



Patients' preferences for selective versus complete excavation: A mixed-methods study



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ABSTRACT

Objectives: Despite increasing evidence supporting selective caries tissue removal, the technique is not adopted by most dentists, one possible reason being that patients might reject it. We aimed to assess patients' preferences for selective versus complete excavation, and to identify predictors of this preference.

Methods: A sequential mixed-methods approach was taken. First, semi-structured focus group discussions on two convenience samples were performed. Verbatim transcripts were evaluated using content-analysis to inform quantitative study design. The subsequent survey employed convenience, snow-ball and deviant-case sampling, yielding 150 respondents. The relevance of treatment attributes (risks of nerve damage, root-canal treatment, recurrent caries, restorative complications, treatment costs, aesthetic consequences) on patients' treatment preferences was measured using case-vignettes. Dental experience and anxiety as well as patients' personality and socio-demographic details were recorded. Association of predictor variables (age, gender, education, partnership status, personality items, dental experience, anxiety) with treatment preference was assessed using regression analysis.

Results: Focus group participants perceived complete excavation as reliable, but feared endodontic treatment. The vast majority of survey respondents (82.7%) preferred complete over selective excavation. The preference for selective excavation was significantly increased in patients with an emotionally stable personality ($p < 0.001$), university entrance degree ($p < 0.001$), none or little dental anxiety ($p = 0.044$), few dentist changes in the past ($p = 0.025$), and who accepted that sealed lesions could progress ($p < 0.002$).

Conclusion: Treatment attributes, socio-demographic characteristics, personality and dental experiences shape patients' preference towards caries excavation.

Clinical significance: Clinical decision-making regarding carious tissue removal might be affected by dentists on both an informative and an empathic level.

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1. Introduction

For deep lesions, dentists can attempt complete excavation, i.e. remove all carious dentin and bacteria from the cavity, which bears great risks for the pulp. Alternatively, they can actively leave carious dentin close to the pulp when performing stepwise (two-

step) or selective (incomplete, partial) excavation. The latter techniques seem beneficial, as risks of pulp exposure and complications are reduced, with even greater advantages when using selective instead of stepwise excavation [1,2]. Selective excavation permanently seals carious dentin under a restoration, with sealed bacteria being deprived from dietary carbohydrates, leading to lesion arrest [3].

There is strong indication that dentists do not widely support selective excavation, even for deep lesions, but rather accept pulp exposure as an "inevitable" consequence of complete excavation [4,5]. Survey data indicates that the rejection of selective

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excavation is based on several reasons, like the fear that remaining bacteria could harm the pulp or sealed caries lesions could progress. Further uncertainty stems from possible restorative risks associated with sealing caries beneath restorations [5]. One reason, which has so far not been investigated, might be that dentists think patients could perceive selective excavation as unprofessional or “neglect”, and reject it.

Understanding decision making from patients' perspective is relevant, as patients might be both enablers and barriers for changing caries treatment philosophies, either embracing less invasive treatments and demanding them from their dentists, or rejecting such management based on an understanding of caries as an infectious disease. Although patients prefer to share treatment decisions with their dentists, lack of knowledge and established trust in their dentist give them a rather passive role in treatment decisions [6,7]. It is thus of interest if patients agree with their dentists, or if their decision-making differs due to different priorities, as has been shown for dental restorative material choice [8].

In many medical fields, a broad literature exists on patients' decision-making and its influencing factors: predisposing variables (like gender, age or education), enabling factors (like income or insurance status), subjective needs, general health behavior and attitudes as well as treatment-specific outcomes have been found to shape decision-making [9]. In the context of dentistry, such data are sparse. Specially, for management of caries lesions, it is currently not known how socio-demographic characteristics, anxiety and personality traits, or expected treatment outcomes predict patients' decision-making. In analogy to other diseases which can be managed either invasively or conservatively (like prostate cancer), it can be hypothesized that anxious or neuroticistic patients tend to prefer more radical treatment options [10]. Moreover, the expected outcomes of a treatment, based on both earlier experiences and beliefs about the disease and its management ('common sense model'), could influence caries-related decision-making [11,12].

We aimed to explore potential predictors of patients' decisions for selective or complete excavation using a sequential mixed methods approach. We conducted a qualitative study followed by a quantitative investigation, as this allows combining different samples and data collection methods to maximize their utility and to improve the credibility and validity of results [13].

2. Methods

2.1. Study design

Reporting of this study follows established guidelines for qualitative research [14], observational [15] and mixed-method studies [16]. This study was performed from 03/2014 to 03/2015. A sequential mixed-method approach was taken. First, two focus group interviews were performed to identify socio-demographic or personality traits and treatment attributes relevant to patients' preferences. Second, a survey was conducted employing a newly developed case-vignette and questionnaire. Ethical approval for both studies was granted by the ethics committee of the German Society for Psychology (DGPs: SB112013, SB122014). Focus group participants gave their verbal and written consent to participate after being informed verbally and in writing. Both qualitative and quantitative data were de-identified to prevent identification of individuals.

2.1.1. Focus groups

To lay the groundwork for the subsequent survey, semi-structured focus group discussions were performed. The purpose was to gain a better understanding of how patients feel and think

regarding caries tissue removal and the associated risks. The framework of a focus group is helpful to gain this understanding since participants are encouraged to share their perceptions and opinions [17]. In contrast to 1-2-1 interviews, focus groups allow more latitude in the topics discussed. An interview may restrict the discussion to the researcher's conceptions, thus missing central topics and opinions.

The focus groups were semi-structured, meaning that the interview guide consisted of pre-formulated questions to structure the session but also left scope for discussions. The guide consisted of five blocks which took the common sense model [12] into account: [1] Understanding of the disease caries (“What do you think causes caries?”), [2] Understanding of the prevention and management of caries (“How can you prevent caries, how is it treated?”), [3] Fears of patients towards caries and treatments (“What do you fear regarding caries?”), [4] Expectations regarding caries treatment (“What do you expect your dentist to do when you have caries?”), [5] Attitudes towards caries treatment attributes (“What do you fear more—nerve injury due to drilling or leaving caries?”), [6] Attitudes towards caries sealing (“What would you feel if the dentist wants to seal caries, as drilling might lead to nerve injury?”).

Our study population was recruited as a convenience sample face-to-face by one of the investigators (RM) at two dental practices in Kiel and the Kiel University hospital. Sampling aimed for diverse characteristic of the sample regarding gender, age and educational status. Our focus group sample consisted of 7 male and 5 female individuals, with a median age of 31 (range: 21–64). Four members had no higher (college) education, four had higher education, and four a university degree. Four members were actively working, three were retired, and five were studying or out of work at present. Focus group members did not know each other or the moderator before commencing the discussion.

Both group discussion were conducted at the dental university hospital Kiel. The moderator (RM) first introduced participants to each other and the idea of the study, and then guided participants through the discussions, intervening as little as possible to allow members to interact with each other. Probing questions were used to initiate the discussion on each of the blocks. The discussions were audio-recorded, and the moderator took field notes. Records were transcribed verbatim. After the interview, a questionnaire was given to each participant to collect socio-demographic characteristics. Individuals were further asked if they had any experiences of caries treatments and, specifically, different excavation strategies.

2.1.2. Qualitative data analysis

Transcripts and notes were submitted to explorative data analysis. This was to form an initial understanding of patients' preference and decision-making towards caries treatment, and to allow construction of the survey instrument for the quantitative analysis. Data analysis was performed by two investigators with experience in psychology and qualitative research methods (SB; IO). The researchers had no experience in dental research and were not familiar with the discussed disease or treatment options.

While this study employed elements of the common sense model, it did not aim to construct or validate a theoretical framework. Thus, qualitative content analysis as introduced by Mayring [18] was used to develop an idea as to which factors interlink in patients decision-making and preference towards caries treatment. Moreover, core attributes of caries treatments were deducted [19].

Relevant text passages (e.g. “It will be ok if I can avoid a root canal treatment”) were paraphrased and represented by descriptive terms (e.g. risk root canal treatment). Category development was both inductive and deductive. First, overlapping terms were

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