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Why, when and how are endodontically treated teeth restored: a questionnaire-based study comparing the decision-making of dentists in Germany and Switzerland

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Keywords

Endodontics, post-endodontic treatment, root-canal post, treatment decision, survey

Abstract

Post-endodontic treatment preferences can be influenced by educational, healthcare, financial, and historical factors. This study aimed to compare the post-endodontic treatment choices – particularly post and single-crown placement – of dentists in Germany and Switzerland. From August to November 2023, a questionnaire was distributed amongst 334 Swiss and 570 German dentists. A total of 50 Swiss dentists (response rate: 15.0%) and 60 German dentists (response rate: 10.5%) completed the survey. Descriptive analyses were conducted, and data presented as percentages. German dentists reported placing posts in 5–20% of endodontically treated teeth, whereas most Swiss dentists did so in less than 5%. Swiss dentists (58%) tended to place posts in teeth with 0–40% remaining tooth structure, while German dentists (60%) began at 40–70%. Regarding post-endodontic restorations, the majority of German dentists (67%) preferred single crowns, whereas most Swiss dentists (68%) favored composite-resin fillings and maintained even teeth with severely reduced coronal hard tissue. These trends were further supported by responses to various clinical case scenarios.

Abbreviations
FDP: fixed dental prothesis

Introduction

The primary goal of endodontic treatment is the removal of infected or necrotic pulp tissue followed by shaping, disinfection, and final obturation of the root canal (1). Since endodontic treatment decreases the physical properties of the dentin, and reduces the general fracture resistance, post-endodontic treatment is essential for tooth stability and for the long-term survival of endodontically treated teeth (2). However, controversy remains over the general necessity of endodontic posts and the appropriate post material (3–5). Nowadays, a wide range of well-studied materials such as titanium, stainless steel, gold alloys, zirconia, or more dentin-like materials such as glass or quartz fiber are available for the restoration of endodontically treated teeth (6–10).

Insertion of a post itself does not stabilize the tooth structure but is indicated to retain the core build-up within the root canal in cases with severely reduced coronal tooth substance (3). Hence, beneficial effects of a post insertion in anterior and premolar teeth with no residual dentin walls have been demonstrated (3). For the final coronal restoration, cuspal coverage is recommended depending on the remaining dentin walls and their thickness (3). Options for restoration include partial coverage crowns, such as onlays or overlays, which are less invasive (3). Another less invasive restoration technique for endodontically treated teeth is the complete composite build-up; this is recommended for teeth with a significant amount of tooth structure remaining where no post/crown placement is indicated (9–11). In cases of substantial structural loss, full-coverage crowns made of lithium-disilicate ceramics, zirconia, porcelain-fused-to-metal, and cast metal are viable options (3,9). Scientific consensus supports the beneficial effect of a 1.5–2.0 mm circumferential ferrule to enhance tooth load capability and thus tooth survival (3,12,13).

Despite the various treatment options and recommendations described in the literature, educational, healthcare, and geographical differences influence the Dentist's choice of materials and techniques used in post-endodontic treatment (13–15). Several studies have compared the restoration techniques of dentists across different countries through survey-based research. While notable data exists from Sweden, some studies have also gathered insights from Switzerland, England, and Germany (15–17). In Switzerland dental service is predominantly not covered by health insurance, and patients must pay for their own dental treatment (exceptions: trauma, some congenital diseases, recipients of social welfare). On the other hand, dental treatment costs in Germany are largely covered by the health insurance system. For example, the German insurance system covers certain fillings, post and cores, metal crowns, and in some cases porcelain-fused metal crowns. Telescopic crowns and implants are partly reimbursable. For treatments that exceed the threshold covered by basic insurance, for example, gold crowns or primarily esthetic treatment options, the patient must pay out of their own pocket (18). As in Switzerland, patients in Germany can take out supplemental insurances to cover additional dental costs. Whether or not this framework influences treatment decision remains unclear. Therefore, the aim of this questionnaire-based study was to compare the dentist´s post-endodontic treatment choices – specifically regarding post and single crown placement – in Switzerland and Germany. The null hypothesis was that dentists in Switzerland and Germany have comparable treatment concepts in teeth with severe loss of tooth structure. By comparing post-endodontic treatment approaches between the two countries, the study encourages self-reflection on treatment decisions, materials, and techniques, and provides insight into whether current practices align with contemporary standards.

Materials and methods

Two geographic regions were selected for the current study: the district of Verden in Lower Saxony, Germany, and the Basel region (both the city [Basel-Stadt] and surrounding countryside [Basel-Land]) in Switzerland. The participating dental practitioners in both regions were selected in cooperation with the Zahnärztekammer Niedersachsen (Dental Association of Lower Saxony) in Germany and the Schweizerische Zahnärztegesellschaft (Swiss Dental Association) of Basel-Stadt and Basel-Land in Switzerland. These organizations provided the questionnaire as an online link to all practicing dentists of the specific district via email.

Questionnaire

Data were collected using a survey with 30 specific questions, designed based on a questionnaire from Naumann et al. (2016) (13). A short introduction described the topic and purpose of the study. The questionnaire was divided into three parts. The first

part addressed sociodemographic information such as gender, age, and professional work experience. The second part included introductory questions about the use of posts/screws, followed by questions concerning the materials and methods used for post-endodontic treatment. The third part investigated the types of post-endodontic treatment techniques used in specific clinical scenarios. The 30 questions (with possible answers) were as follows (translated into English from the original German):

- Do you practice in Germany or Switzerland?
- How old are you?
- Please enter your gender (male; female; diverse; no option)
- Do you practice at a dental faculty? (yes, in full-time; yes, in part time; no)
- How long have you been practicing? (0<5 years; 6–10 years; 11–15 years; 16–20 years; >20 years; in retirement)
- How many teeth do you treat endodontically per year? (0–30; 30–60; 60–80; >100–150; >150–200; >200)
- In what percentage of endodontically treated teeth do you place a post or screw? (<5%; 5–20%; 20–40%; 40–60%; 60–80%; 80–100%)
- Do you think that a post should be placed in each endodontically treated tooth? (yes; no)
- At what proportion of remaining coronal tooth structure, should a post be used? (Answer: 0-40%, 40-70%, 70-100% of remaining coronal tooth structure)
- At what proportion of remaining coronal tooth structure, should a crown be used? (Answer: 0-40%, 40-70%, 70-100% of remaining coronal tooth structure)
- Would you think that an endodontically treated tooth would be stronger with a post and that the risk of fracture is reduced? (Yes, in every case; Yes, but only if the post is adhesive cemented; Yes, but only if the post is conventional cemented; no)
- Which type of posts do you use? (prefabricated system [Rotex (Rotex Cendres+Métaux, Biel/Bienne, Switzerland)]; fiber-reinforced (glass fiber); zirconium oxide ceramic [CeraPost (CeraPost, Lemgo, Germany)]; metal; glass fiber [e.g., Everstick (everStick, Leuven, Belgium)]; anything else)
- If you use prefabricated posts, which shape do you use most? (non-metallic cylindrical; non-metallic conical; non-metallic cylindro-conical; metallic cylindrical; metallic conical; metallic cylindro-conical; metallic screws; metallic lengthwise slotted; others)
- If you use prefabricated posts, which build-up material do you use most? (amalgam; chemical curing composite; light curing composite; dual-curing composite; glass ion-omer cement; composite modified glass ionomer cement; others)
- If you use indirect casted post-and-cores, which kind of impression do you use? (conventional; digital; both)
- Which is your most used build-up method for single-rooted teeth? (more than one option possible: for single crowns: cast post build-up, prefabricated post with build-up or none; for abutments in fixed dental prosthesis (FDP; bridge): cast post build-up, prefabricated post with build-up or none; for telescope: cast post build-up, prefabricated post with build-up; none)
- Which is your most used build-up method for multi-rooted teeth? (more than one option possible: for single crowns: cast post build-up, prefabricated post with build-up or none; for bridge abutments: cast post build-up, prefabricated post with build-up or none; for telescope cast post build-up, prefabricated post with build-up; none)
- Which method do you use for retention in the root canal for removable dentures? (casted post copings; direct retention elements [Dalbo Rotex (Cendres+Métaux, Biel/Bienne, Switzerland)]; not using; others)
- Do you rinse or etch the post space before cementation? (no; yes, [with filled answer]"
- How do you remove the root canal filling before placing a post? (rotation reamer; manual reamer; heated endodontic instrument; solvent [e.g., eucalyptus oil]; others)
- Which insertion depth do you prefer? (6 mm; 7 mm; 8 mm; apical sealing around 3–5 mm; starting from root canal entrance; individual)
- Which type of anchorage system do you use mostly? (luting cement [e.g., Harvard Cement (Harvard Dental International, Hoppegarten, Germany)]; luting cement with chemical adhesion [e.g., glass ionomer cement]; adhesive composite & adhesive cement [e.g., Panavia V5 (Kuraray Europe, Hattersheim, Germany)])
- Which is your most common post-endodontic restoration treatment? (crown; partial crown; composite; amalgam)
- Name your mean failures regarding post-endodontic treatment. (more than one option possible: no failures; loss of restoration retention; root fracture; crown fracture; endodontic problem; others)

Typical clinical scenarios were illustrated with photographs, and the following questions were posed: "Would you place a post? (If yes, how many and which material)", "Which material would you use for build-up filling?", "Would you place a crown? If yes, which material?".

Case 1: lower premolar with mesial, vestibular, lingual walls maintained
Case 2: upper molar with buccal, palatal walls maintained
Case 3: upper premolar with buccal, distal, palatal walls maintained

Case 4: upper premolar with buccal and palatal walls maintained
Case 5: upper premolar with buccal walls maintained
Case 6: upper front tooth with reduced residual vestibular, palatal walls
Case 7: lower premolar with NO more mesial, distal, buccal, lingual walls

Evaluation

Descriptive statistics were calculated with standard deviations. Categorical variables were described by indicating the number and percentage in each group. For age, the median and IQ were calculated. In addition, p-values from the corresponding significance tests like Fisher's exact test, Chi-square test, and Rank Sum test were indicated. Data were analyzed using a software package (SPSS 30.0; SPSS, Chicago IL, USA).

Results

Cohort characterization

In total, 334 Swiss and 570 German dentists received the questionnaire from August 2023 to November 2023. Fifty dentists from Switzerland and 60 from Germany returned the completed questionnaire resulting in response rates of 15% (Switzerland) and 10.5% (Germany). The average age of participants was similar in both countries (Germany 51.4 ±11.8 years and Switzerland 53.4 ±10.8 years) (Table 1).

Table 1. Cohort characterization.

	Germany (N=60)	Switzerland (N=50)
Average age (range)	51.4y±11.8y (29y-75y)	53.4y±10.8y (33y-69y)
Female	42	28
Male	57	70
Divers	1	2
Working in a dental faculty		
Full time	3	16
Part-time	5	6
No	92	78
Work experience in years:		
0<5	5	4
6-10	10	8
11-15	12	12
16-20	10	12
>20	58	62
Retirement	5	2
Endodontically treated teeth per year (estimate):		
<100	42	76
>100	58	24

Responses in percent.

In Switzerland, the majority (70%) of participants were male while in Germany only approximately half of the participants (57%) were male. In both countries, the majority of dentists were working in private practice (92% in Germany and 78% in Switzerland) and more than half of them had a professional work experience of more than 20 years (58% in Germany, 62% in Switzerland). Interestingly, there was a difference in the estimated amount of endodontically treated teeth per year between countries. Fifty-eight percent of the German dentists treated more than 100 teeth endodontically per year; more than twice as many as Swiss dentists (24%; $p < 0.01$).

General post-endodontic treatment questions

Dentists from both countries agreed that not every endodontically treated tooth needs a post (Germany 93%, Switzerland 96%). The majority of Swiss dentists (58%) indicated that post insertion is required when only 0–40 % residual coronal tooth structure has remained, while most German dentists (60%) set this threshold at 40–70% of remaining tooth substance (Table 2). This difference was borderline significant (p=0.051).

Table 2. The proportion of remaining coronal tooth structure requiring a post to be used.

Remaining coronal tooth structure in %	Germany	Switzerland
0-40 %	29	58
40-70 %	60	35
70-100 %	11	7

Responses in percent.

Accordingly, most of the Swiss dentists (70%) but only 47% of the German dentists agreed that posts will neither strengthen the tooth nor decrease the risk of fracture (p=0.034) (Table 3).

Table 3. Would you agree that an endodontically treated tooth will be stronger with a post and the risk of fracture is reduced?

Options	Germany	Switzerland
No	47	70
Yes, but only if the post is adhesively cemented	42	22
Yes, in every case	11	6
Yes, but only if the post is conventionally cemented	0	2

Responses in percent.

Both groups agreed on the material used for posts: 40% of the surveyed German dentists and 60% of the Swiss participants used glass fiber (fiber reinforced and glass fiber material such as everStick; GC Europe, Leuven, Belgium), in particular in the shape of non-metallic conical posts (Germany 45%, Switzerland 28%; Fig. 1). Interestingly, 15% of the German dentists preferred metallic screws. For the post insertion in Germany (63%) and Switzerland (80%) a system of bonding and adhesive resin cement was used. Therefore, both groups also agreed on an etch & rinse procedure (Germany 73%, Switzerland 74%). With regard to prefabricated posts, the vast majority of both groups agreed on the use of composite resin as core build-up material (Germany 90%, Switzerland 98%). However, German dentists preferred dual-curing composite resin (55%), whereas Swiss participants used light-curing composite resin (52%, Fig. 1).

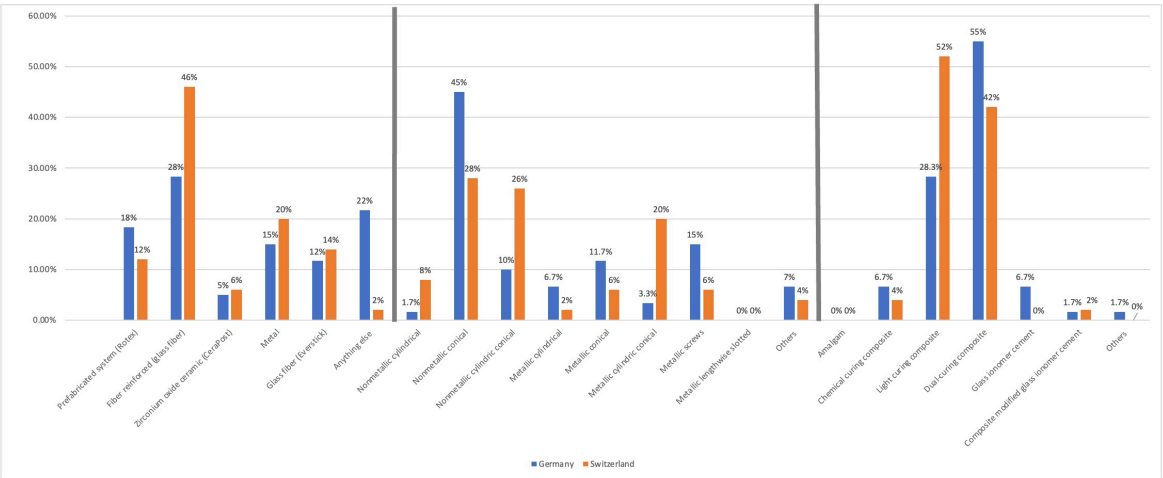

Figure 1. Answer for the three questions: Which type of posts do you use? If you use prefabricated posts, which shape do you use most? If you use prefabricated posts, which build-up material do you use most? Distribution of answers (in %).

Both cohorts preferred prefabricated posts combined with composite core build-ups for single crowns (Germany 75%, Switzerland 62%) and FDP (Germany 63%, Switzerland 68%) on single-rooted and multi-rooted teeth (single crown: Germany 65%, Switzerland 58%; FDP: Germany 68%, Switzerland 68%). When comparing the use of single crowns based on the remaining coronal tooth structure, the majority of both groups indicated a preference for single crowns when 40–70% of the tooth structure remained. Notably, 45% of Swiss dentists answered they would place a crown with only up to 40% of residual tooth structure, whereas only 24% of German participants indicated the same approach (p=0.034; Table 4).

Table 4. The proportion of remaining coronal tooth structure requiring a crown to be used.

Remaining coronal tooth structure in %	Germany	Switzerland
0-40 %	24	45
40-70 %	72	45
70-100 %	4	10

Responses in percent.

In addition, the most common post-endodontic treatment were single crowns in Germany (67%) and composite resin fillings in Switzerland (68%). Both groups indicated different main failures in

their post-endodontic treatment. While the majority of German participants named the general endodontic treatment (53%) as main source of failure, vertical root fractures (50%) was most frequently mentioned among Swiss dentists.

Regarding the retention of removable dental prostheses on abutment teeth with root-canal treatment different methods were observed in German and Swiss dentists. German dentists preferably used prefabricated posts with composite core build-ups for telescopic crowns (60%), while Swiss participants (68%) preferred casted post copings, irrespective of the tooth morphology, i.e., single or multi-rooted.

An overall agreement was found among German and Swiss participants related to general questions: both preferred conventional impression methods for indirect casted post-and-cores (Germany 85%, Switzerland 80%). Further, both groups preferred the use of rotation reamer for removal of obturation material (Germany 78%, Switzerland 66%) and an individual insertion depth of the post (Germany 52%, Switzerland 40%).

Clinical example cases

In the first clinical case of a lower premolar with 3 remaining walls, a greater proportion of German dentists (43%) would choose to place a post compared to only 16% in the Swiss group ($p<0.01$). Furthermore, 62% of the German dentists would decide to insert a crown, compared to 36% of the Swiss dentists who would restore the tooth with composite resin (Fig. 2).

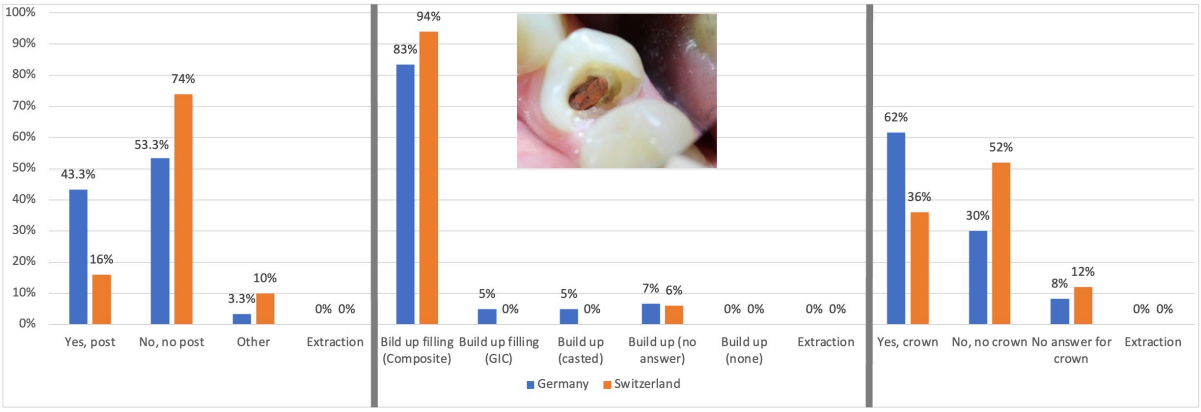

Figure 2. Case 1: lower premolar with mesial, vestibular, lingual walls maintained. Responses in percent to the following questions: Would you place a post? Which material would you use for build-up filling? Would you place a crown?

The preference of German dentists to favor post placement and restoration with a single crown was also found in the second clinical case illustrating a maxillary molar with two remaining dentin walls ($p<0.01$) (Fig. 3), in the maxillary premolar with 3 remaining walls ($p<0.01$) (Fig. 4), and in the maxillary premolar with 2 remaining walls ($p<0.01$) (Fig. 5).

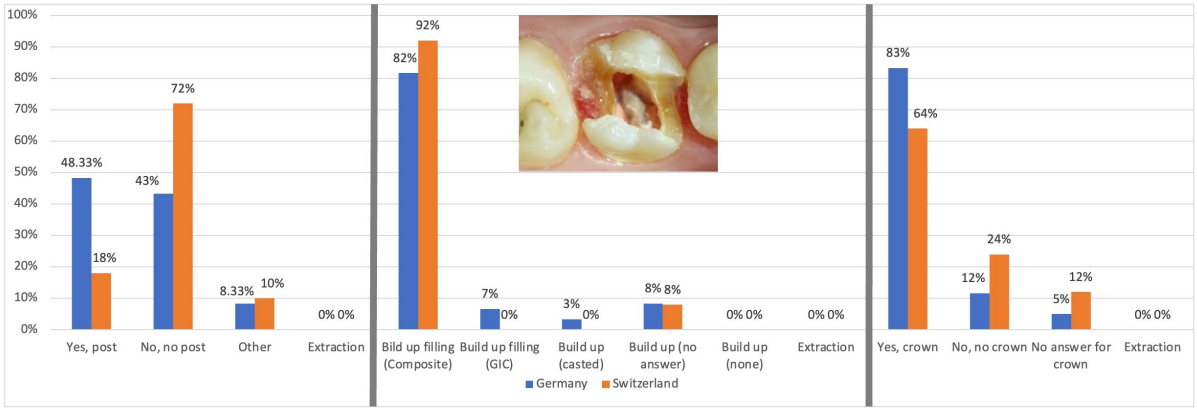

Figure 3. Case 2: upper molar with buccal, palatal walls maintained. Responses in percent to the following questions: Would you place a post? Which material would you use for build-up filling? Would you place a crown?

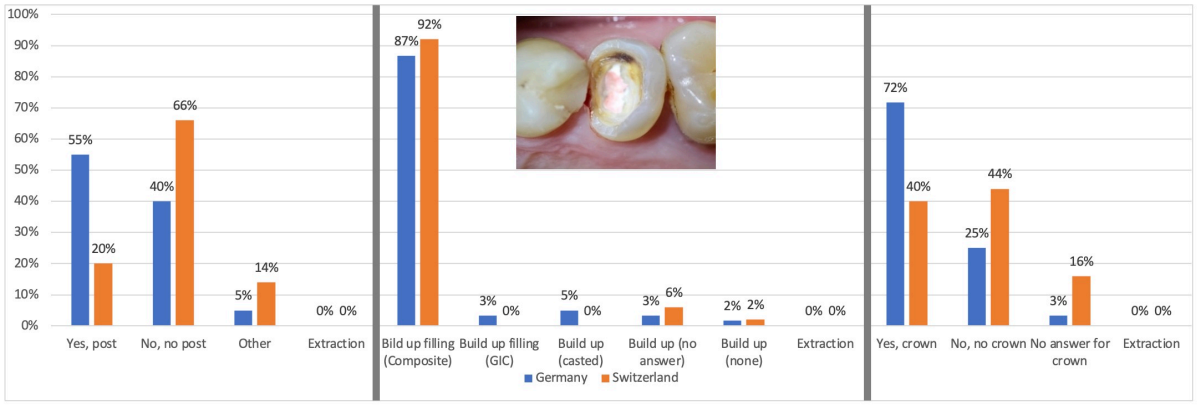

Figure 4. Case 3: upper premolar with buccal, distal, palatal walls maintained. Responses in percent to the following questions: Would you place a post? Which material would you use for build-up filling? Would you place a crown?

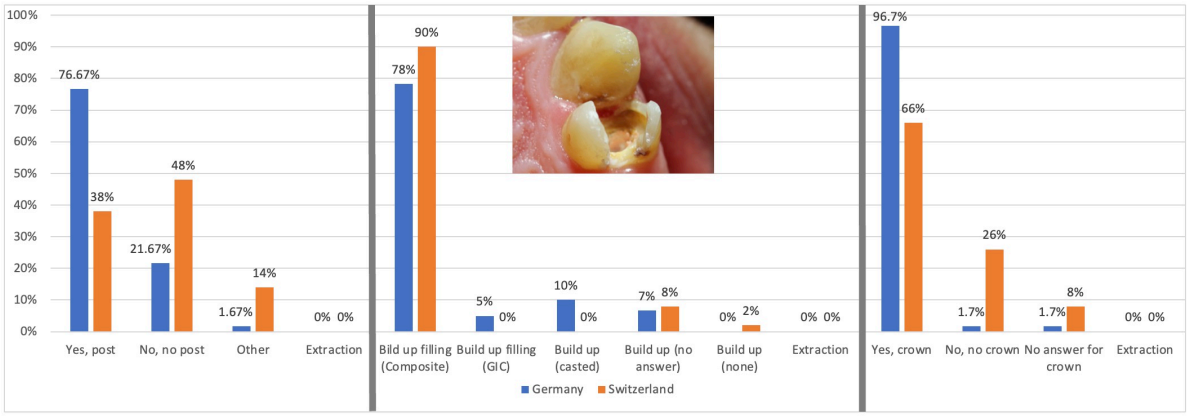

Figure 5. Case 4: upper premolar with buccal and palatal walls maintained. Responses in percent to the following questions: Would you place a post? Which material would you use for build-up filling? Would you place a crown?

In the latter case (Fig. 5), a casted post-and-core was favored by 10% of German dentists, while this option was never selected by Swiss dentists in Cases 1–4. Similar assessments were observed for the situation of a maxillary premolar with only one remaining wall, in which post placement was favored by 73% (Germany) and 76% (Switzerland) and crown insertion was deemed necessary by 67% (Germany) and 76% (Switzerland, Fig. 6).

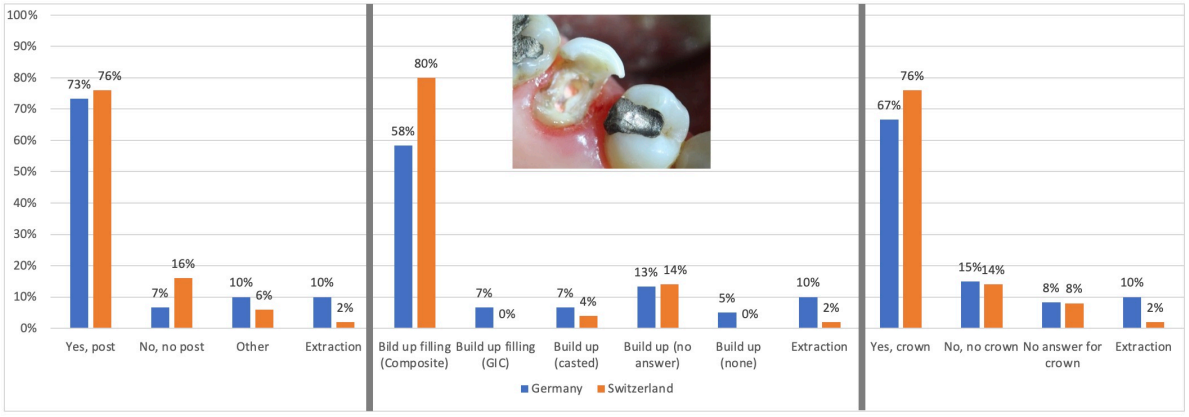

Figure 6. Case 5: upper premolar with buccal wall maintained. Responses in percent to the following questions: Would you place a post? Which material would you use for build-up filling? Would you place a crown?

Tooth extraction was selected by 10% of the Germans, whereas only 2% of the Swiss dentists chose this treatment option (Fig. 6). The anterior tooth situation with limited residual tooth substance revealed a high approval for the usage of a post (Germany 82%, Switzerland 94%), a build-up with composite resin (Germany 65%, Switzerland 72%), and restoration with a single crown (Germany 82%, Switzerland 88%) in both groups (Fig. 7).

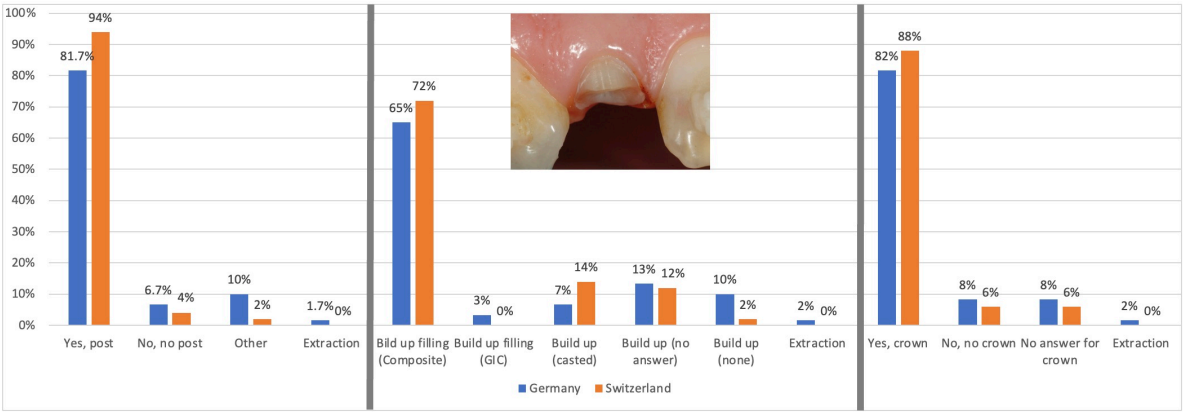

Figure 7. Case 6: upper front tooth with reduced residual vestibular, palatal walls. Responses in percent to the following questions: Would you place a post? Which material would you use for build-up filling? Would you place a crown?

In the last clinical case showing a premolar after fracture at the gingiva level, tooth extraction was selected by 30% (Germany) and 16% (Switzerland; $p<0.01$). Post placement was selected by 37% (Germany) and 58% (Switzerland), and cast post-and-core was recommended by 5% (Germany) and 16% (Switzerland, Fig. 8).

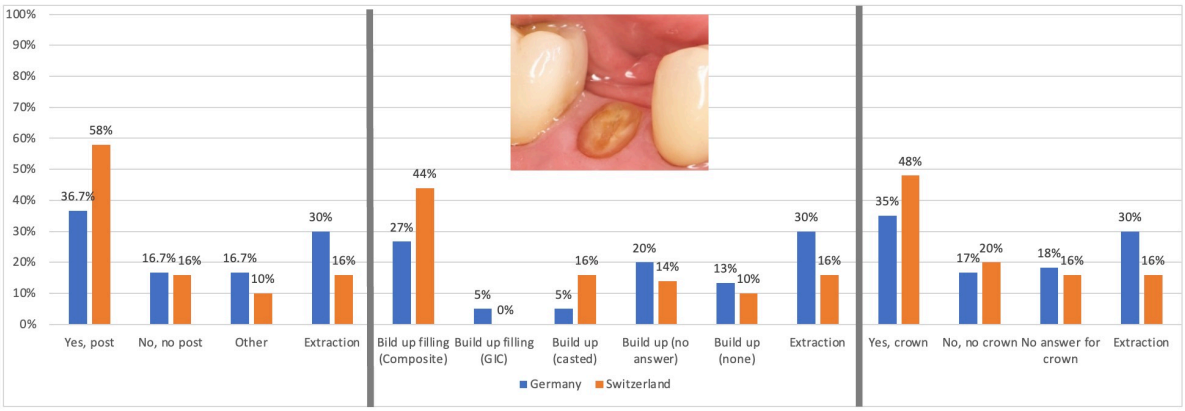

Figure 8. Case 7: lower premolar with NO mesial, distal, buccal, lingual walls. Responses in percent to the following questions: Would you place a post? Which material would you use for build-up filling? Would you place a crown.

Discussion

This study aimed to compare post-endodontic treatment strategies in Germany and Switzerland and demonstrated higher frequencies of post insertion, single-crown placement, and tooth extraction among German dentists. The response rate in the current study (15% in Switzerland and 10.5% in Germany) was a major limitation and was below the reported range of 16 % to 100 % in similar surveys (13,14,16,17). This might be attributed to the indirect recruitment of participants via the professional dental associations (the Dental Association of Lower Saxony and the Swiss Dental Association of Basel-Stadt and Basel-Land). Another explanation is the structure of the online questionnaire, which was conducted anonymously and sent via an online link to the dentists' clinical email addresses and not to

colleagues in person. Repeated emails with online links may have been considered spam by the recipients and thus might not have been the best choice for inviting participants. As the average age of the cohort group was over 50 years old, their affinity with digitalization could have been another limitation. The respondents from both countries shared comparable demographic and professional profiles with a mean age of 51 to 54 years, an average of over 20 years of clinical experience in clinical practice, and predominantly not working in a dental faculty. The results are therefore considered interesting for any dentist working in dental practice.

The selection of clinical cases in the current study with varying amounts of residual coronal tooth substance aimed to differentiate from no need for post placement to clearly indicated post placement for sufficient build-up retention within the root canal based on the dentist's own threshold. Accordingly, the situations with only 2, 1, or no remaining cavity wall in a premolar or anterior tooth (Cases 4–7) demonstrated high percentage of dentists in favor of post placement and restoration with a single crown. Due to the illustration of presented clinical cases without additional data such as probing pocket depth values, the answers could be influenced by a wider range of treatment options that were not mentioned in the answer options, e.g., surgical crown lengthening in Cases 5–7. Several meta-analyses demonstrated no overall positive effect of post placement, with the exception of teeth without remaining coronal walls and those with one residual wall, for which a clear benefit from intraradicular posts is evident (19–21). In clinical longitudinal studies no significant association was found between numbers of remaining cavity walls and time until failure, even when molars were excluded from risk analysis. These contradictory results, however, could be attributed to differences in treatment methods and study duration (22). The surveyed Swiss and German dentists indicated to insert posts mainly in accordance with the guidelines of the European Society of Endodontology (3), which was demonstrated in the general questions regarding the loss of tooth structure (Table 2) and in the clinical cases (Fig. 2–8). The highest approval rate for a post insertion in both groups was found for maxillary anterior teeth with no residual walls (Fig. 7). The shear forces in the maxillary anterior region have shown to increase the risk of structural failure and therefore a post placement was strongly recommended in several studies (23–26).

The majority of German dentists indicated to insert posts in endodontically treated teeth at a stage of 40–70% remaining tooth hard substance (Table 2); this was in contrast to the Swiss dentists. The German dentists were more likely to treat endodontically treated teeth with posts, as evidenced by their responses to clinical case examples (Cases 2–7). Given the similarities in age and clinical experience between the Swiss and German dentists, and comparable dental education systems between countries (27), these differing treatment decisions may be influenced by other factors, such as the legal regulations of the respective healthcare systems. In particular, the vast majority of German dentists are contracted with statutory health insurance providers and are therefore bound by the guidelines of the Gemeinsamer Bundesausschuss (Federal Joint Committee) (18). According to these regulations the German healthcare insured patients have a legal claim to prefabricated or casted post-and-core due to a (not precisely defined) high loss of tooth structure in endodontically treated teeth. In return the costs are 60–100% covered by the insurance (18). This might be the reason why German dentists decided to place a post more often than their Swiss colleagues. In Switzerland, dental treatment is generally not covered by health care insurers (except for patients receiving social welfare, patients having specific diseases, dental trauma patients, or patients with voluntary supplementary insurance). In the present study, there was a trend towards casted post-and-core only when the coronal tooth substance was severely reduced (Case 5–7), particularly among Swiss dentists. Overall, the majority of dentists in both groups favored the placement of fiber posts in endodontically treated teeth (Fig. 8). In several studies, no beneficial effects of either rigid (e.g., metallic) or flexible (e.g., fiber) posts on the tooth or the restoration survival were demonstrated (3,28–30). On the other hand, a recently published meta-analysis found significantly higher survival rates of endodontically treated teeth with fiber posts in comparison to metallic posts over a medium-term of 3 to 7 years (31). Interestingly, the trend towards use of fiber posts over metallic posts in Germany is consistent with past surveys (13,16). This tendency was shown in the present study for Swiss dentists in comparison to previous surveys (17,32,33).

The present study compared the different build-up methods for single- and multi-rooted teeth in both countries. While most German dentists used dual curing composite resin (55%), Swiss dentists

preferred light-curing composite resin (52%) as material for directly placed build-ups (Fig. 8). Smaller percentages in both groups used glass-ionomer cement and casted core build-ups, which is in accordance with previous studies (13,16).

For the final coronal restoration of endodontically treated teeth, an indirect restoration with a cusp coverage is generally recommended, but not evidence-based due to the paucity of suitable studies (3,34–36). Meta-analyses data demonstrated no difference for neither indirect nor direct restorations regarding the tooth survival over a short- and long-term period (35,37). Clinician should consider their final post-endodontic treatment decision based upon their own clinical experience under consideration of tooth structure loss, thickness of the remaining walls, tooth location, number of proximal contacts, existing cracks, co-factors such as parafunctional habits, and the preferences of their patients when recommending a post-endodontic treatment (3,36). This lack of clear scientific recommendations might be the reason for the very different treatment decisions for the final coronal restoration in the present study, with crowns dominating in Germany and indirect composite-resin fillings favored in Switzerland, in particular in cases of little hard-tissue loss (Cases 1–4).

The majority of German dentists started indirect restorations in endodontically treated teeth at a stage of 40–70 % remaining hard tooth structure (Table 2, 4). In contrast, the majority of Swiss dentists started indirect restorations in teeth with 0–40 % residual cavity walls (Table 2, 4) and treated endodontically treated teeth with composite-resin fillings (Cases 1–4). Accordingly, Swiss dentists named fractures as the main failure cause in their post-endodontic treatment maintaining the importance of the cusp coverage (3,34–36). German dentists found endodontic problems to be the main type of failure, in accordance with previous published surveys which identified these as the main or second largest type of failure (13,16). However, the individual treatment decision of German dentists was dominated by single crown placement, what might be guided by the specific health insurances, which in part cover patients' costs (18). In the cases with no or only one remaining cavity wall (Cases 5–7) more Swiss dentists aimed at tooth preservation using posts and single crowns compared to their German colleagues, who tended to extract teeth with severely reduced tooth substance. In our sample, the average age of German dentists indicates that they graduated before 2020 under dental education guidelines focusing on prosthodontic therapies; these were revised in 2020 and now emphasize and focus on more restorative aspects (18,27,38). The decision of the Swiss dentists to predominantly maintain teeth could also be explained by the differences in healthcare and educational systems. While the Swiss dental educational regulations are similar to other European universities, a preference to maintain and restore even strongly decayed teeth rather than to extract them was obvious. It can be assumed that the Swiss dentists followed the progressive staged approach with a high potential for reintervention, starting with the least minimally invasive treatment option. Additionally, avoiding high laboratory costs for indirect restorations, or for subsequent treatment following extraction, which are not covered by health insurances, might be responsible for favoring direct post-endodontic composite build-ups (13,38). For retention of removable dental prostheses, the majority of German dentists preferred telescopic crown restorations even in teeth with endodontic treatment and selected prefabricated posts with core build-ups, while two-thirds of Swiss participants preferred casted post copings. In Switzerland, the selection of retention elements of removable dental prothesis is dependent on the assessment of the coronal tooth substance of the tooth. While teeth with sound tooth structure or sufficient restorations are planned for clasp retention (or adhesive attachments), teeth in need for single crowns are restored with telescopic retention, and root-canal treated teeth are intended for casted post copings with prefabricated retention elements. A cost-effective chairside alternative is the Dalbo-Rotex anchor, which is particularly indicated in teeth with questionable prognosis (39). This difference is attributed to the German insurance system, in which the application of post copings is restricted to repair after fracture, while planning a removable restoration with a combination of retention elements (telescopes and post copings) that account for the endodontic situation is not permitted.

Conclusions

Within the limitations of the present study, it can be concluded that German dentists tend to place endodontic posts and single crowns more frequently than their Swiss colleagues, in particular in cases of minimal hard tissue loss. In Switzerland, maintaining teeth, avoiding single-crown placement, and applying composite-resin fillings are the preferred options for final restoration of endodontically treated

teeth. Dentists should be aware of the current practice-based recommendations for post-endodontic restorations.

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Zusammenfassung

Einleitung

Die Entscheidungen über postendodontische Behandlungen können durch Bildungs-, Gesundheits-, finanzielle und historische Faktoren beeinflusst werden. Ziel dieser Studie war es, die postendodontischen Behandlungsentscheidungen – insbesondere die Verwendung von Stiften und Einzelkronen – von Zahnärzten in Deutschland und der Schweiz zu vergleichen.

Material und Methoden

Von August bis November 2023 wurde ein Fragebogen unter 334 Schweizer und 570 deutschen Zahnärzten verteilt. Insgesamt nahmen 50 Schweizer Zahnärzte (Rücklaufquote: 15.0 %) und 60 deutsche Zahnärzte (Rücklaufquote: 10.5 %) an der Umfrage teil. Es wurden deskriptive Analysen durchgeführt, und die Daten in Prozentangaben dargestellt.

Resultate

Deutsche Zahnärzte gaben an, in 5–20 % der endodontisch behandelten Zähne Stifte zu setzen, während die meisten Schweizer Zahnärzte dies in weniger als 5 % der Fälle taten. Schweizer Zahnärzte (58 %) neigten dazu, Stifte bei einem verbleibenden Zahnsubstanzanteil von 0–40 % zu setzen, während deutsche Zahnärzte (60 %) dies bei 40–70 % begannen. Hinsichtlich der postendodontischen Restaurationen bevorzugte die Mehrheit der deutschen Zahnärzte (67 %) Einzelkronen, während die meisten Schweizer Zahnärzte (68 %) Komposit Füllungen bevorzugten und selbst stark geschädigte Zähne mit reduzierter koronaler Hartsubstanz erhielten. Diese Tendenzen wurden durch die Antworten auf verschiedene klinische Fallszenarien weiter untermauert.

Diskussion

Unter den gegebenen Limitationen der vorliegenden Studie deuten die Daten darauf hin, dass die beobachteten Unterschiede in der Wahl der postendodontischen Behandlung auf Unterschiede im Gesundheitssystem und in der zahnärztlichen Ausbildung in Deutschland und der Schweiz zurückzuführen sind. Die Kostenübernahme durch die Krankenversicherung könnte der ausschlaggebende Faktor dafür sein, dass deutsche Zahnärzte häufiger Stifte und Kronen verwenden, selbst bei geringem Hartsubstanzverlust, während Schweizer Zahnärzte in vergleichbaren Fällen eher Komposit Restaurationen bevorzugen.

Résumé

Introduction

Les préférences en matière de traitement post-endodontique peuvent être influencées par des facteurs éducatifs, sanitaires, financiers et historiques. Cette étude visait à comparer les choix de traitement post-endodontique – en particulier la pose de tenons et de couronnes unitaires – des dentistes en Allemagne et en Suisse.

Matériels et méthodes

D'août à novembre 2023, un questionnaire a été distribué à 334 dentistes suisses et 570 dentistes allemands. Au total, 50 dentistes suisses (taux de réponse : 15.0 %) et 60 dentistes allemands (taux de réponse : 10.5 %) ont complété l'enquête. Des analyses descriptives ont été réalisées et les données présentées en pourcentages.

Résultats

Les dentistes allemands ont déclaré poser des tenons dans 5 à 20 % des dents traitées endodontiquement, tandis que la majorité des dentistes suisses le faisaient dans moins de 5 % des cas. Les dentistes suisses (58 %) avaient tendance à poser des tenons lorsque la structure dentaire restante était de 0 à 40 %, alors que les dentistes allemands (60 %) commençaient à le faire entre 40 et 70 %. En ce qui concerne les restaurations post-endodontiques, la majorité des dentistes allemands (67 %) préféraient les couronnes unitaires, tandis que la plupart des dentistes suisses (68 %) privilégiaient les obturations en résine composite, même pour des dents avec une structure coronaire fortement réduite. Ces tendances ont été confirmées par les réponses à divers scénarios cliniques.

Discussion

Dans les limites de la présente étude, les données indiquent que les différences observées dans le choix du traitement post-endodontique sont liées aux différences entre les systèmes de santé et la formation dentaire en Allemagne et en Suisse. La prise en charge des coûts par l'assurance maladie pourrait être le facteur déterminant expliquant pourquoi les dentistes allemands utilisent plus fréquemment des tenons et des couronnes, même en cas de perte minime de tissu dur, tandis que les dentistes suisses montrent une préférence plus marquée pour les restaurations en composite dans des cas similaires.

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