

MICHELLE THIESSEN
MATTHIAS ZEHNDER
THOMAS ATTIN
MONIKA MARENDING

Center of Dental Medicine,
Clinic of Conservative and
Preventive Dentistry, University
of Zurich, Zurich, Switzerland

CORRESPONDENCE

Dr. med. dent.
Monika Marending Soltermann
Universität Zürich
Zentrum für Zahnmedizin
Klinik für Zahnerhaltung und
Präventivzahnmedizin (ZPZ)
Plattenstrasse 11
CH-8032 Zürich
Tel. +41 44 634 34 68
E-mail: monika.marending@
zsm.uzh.ch

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What happened to our former students five to six years after graduation?

An endodontic teacher's perspective

KEYWORDS

Dental education
Survey
Root canal treatment
Rubber dam

SUMMARY

Endodontic teaching follows common concepts in the four Swiss dental schools. The aim of this survey was to ask former Swiss dental students how they adopted these endodontic concepts in clinical practice. All the graduates of the years 2012 and 2013 ($n = 196$) were targeted in 2018 using an internet-based anonymous questionnaire, which was based on five initial questions. One hundred forty-one individuals (participants) filled in these questions on their work situation and referral concepts (72% response rate). Those 111 participants who performed root canal treatments themselves were the focus group. They answered an additional 11 questions. Their affinity towards performing endodontic treatments was investigated. The use of rubber dam isolation served as a surrogate to see if biological principles were respected. Furthermore, it was asked which

instrumentation systems they used in daily practice, and how they perceived the impact of their superior/employer on these choices. Of the 141 survey participants 55 were men and 86 women. Thirty-eight of these (27%) reported to refer difficult endodontic cases. Individuals in the focus group had an overall positive attitude towards endodontics. There was very little variance in the responses between the four Swiss dental schools. The vast majority (86.5%) reported to use rubber dam routinely. More than half in the focus group used reciprocating systems, and only a few (22.5%) would still use the rotary system they were taught at university. There was a significantly ($p < 0.05$) higher perceived impact of the employer on choice of instrumenting system versus the use of rubber dam.

Introduction

Root canal treatments are still performed by general practitioners mostly (WENTELER ET AL. 2015). Hence, it is the duty of dental schools to prepare their students for these treatments in daily practice. Graduates should be qualified to perform adequate clinical diagnostics and pain treatment. Furthermore, they should be able to treat simple endodontic cases independently and with predictable quality. The Swiss education system in dentistry is fairly uniform. All four dental schools (University of Basel, Bern, Geneva, and Zurich) are state schools and teach the same endodontic rationale and comparable root canal preparation concepts. School representatives meet annually with the Swiss Endodontic Society (SSE) to reach agreements concerning the content of clinical teaching. Furthermore, the implementation of the Bologna Process made it necessary that schools agree upon federal exam questions and core teaching contents. Endodontic teachers meet twice per year at the University of Bern to discuss and agree upon their exam questions.

For more than 15 years mechanically-driven root canal instrumentation has now been fully integrated in the curriculum of the four Swiss dental schools. This has simplified the endodontic workflow, and clinical results appear to be more predictable with fewer aberrations (DAHLSTRÖM ET AL. 2015). However, after graduation the further education of the new dentists appears to be significantly affected by their first employer. Whether this is true or not has not been studied to the best of our knowledge. Based on an former survey performed in our country, it would not appear that older Swiss general practitioners adhere to what they learnt in dental school (BARBAKOW ET AL. 1995A, 1995B). From the standpoint of instrument manufacturers, it might also be interesting whether their sponsoring of undergraduate programmes results in the adaptation of their instruments in practice.

In the current study, a survey was performed using an internet-based anonymous questionnaire to analyse how many endodontic treatments were performed by young Swiss-trained dentists, and how their university education affected their core biological and technical concepts. It was also asked whether these choices were influenced by their current employer. It was aimed to reach all former Swiss dental school graduates from the years 2012 and 2013 (n = 196) five to six years after their graduation (2018).

Material and Methods

For this study a web-based questionnaire was created (Limesurvey Version 3.0.0). Various aspects of daily dental practice and, specifically, appraisal of the implementation of what had been taught at University were investigated. Most questions were multiple-choice. Some questions also provided space for free text entry if further explanation was required. The survey was piloted locally to check for question clarity, functionality, and time required to complete.

The data were generated anonymously and solely for use in this study. All Swiss dental school graduates of 2012 and 2013 from the Universities Basel, Bern, Geneva and Zurich were identified by contacting the respective student affairs offices. They were contacted in 2018 and asked to participate in this survey. One month before the questionnaire was made available, an e-mail was sent out informing about the upcoming survey to motivate the young clinicians to participate. A hard copy of the questionnaire was sent to those former students

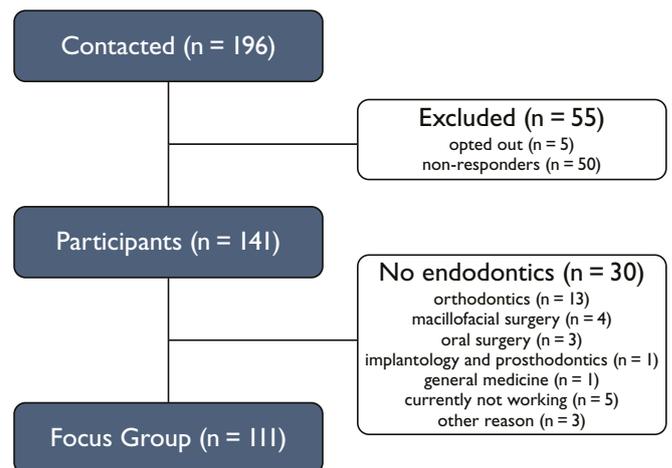


Fig. 1 Flow chart depicting the cohort that was targeted (all Swiss dental school graduates of 2012 and 2013), the individuals who responded to the request and filled in the basic survey (participants), and the focus group that performed endodontic treatments in clinical practice. Individuals in the focus group filled in the full survey with 11 additional questions (Tab. I).

who were not accessible by e-mail. Three and seven weeks after initiation a reminder e-mail was sent to all individuals in the targeted cohort who had not yet answered at that time. The questions were formulated in German and translated into French for participants who graduated from the University of Geneva. A total of 196 individuals were targeted (Fig. 1), 167 in German and 29 in French. This corresponded to all the Swiss dental school graduates from 2012 and 2013. The survey was open from February to May 2018.

The questionnaire consisted of 16 items. The first five questions related to the general work situation of the graduates. Two of these questions checked if at the time of the questionnaire they worked in an environment providing endodontic treatments and whether they performed these treatments themselves or not. If not, it was asked if they referred inside their unit or to an external colleague. Two further questions related to the final degree and gender of the survey participant. The fifth and last question in the first part asked if participants remembered the name of the rotary instrumenting system they were taught at university. Participants not currently performing any root canal treatments ended the survey here.

The focus group of this study was guided to the second part of the survey consisting of 11 questions related to endodontics (Tab. I). Questions evolved around workload and workspace, as well as their employer's interest in endodontics. Individuals in the focus group were also asked if their actual employer influenced their use of rubber dam and choice of instrumenting system. They were then asked their average hours spent performing endodontic treatments per week, their use of rubber dam isolation for endodontic treatment, and the type of root canal preparation system they used routinely. If they had more than one place of employment, they were asked to indicate the situation in the environment of their main employer. The next question related to how much they liked to do endodontic treatments on a scale from 0 to 100. One further question was related to continuous education hours in endodontics during the previous two years. Finally, they were asked about their affinity to endodontics in general and the preparation system that they were taught at university, i.e. whether they liked it and if they would use it if they could decide by themselves. The

Tab. I The 11 questions the focus group was asked in tabulate form

Question	Type of answer	Variable treated as
Workspace	5 items	Categorical
Workload general	Per cent of 5 days	Continuous
Employer's interest in endodontics	Yes/no	Dichotomous
Employer's influence	5 items, yes/no	Dichotomous
Workload endodontics	Hours	Continuous
Use of rubber dam	Yes/no	Dichotomous
Type of instruments used	4 items	Categorical
Affinity to endodontics	Scale, 0–100	Continuous
Continuous endodontic education in previous 2 years	Hours	Continuous
Affinity to taught system	Scale, 0–100	Continuous
Propensity to keep using taught system	Yes/no	Dichotomous

collected data were exported anonymised from the LimeSurvey into an Excel table.

Data presentation and analysis

The evaluation was done by descriptive statistics mainly. Per cent values were rounded to 0.5%. Continuous data with a normal distribution (Shapiro–Wilk test) are presented as means \pm standard deviation, while counterparts with a non-Gaussian distribution are presented as median values and inter-quartile ranges. Interlinking of some factors was checked by correlation analysis, and individual comparisons were made using Fisher's exact test. The alpha-type error was set at 5%. Statistical analyses were conducted using SAS 9.4 (SAS Institute, Cary, NC, USA).

Results

Participants

One hundred and forty-one questionnaires were filled in, 19 in French and 122 in German, corresponding to an overall return rate of 72%. The basic questionnaires were completed by 70%, 64%, 62% and 84% by graduates from Basel, Bern, Geneva and Zurich, respectively. Of the 141 survey participants 55 were men and 86 women. Thirty individuals filled in the basic questionnaire only (consisting of five preliminary questions), disclosing that they did not work in an endodontic environment and/or did not perform endodontic treatments (Fig. 1). Thirty-eight of the 141 participants (27%) reported to refer endodontic cases that they deemed to be difficult. Twenty-three (16%) referred to an external experienced colleague and 15 (11%) to a colleague/superior within the same practice/clinic. Twenty-eight of the 141 participants did not remember the rotary system they were taught at university.

Focus group

One hundred eleven participants, 68 female and 43 male dentists, worked in an environment where endodontic treatment is provided, and they personally performed root canal treatments in everyday clinics (Tab. II). This group filled in the complete survey, and their answers were analysed further. Seventy of

these individuals worked exclusively in private practice, 17 in a private multi-centre clinic, 16 at a university clinic, two in a pedodontic clinic run by the state, and six in more than one of these units. Most of the individuals in the focus group worked 80% (i.e. four full working days or 33.6/42 h) or more, and merely 12 worked 65% or less. Seven individuals were employed in at least two different facilities. The average employment in the focus group was $88 \pm 16\%$.

General approach to endodontics

The time spent performing root canal treatment per week varied considerably, i.e. from 0.01 to 20 h. Most individuals in the focus group performed between 2 and 6 h of endodontic treatment per week (Tab. III). A continuous point scale from 0 (strongly dislike) to 100 (strongly like) was used to determine their affinity towards endodontic treatments. The mean score was 75 with a median of 77 and interquartile range (IQR) of 16.

The number of hours of further education in endodontics varied highly (average 9 h, median 5 h). Twenty-seven individuals had not performed any further endodontic education in the previous two years. Others performed up to 60 h in the same period. None of these outcomes differed between the four schools (Tab. III).

Biological and technical principles

Routine rubber dam isolation for endodontic treatment was used by 86.5% (96 of 111) of the individuals in the focus group. The frequency of rubber dam application during endodontic interventions did not differ significantly between dental schools (Tab. III).

Regarding technical treatment aspects, 25 of the 111 did not remember the name of the instrumenting system they were taught at university, and merely 25 would still use the same rotary instrumenting system they were taught at university if they had a free choice (Tab. IV). Sixty-five (58.5%) used a reciprocating system predominantly or exclusively. A mere 29% used a rotary instrumenting system for root canal preparation and 19 individuals (17%) used rotary as well as reciprocating.

Tab. II Distribution of contacted individuals, participants, and the focus group according to dental school

	Total	Basel	Bern	Geneva	Zurich
Contacted m/f	196 75/121	50 20/30	50 24/26	29 14/15	67 17/50
Participants m/f	141 55/86	35 15/20	32 19/13	18 8/10	56 13/43
Focus group m/f	111 43/68	26 12/14	27 15/12	15 7/8	43 9/34

m = male, f = female

Tab. III Main outcomes of survey in the focus group according to dental school

	Basel	Bern	Geneva	Zurich	p-value
Weekly endo time [h]	3 (2–5) Min 0.25 Max 10	3 (2–6) Min 1 Max 8	3 (2–7) Min 1 Max 10	3 (2–6) Min 0.01 Max 20	0.950*
Affinity to endodontics [0–100]	80 (65–88)	80 (72–90)	70 (60–90)	80 (70–85)	0.505*
Hours of continuing education in endodontics [h]	5 (2–8) Min 0 Max 20	4 (0–10) Min 0 Max 60	5 (0–30) Min 0 Max 60	4 (2–10) Min 0 Max 50	0.881*
Routine rubber dam usage [yes/no]	23/3	21/6	15/0	37/6	0.268 [#]

Continuous data are presented as medians and interquartile ranges. Data were analysed regarding the influence of the variable “dental school” using the Kruskal-Wallis Test (*), the categorical counterparts using Fisher’s exact test ([#]).

Tab. IV Overview on instrument background, preferences, and currently used instrumenting kinetics in the focus group

	Basel	Bern	Geneva	Zurich	Total
System recent graduates were taught	Mtwo	System GT	ProTaper	ProFile	111 (100%)
Remember taught system [yes/no]	19/7	22/5	13/2	32/11	86 (77.5%)
Would use taught system [yes/no]	5/21	2/25	6/9	12/31	25 (22.5%)
Use rotary system	2	8	9	13	32 (29%)
Use reciprocating system	19	12	3	12	46 (41.5%)
Use both kinetics	3	7	2	7	19 (17%)
Use hand instrumentation only	1	0	0	8	9 (8%)
No data available	1	0	1	3	5 (4.5%)

cating instruments. Nine (8%) individuals in the focus group performed hand instrumentation only.

Employer’s impact

Because responses regarding the outcomes under investigation were similar between schools, data were pooled to assess a possible employer impact on these answers. Most of the employers (77.5%) were judged by the individuals in the focus group to be interested in endodontics.

Regarding the influence of the employer on biological and technical treatment aspects, this was reported to be higher for the latter than the former. While merely 43% (48 of 111) indi-

viduals in the focus group were influenced by their superior regarding the use of rubber dam, 65% (72 of 111) of them were told which instrumenting system to use ($p < 0.05$).

Discussion

This survey revealed some interesting aspects regarding the daily work life of young dentists who graduated from the Swiss dental schools with a focus on endodontics. While some of the current findings may be country-specific, others appear to show a general trend.

This investigation had a relatively high response rate of 72%. One hundred and forty-one of 196 contacted graduates com-

pleted the questionnaire. At the time the questionnaire was made available, they had been out of dental school for either five or six years. The target group in this study was well-defined, and individuals were contacted anonymously per e-mail or mail. This procedure enabled the investigators to send a reminder three and seven weeks after initiation of the questioning process. Graduates from all four Swiss universities were included to monitor the whole country.

As in any survey-based investigation, there are inherent weaknesses in the current study. A certain amount of reporting bias cannot be excluded. Knowing that this survey came from a university, participants and especially the individuals in the focus group theoretically could have attempted to present themselves in a better light. This may be because some of these dentists were in the process of applying for a post-graduate programme and erroneously suspected that their data could be used against them.

Increasing numbers of women are entering the once male-dominated dental profession in Switzerland, which concurs with the situation in other countries (PURYER ET AL. 2017). About 60% of the graduates in this survey were female. In Zurich three quarters of the 2012 and 2013 graduates were women, while at the other dental schools the male-female distribution was more balanced (Tab. II). Almost all young dentists who participated in the current survey found employment. Only five females (3.5%) did not work. The reason for their employment status is not known, but could at least partly be because of maternity leave. Career breaks have also been associated with shorter working hours on return to the profession (NEWTON ET AL. 2001). The percentage of female undergraduates who intended to work part-time 5 and 15 years after qualification has been reported to be higher than that of male undergraduates (PURYER & PATEL 2016; RUSSELL & LEGGATE 2002). According to the current survey 57 participants, 42 women and 15 men, did not have a full-time employment. Twelve participants worked in a part-time engagement below 80%, nine of these were women. This data is comparable to a survey conducted in 2007 by the Swiss Dental Association, in which most responders stated that they had found employment with a workload between 80% and 100% (HESS ET AL. 2007). On the other hand, some Swiss dental offices apparently have developed problems with capacity utilisation over the recent years (WÄCKERLE ET AL. 2016). The relatively high employment rate found in the current survey was thus not necessarily expected. The percentage of individuals working at the university or dental clinics was three times higher in this young focus group than in the national survey that was recently published by the Swiss Dental Association (MARMY ET AL. 2019).

Additional interesting results of a more general nature emerged from this survey. Thirty individuals did not work in an environment providing endodontic treatment and/or did not perform any root canal treatments at all. The main reason for that can be seen in the relatively high number of graduates seeking specialisation in orthodontics (Fig. 1). Like in other countries (PURYER ET AL. 2016; PURYER & PATEL 2016), an orthodontic specialisation appears to be a popular postgraduate qualification also in Switzerland. According to the recent survey of the Swiss Dental Association by Marmy and co-workers, 6% of Swiss dentists stated to perform orthodontic treatments exclusively (MARMY ET AL. 2019). In the current younger cohort this proportion was at 9% and thus even higher.

Among the 141 participants of the basic survey, merely 27% referred cases they deemed to be difficult to an experienced

colleague. The reason for that low number is unknown, but could be that there was no available endodontic specialist within reasonable distance, no referral concept in practice, or no need for referral because they felt well-trained to manage difficult cases themselves.

It would be reasonable to assume that contemporary supervisors in general practice or clinics graduated at a time when the endodontic field was still under-represented in the Swiss dental education, and rotary instrumentation was not yet integrated in the education program (that happened 2001). However, and perhaps surprisingly, most of the employers (77.5%) were judged to be interested in endodontics. A Swedish study based on focus group interviews reported that general dental practitioners are less positive towards endodontic treatment than the current data might suggest (DAHLSTRÖM ET AL. 2015). In the present study the majority (79%) of the young Swiss graduates, however, performed endodontic treatments, and most of them apparently liked to do so. Affinity to endodontics was determined using a numeric rating scale from 1 to 100. The median was 77 and the average 75 (Tab. III). Only 11 out of 111 individuals in the focus group of the current study reported a value of 50 or less, which indicates that 90% had a positive rather than a negative attitude towards performing endodontic treatments. In the literature, however, the reported affinity to endodontics by general practitioners is rather low. Only about a quarter of the responders in England and Wales liked to carry out endodontic treatments (LOCKE ET AL. 2013; HOMMEZ ET AL. 2003), and merely one third of Flemish dentists said they were interested in endodontics (SLAUS & BOTTENBERG 2002). This apparent difference may be partly explained by a reporting bias in the current cohort. However, the perhaps more positive work attitude in the focus group of this study may also be due to the fact that Switzerland is a high-income country, and endodontic treatment is well paid in Switzerland compared to other countries, enabling practitioners to buy the latest tools. This is reflected in the high reported usage of reciprocating systems found in this survey. However, whether access to new equipment truly improves the attitude towards endodontics or not, awaits further clarification. Another explanation could be that the education in endodontics has improved, or simply that there is a continued need for this type of treatment (SCHNEIDER ET AL. 2019), but this question would need to be addressed in a separate study.

Apart from the general aspects of employment and affinity to endodontics, biological and technical aspects were assessed in this study. All Swiss dental schools use advanced materials and equipment. They train their students to use manual and rotary instruments during preclinical and clinical training. Rubber dam isolation is a standardised procedure for all conservative and endodontic treatments. Two Swiss surveys about daily endodontic practice, covering endodontic materials, techniques and frequency of root canal treatment, date back to 1995 (BARBAKOW ET AL. 1995A, 1995B). Since then, there have been significant technological advancements, which facilitated root canal cleaning and shaping. A recent national survey on endodontic treatment in Switzerland showed that today electrometric length measurements and magnification devices are recognised as essential utilities and that the majority of dentists in Switzerland follows the quality guidelines of the European Society of Endodontology (ESE) and the Swiss Society for Endodontology (SSE) (ZAUGG ET AL. 2020). However, the current survey also showed some discrepancies with the recent study conducted by Zaugg and co-workers performed on participants of Swiss den-

tal meetings, who were mostly practice owners (ZAUGG ET AL. 2020). In that group, the routine reported usage of rubber dam was 56%. Looking at the subgroups in that study the data indicated a gap between general practitioners and endodontic specialists. Endodontic specialists and endodontically interested practitioners used rubber dam routinely in 89.5% and 69.9% of the cases, respectively, as opposed to 52.2% in the general practitioner group (ZAUGG ET AL. 2020). In the nineties only 31% of the Swiss colleagues stated to use rubber dam isolation for root canal treatment routinely (BARBAKOW ET AL. 1995A). Despite a possible reporting bias, the current results suggest that indeed there may be a general trend that younger dentists have a more positive approach towards rubber dam usage than older colleagues (NEUKERMANS ET AL. 2015).

Leaving the protected environment of the university, graduates are subordinated to more experienced supervisors. It is requested by the Swiss Dental Association and also by the national insurance system that graduates work for a least two years under supervision of an experienced dentist in a private practice or dental clinic. However, most individuals take longer before they open their own dental office, as is indicated by the current data. None of the 141 survey participants was self-employed at the time of the survey, i.e. five to six years after graduation. During their time as an associate dentist the young clinicians gain operating experience in diagnostics and treatment. Concurrently they may also adopt clinical concepts from their supervisor. In this context the first employment may have an important impact on a practitioner's professional attitude. This study showed that most of the individuals in the focus group (77.5%, 86 of 111) had a superior who was interested in the field of endodontics. Apparently and perhaps luckily, these superiors influenced our recent graduates more when it came to choosing their tools rather than in their use of rubber dam. Moreover, the eagerness of some companies in trying to get their instrumenting systems to be used by undergraduate dental students is not supported by the current data. The young dentists appeared to use the system that their superior/practice owner chose. This also contrasts with the survey by Barbakow and co-workers (BARBAKOW ET AL. 1995A), in which 60% of the dentists reported to enlarge the canal system solely with manual instruments and 59% used the same technique they learned at the university. Today, there is a large selection of engine-driven endodontic system brands, and new products appear on the market regularly, whilst some products are also discontinued. The root canal instrumentation systems ProFile (University of Zurich) and System GT (University of Bern) are "first generation" systems, while Mtwo (University of Basel) and ProTaper Universal (University of Geneva) belong to the "second generation" of rotaries (HAAPASALO & SHEN 2013). System GT was no longer available when this study was initiated. Thus, this survey and its interpretation had to be adapted to this fact by asking whether individuals in the focus group would still use their taught system if it was still available. However, more than half of them used a reciprocating system, although this type of kinetics or the use of single-file systems was not taught at the time of their graduation. Most graduates from the Universities of Basel and Bern worked exclusively with a reciprocating system (Tab. IV). The risk of instrument fracture due to cyclic fatigue or torsional overload is an unpleasant complication during root canal instrumentation. New generations of instruments tackle this problem by advanced file designs, different kinetics and new thermomechanical processing (PEDULLÀ ET AL. 2013; SHEN ET AL.

2013). This may explain why more than 75% of the individuals in the focus group would not want to continue using the file system they had learned at the university if they had a free choice (Tab. IV). The points of criticism mentioned for the individual systems were, at least in part, problems that have diminished with newer generation systems. In their written text (not mentioned in the results section) individuals in the focus group mainly were against their university-taught system because they thought it was composed of too many files or was "too complicated". Merely a few individuals in the focus group worked exclusively with hand instruments (9 out of 111).

The number of hours spent for further education in endodontics varied highly (Tab. III). Twenty-seven individuals had not taken any continuing education courses or classes in the previous two years. Of these, 15 individuals worked with reciprocating instruments. Apparently, they learned the new techniques from superiors or colleagues, and not from qualified instructors.

Future studies could tackle the impact of university education on the eagerness of young general practitioners to perform certain treatments. To this end, undergraduate educational contents and practical training hours could be compared between different countries and be correlated to the self-reported confidence of recent graduates when performing these treatments.

Conclusions

This survey highlighted some general work aspects and endodontic concepts of young Swiss-trained dental practitioners, and how these were influenced by their employers/superiors. A mere 3.5% of survey participants did not work at the time of this survey, while 79% performed endodontic treatments. Most of these individuals had a positive approach to endodontics. The vast majority (86.5%) used rubber dam routinely. More than half of them used reciprocating systems, and only 22.5% (25/111) would use the rotary system they were taught in dental school if they had a free choice. This would suggest that, whilst biological principles taught at university are adhered to, the choice of instrumenting system appears not to be related to dental school education.

Acknowledgements

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Zusammenfassung

Einleitung

Die endodontische Ausbildung an den Schweizer Universitäten (Bern, Basel, Genf und Zürich) ist einheitlich und folgt den Richtlinien der Europäischen Gesellschaft für Endodontologie (ESE). Die in der Lehre vermittelten Aufbereitungssysteme sind allerdings nicht identisch. Ziel der vorliegenden Studie war es, anhand einer Umfrage den heutigen Stellenwert der Endodontie bei jungen Assistenz Zahnärzten/innen zu ermitteln. Zudem sollte geprüft werden, ob die Lehrinhalte der Schweizer Universitäten in die spätere praktische Tätigkeit übernommen werden und wie weit die aktuellen Arbeitgeber/innen die Befragten dabei beeinflussen.

Material und Methoden

Die webbasierte anonyme Umfrage richtete sich an alle Absolvent/innen der Abschlussjahrgänge 2012 und 2013 (n = 196) fünf bzw. sechs Jahre (2018) nach dem Schweizer Staatsexamen.

men. In fünf Vorfragen wurden neben demografischen Daten die aktuelle Arbeitssituation sowie das persönliche Überweiskonzept evaluiert. Absolvent/innen, die im Arbeitsalltag selbst Wurzelkanalbehandlungen durchführten, gelangten anschliessend zum Hauptteil der Befragung. Sie repräsentierten die eigentliche Zielgruppe dieser Untersuchung. Zusätzlich zu allgemeinen Fragen zum Arbeitsvolumen und zum Arbeitsort wurden sie auch zum empfundenen Interesse ihres Arbeitgebers an der Endodontologie sowie zu dessen Einfluss auf ihre Behandlungskonzepte befragt. Des Weiteren wurden die Häufigkeit endodontischer Behandlungen, die dabei verwendeten Aufbereitungsinstrumente, die persönliche Einstellung zu den an der Universität gelehnten Präparationssystemen, die Affinität zu endodontischen Behandlungen im Allgemeinen (kontinuierliche Punkteskala von 0 bis 100) sowie die Anzahl im Fach besuchter Fortbildungsstunden ermittelt. Als Indikator für die Einhaltung der biologischen Grundprinzipien diente die Verwendung von Kofferdam.

Resultate

Die Rücklaufquote lag bei 72% (141 von 196; 55 Männer und 86 Frauen). Nur 38 der Teilnehmer (27%) gaben an, schwierige Fälle intern oder extern zu überweisen. 30 Befragte füllten den ersten Teil der Umfrage aus, da sie selbst keine Wurzelkanalbehandlungen durchführten. 111 Teilnehmer (79% aller Absolvent/innen, 68 Frauen und 43 Männer) führten selbst endodontische Behandlungen im Arbeitsalltag durch (Tab. II) und füllten den vollständigen Fragebogen aus. 70 Individuen aus dieser Zielgruppe arbeiteten exklusiv in einer Privatpraxis, 17 in einem privaten Zahnarztzentrum, 16 an Universitätskliniken, 2 an Schulzahnkliniken und 6 an mehr als einer dieser Stellen. Der durchschnittliche Anstellungsgrad lag bei $88 \pm 16\%$. Die wöchentliche endodontische Behandlungszeit variierte stark und lag durchschnittlich bei zwei bis sechs Stunden (Tab. III). Mit einem Mittelwert von 75/100 gaben die Befragten an, endodontische Behandlungen gerne durchzuführen. Die Anzahl besuchter Weiterbildungsstunden im Bereich Endodontologie innerhalb der letzten zwei Jahre variierte jedoch stark (Durchschnitt 9 Stunden, Median 5 Stunden). 27 der 111 Zielgruppenbefragten gaben an, gar keine Weiterbildungen besucht zu haben, bei anderen waren es bis zu 60 Weiterbildungsstunden. 96 (86,5%) aus dieser Gruppe verwendeten routinemässig Kofferdam für endodontische Behandlungen. Die Antworten zwischen den Universitäten fielen sehr einheitlich aus. 65 (58,5%) verwendeten überwiegend oder ausschliesslich ein reziprok arbeitendes Aufbereitungssystem. Lediglich 29% arbeiteten mit einem rotierenden Aufbereitungssystem, und 19 (17%) benutzten sowohl rotierende als auch reziprozierende maschinelle Instrumente. 9 Personen aus der Zielgruppe (8%) verwendeten ausschliesslich Handinstrumente, und nur 25 (22,5%) gaben an, das an der Universität erlernte System weiter verwenden zu wollen. Die Arbeitgeber/innen wurden mehrheitlich (77,5%) als endodontisch interessiert eingestuft. Lediglich 43% (48 von 111) der Vorgesetzten haben laut den Befragten aus der Zielgruppe Einfluss auf die Anwendung von Kofferdam genommen, aber 65% (72 von 111) der Befragten gaben an, ihre Vorgesetzten würden die Wahl des Instrumentensystems beeinflussen ($p < 0,05$).

Diskussion

Diese Studie konnte aufzeigen, dass die Endodontie im Praxisalltag der jungen in der Schweiz ausgebildeten Zahnärztinnen und Zahnärzte einen bedeutenden Stellenwert hat und dass sie diese

Behandlungen gerne durchführen und grösstenteils (86,5%) die gelehnten biologischen Grundprinzipien einhalten. Bei der Wahl der Instrumentensysteme scheinen andere Faktoren als die universitäre Grundausbildung eine Rolle zu spielen.

Résumé

Introduction

La formation en endodontie est comparable dans les différentes universités suisses (Berne, Bâle, Genève et Zurich) et suit les directives de la Société européenne d'endodontologie (ESE). Toutefois, les systèmes de préparation canalaire enseignés ne sont pas identiques. L'objectif de cette étude était de déterminer par une enquête l'importance actuelle de l'endodontie chez les jeunes assistants en médecine dentaire. Il s'agissait en outre d'examiner si le contenu de l'enseignement des universités suisses est repris dans la pratique ultérieure, et dans quelle mesure les employeurs actuels influencent à cet égard les personnes interrogées.

Matériel et méthodes

L'enquête anonyme sur Internet s'adressait à tous les diplômés des promotions 2012 et 2013 ($n = 196$), respectivement cinq et six ans (2018) après l'examen fédéral. Dans cinq questions préliminaires, en plus des données démographiques, la situation professionnelle actuelle et le concept personnel de référencement ont été évalués. Les diplômés qui avaient effectué eux-mêmes des traitements de canal radiculaire dans le cadre de leur travail quotidien ont passé ensuite à la partie principale de l'enquête. Ils représentaient le groupe cible proprement dit de cette étude. En plus des questions générales concernant le volume de travail et le lieu de travail, les diplômés ont également été interrogés sur l'intérêt manifesté par leur employeur dans le domaine de l'endodontologie et sur son influence quant à leurs propres concepts de traitement. En outre, la fréquence des traitements endodontiques, les instruments de préparation utilisés, l'attitude personnelle envers les systèmes de préparation enseignés à l'université, l'affinité personnelle pour les traitements endodontiques en général (échelle continue de points de 0 à 100) ainsi que le nombre d'heures de formation suivies dans la matière ont été indiqués. L'utilisation de digues en caoutchouc a servi d'indicateur quant au respect des principes biologiques de base.

Résultats

Le taux de réponse a été de 72% (141 sur 196; 55 hommes et 86 femmes). Seulement 38 de ces participants (27%) ont déclaré avoir référé des cas difficiles en interne ou à l'extérieur. 30 répondants n'ont rempli que la première partie de l'enquête, car ils n'avaient effectué aucun traitement de canal radiculaire. 111 participants (79% de tous les diplômés, 68 femmes et 43 hommes) avaient effectué eux-mêmes des traitements endodontiques dans le cadre de leur travail quotidien (tab. II) et ont rempli le questionnaire complet. 70 personnes de ce groupe cible avaient travaillé exclusivement dans un cabinet privé, 17 dans un centre privé de médecine dentaire, 16 dans une clinique universitaire, 2 dans une clinique de médecine dentaire scolaire et 6 dans plus d'une de ces places de travail ou institution. Le taux d'emploi moyen était de $88 \pm 16\%$. Le temps de traitement endodontique hebdomadaire variait considérablement, se situant en moyenne entre deux et six heures (tab. III). Avec une valeur moyenne de 75/100, les répondants ont indiqué qu'ils effectuaient volontiers les traitements endodontiques.

Cependant, le nombre d'heures de formation continue suivies dans le domaine de l'endodontologie au cours des deux dernières années était très variable (moyenne 9 heures, médiane 5 heures). 27 des 111 répondants du groupe cible ont déclaré n'avoir suivi aucun cours de formation continue, alors que d'autres ont suivi jusqu'à 60 heures de formation continue. 96 membres (86,5 %) de ce groupe utilisaient de routine des digues en caoutchouc lors de traitements endodontiques. Les réponses des diplômés des différentes universités ont été très similaires. 65 (58,5 %) ont utilisé principalement ou exclusivement un système de préparation à mouvements alternatifs asymétriques (réciproques). Seulement 29 % ont travaillé avec un système de préparation rotatif, et 19 (17 %) ont utilisé des instruments mécaniques à la fois rotatifs et alternatifs asymétriques. Neuf personnes du groupe cible (8 %) ont utilisé exclusivement des instruments à main, et seulement 25 (22,5 %) ont déclaré

vouloir continuer à utiliser le système appris à l'université. La majorité des employeurs (77,5 %) ont été déclarés intéressés par l'endodontie. Selon les répondants du groupe cible, seuls 43 % (48 sur 111) des superviseurs ont exercé une influence sur l'utilisation des digues en caoutchouc, alors que 65 % (72 sur 111) de ces répondants ont déclaré que leurs superviseurs avaient influencé leur choix du système d'instruments ($p < 0,05$).

Discussion

Cette étude a montré que l'endodontie joue un rôle important dans la pratique quotidienne des jeunes médecins-dentistes formés en Suisse, qu'ils aiment pratiquer ces traitements et adhèrent pour la plupart (86,5 %) aux principes biologiques de base tels qu'ils sont enseignés. Dans le choix des systèmes d'instruments, d'autres facteurs que la formation universitaire de base semblent jouer un rôle.

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