and tested in various clinical trials, but there is still a lack of evidence for additional benefit with chlorhexidine as measured by pocket depth reduction or clinical attachment level gain (SOUTHARD ET AL. 1989), or antiseptics in general (DRISKO ET AL. 2000). PVP-iodine was rarely used in both groups (SAHRMANN ET AL. 2009). In both groups, more than half of the dentists used sterile saline solution for routine rinsing or cooling procedures (61% vs. 56%).

Conditioning the root surface by applying EDTA before the use of EMD, SCULEAN ET AL. (2006) failed to find an additional benefit in terms of increased clinical attachment win in a group of 24 patients that were randomly treated with or without EDTA before EMD use. EDTA, however, was more frequently used by SP (53%) than by NSP (23%; $p<0.0001$). The use of citric acid for surface conditioning has been shown to provide limited clinical effects on regeneration potential (ISIDOR ET AL. 1985). In accordance with the literature, SP and NSP omitted citric acid for the root surface modification in the majority of cases.

According to studies, smoking significantly reduces the rate of successful periodontal surgical procedures (STAVROLPOULOS ET AL. 2004, TONETTI ET AL. 2004). Twenty-eight percent of both the SP and the NSP groups regarded smoking as a contraindication for EMD use. However, 52% of the SP and 60% of the NSP still used EMD on patients who smoked less than ten cigarettes per day. In patients who smoke up to twenty cigarettes per day, 17% of the SP and 11% of the NS still used EMD. Patients who smoked more than twenty cigarettes per day were treated with EMD by only 6% of the SP and 3% of the NSP. These numbers

show that the significance of smoking in reducing healing ability is widely accepted among practitioners. We also saw that the SP tended to be a little more courageous in treating heavy smokers with EMD than the other group of dentists. This may partly be due to the fact that SP are generally more confident in dealing with difficult periodontal cases and partly because the more severe cases often end up as referrals in SP practices. This might also explain why the SP more often use a combination of filler/membrane or a combination of EMD/filler. Obviously, a more complex periodontal case often calls for a more complex treatment approach.

When assessing the use of EMD as an adjuvant tool for an advanced outcome in periodontal therapy, it is essential that an effective cause-related therapy has been performed in advance. From a technical point of view, the effective treatment of the infected sites, as well as the oral health maintenance, represent crucial steps for any success. Mechanical debridement, disinfection and root planing have been considered important issues to achieve optimal clinical results and regular appointments with the dental hygienist may guarantee acceptable long-term results (DRISKO ET AL. 2000). This survey showed that almost every operator (98% vs. 97%) used mechanical means of root debridement, i.e. manual instruments and/or ultrasonic instruments (75% vs. 85%). However, SP used rotary instruments more frequently (78%) than NSP (56%) ($p=0.0033$).

To summarize and conclude, one can say that EMD are frequently used by dentists dealing with periodontal problems. In general, the application guidelines are followed, but some variance was observed in several technical and material application and selection criteria. The subjective perception of clinical success varies greatly. Residual pockets are present in approximately one third of the defects. Nevertheless, EMD application was considered an accepted and safe method for periodontal regeneration by members of the SSP. However, a strict dependence upon scientific evidence is important to achieve optimal clinical results.

Zusammenfassung

Studien haben gezeigt, dass Schmelzmatrixproteine (enamel matrix derivatives = EMD) einen messbaren positiven Effekt auf die Resultate chirurgischer Behandlung von parodontal erkrankten Zähnen haben. Dennoch gibt es wenig Information bezüglich Akzeptanz, Applikationsmodalitäten und Ergebnissen der Anwendung von Schmelzmatrixproteinen in der Praxis. Die vorliegende Umfrage zielte darauf ab, die gängige Erfahrung mit der regenerativen parodontalen Chirurgie mit Schmelzmatrixproteinen unter Parodontologen und nicht spezialisierten, aber aktiven Mitgliedern der Schweizerischen Gesellschaft für Parodontologie (SSP), mit speziellem Augenmerk auf vertikale Knocheneinbrüche, zu beleuchten.

533 Zahnärzten und Zahnärztinnen, die bei der SSP registriert sind und in der Schweiz praktizieren, wurde per Post ein Fragebogen zugesendet.

Der Fragebogen war in drei Teile gegliedert. Der erste Teil beinhaltete allgemeine persönliche Fragen über die Lage der Praxis und die Ausbildung des Zahnarztes/der Zahnärztin. Im zweiten Teil wurden Fragen bezüglich parodontaler chirurgischer Routineeingriffe gestellt. Der dritte Teil schliesslich bestand aus spezifischen Fragen bezüglich der regenerativen Techniken, speziell unter der Anwendung von Schmelzmatrixproteinen. Zusätzlich fragten wir nach einer Einschätzung der Akzeptanz von Schmelzmatrixproteinen seitens der Patienten und den Gründen dafür.

In der statistischen Analyse wurden deskriptive Statistiken wie IQR, Minimum, Maximum und relative Frequenzen angewendet. Die Evaluierung wurde unter Anwendung von StatView Version 5.0.1 sowie SPSS Version 17 vorgenommen. Der Unterschied der Antworten von Spezialisten und Nichtspezialisten wurde ausgewertet, und p-Werte, welche kleiner als 5% waren, wurden als signifikant betrachtet.

Die Rücklaufquote bei den Spezialisten betrug 69%. Dagegen wurde die Umfrage nur von 37,4% der nicht spezialisierten Aktivmitglieder beantwortet. Insgesamt wurden 42,4% der Fragebögen zurückgesendet. Im Allgemeinen zeigte die Studie, dass die Spezialisten einen grösseren Bedarf für parodontale Chirurgie bei ihren Patienten registrieren. Sie führen häufiger chirurgische Eingriffe durch und wenden dabei beträchtlich öfter EMD an als die Kontrollgruppe. Die Applikationsrichtlinien schienen dabei in beiden Gruppen im Allgemeinen eingehalten zu werden. Gewisse Abweichungen konnten aber im Bezug auf Applikations- und Selektionskriterien beobachtet werden. Bemerkenswert ist, dass das am häufigsten angegebene Motiv für die Applikation von EMD nicht die Aussicht auf ein besseres Resultat war, sondern die einfache Handhabung. Bezüglich des klinischen Erfolges der Applikation von EMD konnte die Umfrage keine signifikanten Unterschiede zwischen den berichteten Behandlungsergebnissen von Spezialisten und Nichtspezialisten feststellen. Die subjektive Auffassung bezüglich des klinischen Erfolges variierte stark unter den Klinikern der beiden Gruppen. Persistierende Residualtaschen lagen demnach subjektiv in etwa einem Drittel der Defekte vor.

Diese Umfrage zeigte zusammenfassend, dass Schmelzmatrixproteine im Rahmen der regenerativen parodontalen Chirurgie in der Schweiz regelmässig eingesetzt werden. Die Behandlungsmodalitäten der beiden Gruppen stimmten gut überein mit der aktuellen verfügbaren Literatur. Um optimale Resultate zu erreichen, sind eine Anlehnung an die wissenschaftliche Evidenz und eine entsprechende Umsetzung wichtig.

Résumé

Des études ont montré que les protéines de la matrice émailaire (enamel matrix derivatives = EMD) apportent un effet positif et mesurable sur les résultats du traitement chirurgical régénératif. Cependant, il y a peu d'information concernant l'acceptation, les procédures d'utilisation et les résultats de l'application de ces produits dans la pratique. Cette enquête visait à éclaircir l'expérience courante faite en chirurgie parodontale régénératrice parmi les membres actifs et les spécialistes de la

Société Suisse de Parodontologie (SSP), avec un accent particulier sur la perte osseuse verticale.

533 dentistes enregistrés auprès de la SSP et pratiquant en Suisse ont reçu un questionnaire par la poste.

Le questionnaire était divisé en trois parties. La première partie comportait des questions concernant des renseignements généraux sur l'emplacement du cabinet et la formation du chirurgien-dentiste. Dans la deuxième partie, des questions concernant les interventions chirurgicales routinières ont été faites. La troisième partie avait pour but d'évaluer les points spécifiques relatifs aux technologies régénératrices, particulièrement dans l'utilisation des protéines de la matrice émailaire. En outre, une évaluation subjective sur l'acceptabilité d'EMD de la part des patients et les justifications a été faite.

Dans l'analyse statistique, les statistiques descriptives telles que IQR, minimum, maximum et les fréquences relatives ont été utilisées. L'évaluation a été effectuée en utilisant la version 5.0.1 de StatView et SPSS 17. La différence parmi les réponses de spécialistes et de non-spécialistes a été évaluée, et les p-values inférieures à 5% ont été considérées comme significatives.

Le taux de renvois des spécialistes était de 69%. En revanche, seulement 37,4% des membres non spécialisées ont répondu à l'enquête. Dans l'ensemble, 42,4% des questionnaires ont été retournés.

En général, l'étude a montré que les spécialistes enregistrent un plus grand recours à la chirurgie parodontale parmi leurs patients. Les spécialistes faisaient plus souvent des interventions chirurgicales et utilisaient plus souvent des protéines de la matrice émailaire. Les notices directrices semblaient être respectées parmi les spécialistes et les non-spécialistes. Toutefois, des différences dans l'application et les critères de sélection ont été observées. Il est à noter que le motif le plus fréquemment rapporté pour l'application de EMD n'est pas la perspective d'un meilleur résultat clinique, mais la facilité d'utilisation du produit. En ce qui concerne les résultats cliniques de l'application de l'EMD, l'enquête n'a pas pu trouver de différences significatives entre les résultats déclarés du traitement par les spécialistes et non-spécialistes. Le point de vue subjectif concernant le succès clinique varie considérablement entre les cliniciens des deux groupes. Les poches persistantes étaient subjectivement présentes dans environ un tiers des défauts osseux.

En conclusion, les protéines de la matrice émailaire sont fréquemment utilisées dans la chirurgie parodontale régénératrice en Suisse. Les modalités de traitement pour les deux groupes sont en accord avec la littérature existante. Pour obtenir des résultats optimaux, une implémentation de références et l'importance à la preuve scientifique sont importantes.

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