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The use of Dental Anxiety Management Techniques during One-Session Treatment: A Study on Five Video-recorded Patient Cases

Pirjo Kurki[1], Maija Korhonen[2], Kirsi Honkalampi[2], Satu Lahti[3], Anna Liisa Suominen[1,4]

ORCIDs:

Pirjo Kurki: 0000-0003-0462-9634; Maija Korhonen: 0000-0002-0075-4393; Kirsi Honkalampi: 0000-0002-4328-5291; Satu Lahti: 0000-0003-3457-4611; Anna Liisa Suominen: 0000-0002-8543-0055

[1]Institute of Dentistry, School of Medicine, University of Eastern Finland, Kuopio, Finland

[2]Psychology, School of Educational Sciences and Psychology, Joensuu, University of Eastern Finland

[3]Department of Community Dentistry, University of Turku, Finland

[4]Department of Oral and Maxillofacial Diseases, Kuopio University Hospital, Kuopio, Finland

Running title: Use of techniques to manage dental anxiety

Correspondence: Pirjo Kurki, University Lecturer, Institute of Dentistry, Kuopio campus, P.O. Box 1627, FI-70211 Kuopio, Finland, tel. +358400711904, pirjo.kurki@uef.fi

Abstract

Objective. The aim was to examine what kinds of dental anxiety management techniques dentists use in the context of one-session treatment. **Material and Methods.** The data consisted of videotaped treatment sessions for five dentally anxious adults. The treatment was conducted by two experienced dentists without formal training in the treatment of dentally anxious patients or in behavioral management techniques. Theory-driven qualitative content analysis, based on the anxiety management classification of Milgrom et al., was used to identify and classify the techniques used during the treatments. **Results.** Altogether, diverse categories of dental anxiety management techniques were identified under the main themes: enhancing trust and control, and psychological management. Techniques that fell into enhancing trust and control, included the categories of 'building a trustful relationship', 'informational control', and 'behavioral control'. These techniques were used consistently throughout the sessions. Additionally, psychological management techniques were identified and classified as 'behavioral strategies: relaxing the body' and 'cognitive strategies: relaxing the mind', which were regularly used in specific situations. **Conclusions.** The results indicate that a variety of dental anxiety management techniques were used during one-session treatments. The findings provide valuable insights for dentists in managing their patients with dental anxiety and improving their overall treatment experience.

Keywords: behavior management; dental anxiety; patient trust; content analysis; video recording

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Contact: Pirjo Kurki, University Lecturer, Institute of Dentistry, Kuopio campus, P.O. Box 1627, FI-70211 Kuopio, Finland, tel. +358400711904, pirjo.kurki@uef.fi

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Background

One-third of Finnish adults report dental anxiety, and one-tenth report high dental anxiety, which typically leads to avoidance of dental treatment [1]. Avoidance, in turn, can lead to the deterioration of oral health, further feelings of shame and inferiority, and psychosocial distress, which is the vicious circle of dental anxiety [2–5]. These characteristics make the treatment of dentally anxious patients a major challenge for dental care providers [6] and increase the financial costs of oral health care. Nevertheless, several techniques are available to help patients cope with dental anxiety [7].

A dental fear and anxiety management classification of Milgrom et al. 2009 [8] has been introduced into the literature which includes specific strategies to enhance trust and control, in addition to behavioral, cognitive, practical, and pharmacological strategies to reduce patient fear and anxiety. Interventions and treatments based on cognitive behavioral therapy (CBT) have been shown to be effective in reducing severe dental anxiety in adults, including one-session treatment [9,10]. Brief CBT interventions consist of one to five exposure-based dental treatment sessions delivered by trained dentists [11,12] or one to three psychological treatment sessions delivered by psychologists prior to conventional dental treatment [13–15]. Approaches to the treatment of the dental anxiety, such as cognitive restructuring [16,17], the use of relaxation techniques [18], and techniques to increase the patient's sense of control over the dental treatment [19], have also been described in the literature. Treatment has been shown to be most effective when techniques are combined with repeated, graded exposure [9].

However, there is a lack of studies that focus on how different dental anxiety management techniques are used by dentists in conventional dental care. Previous studies have typically been

conducted with dentists specially trained in CBT [11,12] or by psychologists in dental anxiety clinics [16]. Video recordings have been used in previous research to investigate the use of individual techniques to reduce dental anxiety in patients, such as the provision of information [20,21], the use of desensitization [18], and in the qualitative evaluation of health information in dental anxiety videos on YouTube [22]. However, there is a lack of studies examining video-recorded treatment sessions in which dentists use different techniques for patients with dental anxiety. We suggest that data from real dental treatment situations are needed to illustrate how dental anxiety management techniques conceptualized in previous research are used in practice by clinically experienced dentists who have no formal training in the treatment of dentally anxious patients or in behavioral management techniques. Therefore, we aimed to examine what kinds of dental anxiety management techniques dentists use in real-life dental situations, focusing on videotaped patient cases during one-session treatments for individuals with dental anxiety. The data were analyzed using qualitative theory-driven content analysis drawings from the classification of Milgrom et al. [8].

Material and Methods

The data used in this study are part of an intervention study, that included a diagnostic interview (DI) alone or combined with modified one-session treatment (M-OST) for dentally anxious patients (Figure 1). The study was conducted in eastern Finland from 09/2016 to 12/2018 (ClinicalTrials.gov: NCT02919241) [23]. According to the inclusion criteria, the participating adult patients had displayed dentally anxious behavior and had difficulty attending conventional dental care. After the voluntary participants provided verbal informed consent, their dental anxiety was measured using the Modified Dental Anxiety Scale (MDAS) [24]. The participants in this study consisted of five of the eight participants (aged 31 to 58 years, one male, all with irregular and/or emergency dental attendance patterns) who attended a DI + M-OST and the second interview. Prior

to the intervention, one of these participants scored 13 points and four scored 19 points or above, which is the established cut-off point for high dental anxiety on the MDAS [25,26].

[Figure 1 near here]

The data for the present study consisted of video recordings of 18 to 58 minutes of dental treatment performed by two dentists with eight and 18 years of clinical experience. A video camera was installed at a distance of two meters on the dentist's side and focused on the patient. The recording was started when the patient sat in the dentist's chair at the beginning of the treatment session and stopped when the patient left the room. The method and technique (videotaped data + *Atlas.ti 9* computer software) allowed us to observe in detail how the dentists dealt with anxious patients during the treatment. The dentists were briefly oriented by the researcher (PK) on the principles of gradual exposure (max. half an hour) and provided with a one-page written information sheet on the main phases of a specific one-session treatment (OST) [27] in the intervention [23]. These meetings with the dentists lasted half an hour and included a description of M-OST. The one-session treatment was aimed at helping the patient to manage the dental treatment, which consisted of an oral examination (n=4) performed by one of the two dentists or restorative dental treatment (n=1). General information about the patient's dental anxiety was available to the treating dentists on a sheet of paper. This information included the severity of dental anxiety, previous dental attendance behavior, the experience of the previous dental visit, any negative experiences of dental care, and treatment preferences expressed in the diagnostic interview [23]. The baseline interviews with the patients about their dental anxiety, which lasted one to two hours, were conducted by the researcher (PK), after which the treatment session was scheduled for another time. The interview included three self-reported dental anxiety scales, a semi-structured fear assessment questionnaire [8], and a behavioral analysis instrument [28].

Method of Analysis

Video recordings of five dental treatment sessions were analyzed using theory-driven qualitative content analysis consisting of inductive and deductive elements [29]. This approach was chosen because the theoretical framework allowed the researchers to focus on the dental anxiety management techniques identified in previous research [30]. The theoretical framework used in this study draws from the classification of Milgrom et al. [8] concerning techniques in treating fearful patients (Table 1). Another classification described in previous research was used to identify the range of behavioral and cognitive techniques [7].

[Table 1 near here]

In the initial phase of the analysis, the first two authors watched the videos independently, focusing on one patient at a time and identifying all emerging episodes according to the predetermined initial coding categories: building rapport and communication, information, providing control, distraction, positive reinforcement, diaphragmatic or relaxation breathing, cognitive restructuring, and systematic desensitization. The first author (PK) highlighted, point by point, the episodes from the videos in which the dentists used these techniques (*quotation in Atlas)* and added the descriptions to them (*comments in Atlas*). The themes were used as *a broad conceptual framework and organizing principle* for coding (*codes in Atlas*). An episode lasted from a few seconds to approximately 90 seconds and included the dentist's verbal and nonverbal actions and reactions toward the patient, as well as the patient's responses. The unit of analysis helped to evaluate the use of techniques in the context of situations, a dentist-patient relationship, and communication, although the interaction was beyond the focus of the study.

In the second phase, the first author organized all episodes according to the classification of Milgrom et al. (Table 1). The classification divides the techniques into two specific strategies: enhancing trust and control and the psychological management of dental anxiety. These two were

treated as the main themes and the categories of techniques were adjusted to fit them. The analysis also considered findings that did not fit with the theoretical classification. At this stage, the identified episodes were composed into following categories of techniques (*codes in Atlas*): 'behavioral control', 'building a trustful relationship', 'cognitive chance', 'informational control', 'relaxing the body through relaxation', 'relaxing the mind', 'retrospective control or debriefing', 'supporting verbally', and 'usage of structured methods'. The dentists' actions within an episode often involved many techniques that overlapped within a short period of time. In the third phase of the analysis, these techniques were differentiated from each other using a constant comparative method to look for similarities and differences in the ways the techniques emerged. They were then further classified and labeled into more specific techniques (*descriptions in quotations' comments in Atlas*). In the final step, the data from all patients' treatments and the identified episodes were brought together to form an overall description of the dental anxiety management techniques observed in the videos. As a result, the theory-driven analysis of the two themes and their categories led to the description of fear and anxiety management techniques and their characteristics used during one-session treatment, based on hundreds of episodes (Table 2). The classification of techniques was discussed among all authors, refining some of the categorizations and original interpretations. Once the classification was finalized, two authors (PK and MK) selected examples from the taped treatment sessions that best illustrated the findings. The first author then transcribed these episodes verbatim for a more detailed analysis to be presented in this article.

[Table 2 near here]

Results

The results revealed the use of a wide variety of dental anxiety management techniques and demonstrated that the techniques were often used in combination with each other during the one-session treatment. Typically, the techniques fell into Theme 1 (specific strategies to enhance trust and control) and included the categories of 'building a trustful relationship', 'informational control',

and 'behavioral control'. Relatively frequently, the techniques also fell into Theme 2 (specific strategies of psychological management) and included the categories of 'behavioral strategies: relaxing the body' and 'cognitive strategies: relaxing the mind'.

The results are presented below in accordance with the two main themes and their related categories, including the specific techniques presented in Table 2. In order to better understand the use of specific techniques, we added to the data examples the context of an episode (i.e., what is taking place in the treatment and what is known about the patient's dental fear) and the emotions and tones of voice. The voice tones varied according to the situation, i.e., when the dentist was persuading the patient, the voice was encouraging, and when she was assuring the patient, the voice was firm. Table 2 provides brief examples of the use of techniques, while longer examples are included in the main text. Participating patients are numbered one through five. The first dentist treated patient 1 and the second dentist treated patients 2, 3, 4, and 5 in a session. The time points of the video excerpts (in minutes and seconds) are included in the data examples.

Enhancing Trust and Control

Overall, the dentists used a variety of specific techniques related to Theme 1. They tended to reduce patients' dental anxiety by *building rapport*, *encouraging two-way communication*, *expressing concern, demonstrating competence and ethics*, and *including significant others*. The dentists' clinical skills were used when they adopted the techniques according to the patients' anxiety and patient-specific needs, and oral health situation, especially when precisely *providing information about the procedure in lay terms or about safety* or *comfort.* The techniques of *telling-showing-doing* and *structuring the time* were used in situations that seemed unpleasant to the patients. The use of the techniques was flexible, and the treatment proceeded smoothly, despite interruptions. When using the techniques of *agreeing with signaling*, *planning rest breaks*, and *using behavioral*

strategies to control injection pain, the dentists assisted the patients in managing their feelings of pain.

'Building a trustful relationship' with the patient involved specific techniques, which included different means and methods of building trust through communication. The following three examples illustrate the main characteristics of these techniques:

Extract 1 a. *The dentist is inspecting the patient's gums. The patient has expressed concern about her moving teeth and the dental treatment.* (Patient 5; 5.59–6.34)

Dentist (D): What about the air blower that dries the tooth? [Shows the dental air syringe to the patient] Do your teeth ache? [Speaks in a friendly tone]
Patient (P): It is, no, it's fine with that. [Overlapping talk with the dentist]
D: So no, okay. I will keep blowing with it.
P: You won't put anything inside, right? [Gives a nervous laugh while talking]
[Overlapping talk with the dentist]
D: No, I'll just use it for blowing and will look with the mirror. I might have to test some of the teeth, but look, the ball is here, [shows the instrument] so I will just brush with it. It's not a sharp one. [The dentist brushes the ball-headed instrument against the patient's finger]
P: So not inside? [Nervous tone]
D: Not to the gum or inside the tooth, just the outside. [Encouraging tone]
P: Okay.
D: So, I will blow now and look with the mirror. [Determined tone]
P: Hmm hmm. [Approvingly]

Extract 1 b. *The dentist is examining a moving tooth. The patient has expressed worry about extractions* (Patient 2; 14.4–14.58)

D: And of course, if the gum is infected. [You can feel pain when testing the mobility]
P: Aah. [Loud sound that expresses pain]
D: I'll be as careful as I can [while testing the mobility], remember to keep breathing.
P: Mmm-
D: This tooth [with emphasis] had slight mobility, so I will test this one. Let's see if there's a periodontal pocket (unclear word).
P: Aaah. [Sound that expresses pain]

Extract 1 c. *The dentist has followed through with the examination and tells the patient about the findings in the mouth. The patient has expressed worry about her dental situation and symptoms related to the tooth* (Patient 3; 21.46–22.00)

Dentist (D): But then the staining can also be, as you can see the darker spots -
Patient (P): [Right.]
D: from smoking, and if it hasn't been cleaned for a long time.
P: [Mm.]
D: So, something has ingrained between the teeth or stuck in the seam of the filling.
P: [Right.]
D: But there is no hole.

8P: Okay.

First, the dentists *built rapport*, especially at the beginning and the end of the treatment. This involved asking patients direct questions about the ongoing treatment (Extract 1 a, lines 1–2), especially when the patient had expressed concerns about the condition of the teeth. This also occurred when the patient showed no reaction and spoke briefly about the sensations during the treatment situation. In building rapport, the dentists' voice also expressed kindness, after which the patients usually responded by talking about their opinions and sensations related to the procedures (Extract 1 a, lines 2–4).

Second, the dentists *encouraged two-way communication* throughout the sessions. They told beforehand what was going to happen, listened carefully to the patients' wishes related to the treatment, and responded to the suggestions (Extract 1 a, lines 5 – 9). Patients' previous dental treatments, symptoms, and radiographic inspections were considered when planning their ongoing dental treatment together. The dentists *expressed concern* when they patiently responded to the patients' questions and worries (Extract 1 a, lines 10–12). This also occurred when they responded to the patients' unexpected, especially fearful reactions by interrupting the examination or treatment and by calming the patients down. (Extract 1 b, lines 1–4). The dentists anticipated the patients' pain and took it into account when the patients suddenly flinched or showed other signs of anxiety, such as bodily movements or verbal expressions. (Extract 1 b, lines 5–7).

Third, the dentists *demonstrated competence and ethics* when they talked to the patients about the treatment procedures. The treatment usually progressed thereafter, and the patients agreed with the dentists' proposals (Extract 1 a, lines 13–14). The dentists discussed the findings in detail afterwards and when the patients asked about them. In particular, the dentists put effort into responding to the patients' worries or doubts by offering explanations when the patient was suspicious of the dentist's findings (Extract 1 c, lines 1–8). The dentists *suggested including*

significant others when the patients were worried about their ability to cope with future dental treatment (Table 2).

We observed different techniques and their characteristics related to 'providing control' to the patient, which took the form of either 'informational control' or 'behavioral control'. These included providing information about the technique in lay terms, as well as providing safety and comfort to increase the patients' control over the dental procedure and the predictability of what would happen during treatment (Table 2). The following two examples illustrate the main characteristics of the techniques related to informational control:

Extract 2 a. *The dentist has just told the patient that she will inspect the gums with a certain instrument. The patient has expressed high pain sensitivity.* (Patient 4; 14.50–15.19)

1 Dentist (D): So, the last thing I would need to do is inspect the gum with the ball-headed
2 instrument. [Shows the instrument to the patient]
3 Patient (P): Mmmh. [Terror-struck sound]
4 D: Like this one. It's not sharp. [Calming statement]
5 P: Can you feel it? [Interrupts the dentist and asks in a voice that indicates fear]
6 D: You will feel it on the gum, but I'll just gently brush with it. I'll do it very carefully with
7 slight pressure, but I'll mainly just look to see if there's tartar or gingivitis, things that this is used
8 to measure. We can focus on a few teeth here and there, no need to do all of them.

Extract 2 b. *The dentist is applying a filling to the patient's tooth. The patient has expressed worry related to pain.* (Patient 1; 35.43–35.54)

1 D: Like this. [Shows the matrix in their hand to the patient] Are you familiar with a matrix like this?
2 P: Yeah.
3 D: Okay. Now I will also put it [the matrix] into your mouth, and as the mucous membrane has
4 already numbed, you can no longer feel it. [Emphatic, reassuring tone]

The dentists frequently used these techniques when preparing patients for dental treatment procedures. This involved talking about the procedure by using understandable language and avoiding technical terms, showing the instruments, and depicting the sensations related to inspection and treatment (Extract 2 a, lines 1–4). Since providing informational control occurred just before conducting the procedure, the patients had the possibility to express themselves in some way (Extract 2 a, line 5). In addition, the dentists talked in detail about the reasons for the treatment and tried to be gentle when performing the procedure that provoked fear in the patients (Extract 2 a,

lines 6 –8). The patients showed their understanding and acceptance of the dentists' actions by nodding their heads and sometimes by short words.

The specific technique of *telling-showing-doing* was used in situations that were difficult and possibly painful for the patients (Extract 2 b, lines 1 – 4), and *structuring the time* in situations where the patients' endurance needed to be strengthened (Table 2). Because the patients' reactions varied, and some clearly showed their pain, the dentists adapted the activities according to the patients' needs. Not all the patients wanted to see the instruments, and some needed more emotional support than others. Due to this, the drilling procedure was divided into shorter phases.

The following two examples illustrate the main characteristics of the specific techniques related to behavioral control:

Extract 3 a. *The dentist is preparing the situation for a filling. The patient has expressed a strong belief that local anesthesia is ineffective*. (Patient 1; 2.35–2.51)

1 Dentist: You can always interrupt me whenever if you want to close [your mouth] or something
2 and can no longer stay still.
3 Patient: Mm.
4 D: Which signal should we use? You can raise your arm, which means that we'll stop, okay?
5 P: Yeah. [Nods in approval]
[More anesthetic has been applied in between and they have been waiting for it to take effect for over 20 minutes]
6 D: So, you can decide when we stop, when we end it or when we take a break. Whenever you
7 feel like it. We'll of course know if it aches. I mean, if you want to take a break, just raise your
8 arm and I'll stop. But is it okay if we'll do a tiny, let's call it a test drill, just test it a little, okay?
9 P: Mm.
10 Dental nurse: And I'll follow your arm closely, while the dentist looks at the tooth.
11 P: Mm.

Extract 3 b. *The dentist is examining the patient's gum with a special instrument*. *The patient has expressed strong fear of pain.* (Patient 4; 15.18–16.10)

1 D: I'll start here from the top. Just remember to keep breathing. It will feel like this. [After a few
2 seconds of examining] Just keep breathing slowly the whole time.
3 You can swallow in a second. Good, you can close your mouth now.
[Noises from a small child playing can be heard in the background]
4 D: And then the left side. Turn your head towards me again please.
[Continues after a few seconds]
5 D: I'll test just one of the front teeth. You might feel it in the front, but don't get scared.
6 P: Mmmh. [Terror-struck sound]
7 D: Right, you can swallow now. Then there's only the bottom left, and that's it.

The dentist *agreed on signaling* with the patient by telling the patient to raise a hand as a sign to stop (Extract 3 a, lines 1 –5). This was repeated before starting to drill and when ensuring the numbness of the tooth through a brief test drilling (Extract 3 a, lines 6 – 9). The dental nurse also reassured the patient about the possibility of signaling (Extract 3 a, lines 10 – 11).

Planning of rest breaks occurred by agreeing with the patients at the beginning of the treatment that interruptions were allowed during treatment (Table 2). Usually, breaks were taken regularly throughout the session, but the patients' need for breaks and swallowing sometimes led to more frequent rest breaks (Extract 3 b, lines 1 – 4). The dentists responded to the patients' anxious movements, deep or rapid breathing, or breath holding with a pause. The timing of the pauses was usually decided by the dentists, but the patients themselves also regulated the duration of the pauses by opening their mouths only when they were ready to continue. The importance of pauses was emphasized in certain situations, such as when the patients clearly showed anticipation of pain and when the dentists used the technique in conjunction with *structuring the time* (Extract 3 b, lines 5 – 7).

Dentists used *behavioral strategies to control injection pain* when they asked the patient's opinion about the use of surface anesthesia before injections and when they infiltrated the local anesthetic extremely slowly (Table 2).

Specific Behavioral and Cognitive Strategies

In summary, the dentists used several specific techniques related to theme 2. *Relaxation breathing,* and *muscle relaxation* techniques were used in situations that elicited strong anxiety and changes in breathing or in muscle tension. The dentists closely monitored the patients' anxious reactions during the treatment procedures. The techniques *altering expectations by redefining success and offering praise* and *by redefining the experience* were used to encourage patients' possibilities of coping.

The other techniques, *distraction* and *focusing attention*, were suggested to patients to help them redirect their thoughts away from the treatment.

Techniques related to 'behavioral strategies: relaxing the body' were observed. These techniques focused on actions to promote physical relaxation of the patients by paying attention to breathing and muscle relaxation. The following examples illustrate the main characteristics of these techniques:

Extract 4 a. *The dentist is performing an external examination of the mouth. The patient has expressed strong anxiety related to the sensitiveness of her teeth.* (Patient 5; 3.50–4.02)
1 Dentist (D): And just remember to keep breathing the whole time. It's really important [soothing 2 voice]. 3 Patient (P): I'll try. [Slightly worried tone] 4 D: Good.
Extract 4 b. *The dentist is applying local anesthesia in the mouth. The patient has expressed worry about the ineffectiveness of numbing.* (Patient 1; 11.26–12.59)
1 (D): So, keep your mouth wide open please. I will test it first to find the right spot. Next, you will 2 feel a slight puncture. Just remember to keep breathing slowly. This is unpleasant, but I'll start 3 giving the anesthesia in a second and the tissue will start to numb. Yes. Just remember to keep 4 breathing. 5 Dental nurse: You can also lower your shoulders if you can to relax. [Encouraging tone] 6 D: Yes. Great. Excellent. Remember to breath… Remember to breath… This takes a long time, but 7 it will be over soon.

First, *relaxation breathing* occurred when the patients showed anxiety during a procedure and the dentists reminded them to breathe. Some of the patients had difficulties in breathing (Extract 4 a, lines 1 – 4) and sometimes laughed uncomfortably after the dentist reminded them to breathe. This technique also occurred when the dentist demonstrated deep breathing before the drilling procedure while waiting for the tooth to become numb. Usually, patients were reminded to relax during the procedure, and the dental nurse participated in this (Extract 4 b, lines 1 – 7). Second, dentists urged *muscle relaxation* if they noticed that patients were having difficulty coping or that their limbs were stiff during the procedures. Reminding patients about relaxation breathing and muscle relaxation often occurred in combination (Table 2).

Various techniques related to ‘cognitive strategies: relaxing the mind’ could also be observed. These techniques focused on the patient’s negative presumptions and perceptions about dental treatment, doubts about their ability to cope, and the condition of their own teeth. The following three examples illustrate the main characteristics of these techniques:

Extract 5 a. *The dentist examines the patient’s mouth and gives instructions during actions. The patient has expressed severe dental anxiety and many previous negative experiences.* (Patient 3; 4.05–4.33)

1 Dentist (D): And you can swallow. I’ll press your tongue slightly, and then you can say AAH.
2 Patient (P): AAH.
3 D: One more time please.
4 (P): AAH.
5 D: Well done. Then stick out your tongue for me and I will take hold of the tip. There we go.
6 Now, try to keep it relaxed and keep breathing through your nose the whole time. I will check
7 the edges of the tongue. You can swallow in just a moment.
8 Comment: The patient keeps his/her mouth open the whole time.
9 D: Great, you can close it now.
10 Comment: The patient closes their mouth immediately after getting permission.

Extract 5 b. *The dentist is talking about patient’s oral situation after treatment. The patient has expressed worry about the poor condition of her tooth.* (Patient 2; 17.00–17.31)

1 D: Yes, and most of your teeth are really, really good. And you know how to brush, to keep them clean. [Dentist’s tone is appropriate, neutral, thoroughly convincing]
3 P: You know, I’ve just been able to get an electric toothbrush.
4 D: Alright. That’s really good.
5 P: Yeah, yeah. I think I’ve used it only for a year now. [While the nurse lifts the chair up]
6 D: Okay. [In a kind tone]

Extract 5 c. *The dentist is talking about the option to watch videos during treatment. The patient has expressed willingness to turn his thoughts away from the treatment.* (Patient 1; 1.14–2.12)

1 D: Did you talk about watching a video? [Refers to the interview]
2 P: Yeah, we did.
3 D: So, you think that it might help and calm you down a bit?
4 P: Well, I guess so, as it could give me something else to think about.
5 D: [Yes], yes. Well, I could move the monitor over here or YouTube for example. We can play a
6 video on it. Let’s try it at the beginning to see if it helps. What do you think? Do you want
7 something?
8 P: Mm, yeah. I don’t know. [Gives out a laugh]
9 D: You don’t know? Okay, I see. Well, it’s up to you. If you start feeling unwell at any point, we
10 can try the video then to get your mind off of it, okay?
11 P: Mmm.

The technique of *altering expectations by redefining success and offering praise* emerged in many situations during and after the treatment. This technique was used regularly when the dental team praised the patients for their good coping and for managing well in a difficult situation (Table 2). In particular, praise was used together with the other techniques when the dentists gave positive feedback to the patients for managing to follow the instructions (Extract 5 a, lines 1 – 10). It also occurred when the dentists praised the patients' teeth and oral hygiene skills. The patients responded by talking about their success in daily dental care (Extract 5 b, lines 1–6).

Dentists used another technique of *altering expectations by redefining the experience* when patients had previous negative experiences and difficulties in following dental instructions and coping with dental treatment. When using this technique, the dentist responded to the patient's doubts about the ineffectiveness of local anesthesia and ensured that the patient had no difficulties with numbness (Table 2).

The other specific techniques, *distraction* and *focusing attention*, were used when the dental team helped patients to divert their attention from the dental procedure to something else. For example, the dentists suggested a concrete way for patients to divert their attention before they started drilling (Extract 5 c, lines 1 –7). Patients' hesitation was acknowledged by offering them the possibility to change their minds later (see Extract 5 c, lines 8 – 11). The dentists and dental nurses directed the patients' attention to children playing in the background or to the sounds of the suction machines (Table 2).

Discussion

This qualitative study on five cases of dentally anxious patients treated by two dentists found that dental anxiety management techniques were used in a variety of ways and in an individualized manner during one-session treatment. The detailed analysis of episodes identified from videotaped

treatment sessions revealed that the techniques were often used simultaneously in specific treatment situations. The use of techniques was related to specific strategies to enhance trust and control in terms of building a trustful relationship and providing the patient with informational and behavioral control. These consisted of a wide variety of techniques that were consistently used throughout treatment. In addition, the use of techniques related to specific strategies of psychological management, and more specifically, behavioral, and cognitive techniques to relax the patients' body and mind. These included several techniques that were regularly used in situations that were most uncomfortable for the patients. Overall, the use of these techniques indicated diversity, flexibility, and coherence in the proceeding.

Based on the findings, we argue that the two dentists with clinical experience but without formal training in behavioral management techniques, were able to use a wide range of techniques in accordance with patient-specific situations in the context of a one-session treatment. Firstly, the use of techniques to enhance trust and control seems appropriate, because previous research has shown that a good patient–dentist relationship and the provision of control are sufficiently helpful for most dentally anxious patients to manage their dental treatment [31,32] and becoming familiar with the patient can create a trustworthy atmosphere that leads to a supportive and successful interaction [33]. These techniques may help patients to take control of the treatment situation and of their own reactions, thereby empowering them. 'Kind atmosphere' and 'mutual communication' as well as 'trust and safety' have also been preferred by dentally anxious patients [34]. In addition, certain actions, such as efforts to avoid pain, providing the patient with control, and keeping the patient informed about what the dentist is doing and what sensations the patient may experience, have all been demonstrated to alleviate dental anxiety [32]. The use of such techniques was possible because the dentists were aware of patients' fears and received a brief orientation. In previous studies, videos were not used for data gathering but merely as a method to help the patient, for example by providing control before tooth extraction procedures [20]. Pre-operative information during

dentoalveolar surgery [19] has also been shown to reduce the patient anxiety levels after viewing the videos, but only in participants with low trait anxiety. Other visual methods, such as virtual reality relaxation [35] and computer-based exposure with cognitive restructuring [36], have demonstrated effectiveness in reducing dental anxiety, specifically among highly anxious patients, while techniques like music-based distraction and hypnosis [37] also show promise. However, preoperative information and verbal information were found to be more effective than visual information for patients undergoing dental implant therapy [21].

Secondly, the implementation of psychological anxiety management approaches and techniques is useful because we have evidence of their effectiveness in reducing patients' anxiety [7]. This study also highlighted the combined use of behavioral and cognitive techniques during dental procedures that the patients appeared to find difficult to cope with. This is important, because focusing on relaxation may be critical when the patients have an unrealistic understanding of their ability to cope, and previous negative treatment experiences tend to influence patient behavior in dental treatment situations [8]. Patients' participating in desensitization treatment have also reported relaxation as being one of the most important factors in their fear reduction [18]. All in all, this study supported the previous finding that treatment should be proportionate to the severity of dental anxiety [38] and provided new evidence for the deployment and utilization of techniques according to the patient and treatment situation. This study provided examples of dentists' actions and communication as well as dentist-patient cooperation, in treatment situations that were successfully finished. We did not include the patients' perceptions of the helpfulness of techniques, because the focus was on the use of techniques in the context of one-session treatment. However, the benefit of restructuring the positive memories of dental care (e.g., through positive feedback, praising) could have an influence on patients' future regular dental care and break the 'vicious circle' of dental anxiety, which should be the main goal of the dental anxiety management.

The validity of this study relied on a theory-driven qualitative study approach that followed the acceptable quality criteria of qualitative inquiry, except for data gathering [30]. The theory-based analysis was mainly based on a classification of techniques according to Milgrom et al. [8]. The use of another model, such as one-session treatment model of Öst [27] or the most recent classification by Willumsen et al. [39] could have led to a slightly different categorization. An alternative approach, such as coding schemes [46] was not suitable for our study because it focuses on counting the elements that occur in treatment situations. Thus, it would have not allowed for a subtle identification of the versatile use of techniques. Perhaps none of the existing classifications or models [8,27,39] alone are comprehensive enough to assess the range of behavioral and cognitive techniques, or even superior in the context of one-session treatment. The selection of methods in a qualitative study is guided by the specific aims, objectives, and contextual factors [30]. We described the data and the process of analysis in detail in order to facilitate repeatability and transparency, as well as to trace the interferences, based on the systematic identification of characteristics related to the use of the techniques. Overall, data adequacy in qualitative health research is best judged by the specific characteristics of the study at hand [45]. Saturation was achieved with five patient cases treated by two dentists because the use of same techniques repeated in these five patient cases. The findings are based on hundreds of episodes that contributed to the understanding of the dentist–patient relationship and dyad. To ensure the reliability of the study, we used investigator triangulation, i.e., two researchers viewed the videos independently, focusing on one patient at a time, and identified all emerging episodes according to the eight themes. In addition, all authors participated in discussions at several stages during the study, and the interpretations and final classification of the techniques were refined based on shared discussion and evaluation. Moreover, throughout the analysis section, we have provided a substantial number of data excerpts from all five dental treatment sessions to enable the reader to evaluate the credibility of our interpretations.

The limitations in this study contain, firstly, the small sample composing five cases of one-session treatments. More heterogeneity in the variables relevant to the study could have been obtained if more than five patients had completed the intervention in the pilot study [23]. Moreover, sampling was not specifically designed for this qualitative study, as the material was gathered for the intervention. Results of this study are not generalizable to all groups of dentists or treatment situations, especially because our data included only two dentists and the patients had attended a diagnostic interview prior to the treatment in the context of one-session treatment. However, generalizability was not the aim of this study nor in qualitative research in general. The findings gained in this study may well be transferable and applicable to other contexts and situations that are similar enough compared to our study design. Further research is needed to investigate the use of techniques to manage dental anxiety in different settings, and the findings should be verified in future studies of dentally anxious patients involving a larger number of dentists and patients. Secondly, this study could not capture those techniques and structured methods that would have required prior training or the implementation of more than one session, such as guided imagery, thought stopping, biofeedback or systematic desensitization [7,8]. Thirdly, the use of a video camera enabled us to capture all of the patient's reactions, but not those of the dentist. Another approach, conversation analysis could have revealed the interactive dynamics of the conversation between the dentist and the patient [40]. When using this approach, it should be possible to observe the reactions of both partners without face shields and more than one camera should be used.

Despite its limitations, the study has several methodological strengths. Firstly, the theory-driven content analysis of the video recordings of five dental treatment sessions succeeded in capturing the multifaceted process of reducing dental anxiety with different techniques and covered different aspects of dental anxiety, such as behavioral and psychological, that the techniques were targeted.

The use of *Atlas.ti 9* software helped us to systematically conduct the analysis that increased the credibility and the opportunity to achieve our research objective, the identification of techniques in the form of their occurrence in real-life treatment situations. To our knowledge, this is the first study to use videotaped treatment sessions to gain a deeper understanding about dental anxiety management techniques benefited in a real-life dental setting. Previous studies have had different study designs [11,12] or focused on the use of individual techniques [18–21]. The use of videotaped treatment sessions provided more reliable and ecologically valid information about the use of the techniques compared to the information obtained from self-reported questionnaires or interviews with dentists. The uniformity of the video-recording set-ups, and findings from earlier research related to the same intervention [23,28] confirmed the internal validity of the results. This study confirmed previous findings suggesting that dentists have the ability and willingness to use many behavioral and cognitive treatment methods [33], especially when they have prior information about their patients' dental anxiety. The rating of patient dental anxiety [41] helps in discussing fear and fear-related factors and in building trust with the patient [18]. Asking about dental anxiety also helps to increase patient satisfaction and has been shown to reduce their dental anxiety [42–44]. However, the dentists understood that they would be providing treatment as part of the study. Moreover, awareness of being videotaped may have had an effect, as well as the skill and experience of the dentists.

Conclusion

In conclusion, the results indicate that a variety of dental anxiety management techniques were used during one-session treatments by dentists who had only briefly been informed about the patients' dental anxiety. The findings provide valuable insights for dentists in managing their patients with dental anxiety and improving their overall treatment experience.

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Conflicts of interest statement

The authors declare no conflicts of interest and have nothing to disclose in this study.

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Ethics statement

Ethical permission for this study was granted by the Hospital District of Northern Savo under registration number 281/13.02.00/2016. The authors complied with the instructions of the Finnish National Board on Research Integrity regarding all ethical rules and participants' rights in this study.

The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy and ethical restrictions.

References

[1] Liinavuori A, Tolvanen M, Pohjola V, et al. Changes in dental fear among Finnish adults: national survey. Community Dent Oral Epidemiol. 2016;44(2):128–34.

[2] Berggren U, Meynert G. Dental fear and avoidance: causes, symptoms, and consequences. J Am Dent Assoc 1939. 1984;109(2):247–51.

[3] Boman UW, Lundgren J, Berggren U, et al. Psychosocial and dental factors in the maintenance of severe dental fear. Swed Dent J. 2010;34(3):121–7.

[4] Armfield JM. What goes around comes around: revisiting the hypothesized vicious cycle of dental fear and avoidance. Community Dent Oral Epidemiol. 2013;41(3):279–87.

[5] Yuan S, Freeman R, Hill K, et al. Communication, Trust and Dental Anxiety: A Person-Centred Approach for Dental Attendance Behaviours. Dent J. 2020;8(4):118.

[6] Brahm CO, Lundgren J, Carlsson SG, et al. Dentists' views on fearful patients. Problems and promises. Swed Dent J. 2012;36(2):79–89.

[7] Armfield J, Heaton L. Management of fear and anxiety in the dental clinic: a review. Aust Dent J. 2013;58(4):390–407.

[8] Milgrom P, Weinstein P, Getz T. Treating fearful dental patients: a patient management handbook. 3rd ed. Seattle (WA): Dental Behavioral Resources; 2009.

[9] Gordon D, Heimberg RG, Tellez M, et al. A critical review of approaches to the treatment of dental anxiety in adults. J Anxiety Disord. 2013;27(4):365–78.

[10] Wide Boman U, Carlsson V, Westin M, et al. Psychological treatment of dental anxiety among adults: a systematic review. Eur J Oral Sci. 2013;121(3 Pt 2):225–34.

[11] Haukebø K, Skaret E, Öst LG, et al. One- vs. five-session treatment of dental phobia: A randomized controlled study. J Behav Ther Exp Psychiatry. 2008;39(3):381–90.

[12] Vika M, Skaret E, Raadal M, et al. One- vs. five-session treatment of intra-oral injection phobia: a randomized clinical study. Eur J Oral Sci. 2009;117(3):279–85.

[13] Thom A, Sartory G, Jöhren P. Comparison between one-session psychological treatment and benzodiazepine in dental phobia. J Consult Clin Psychol. 2000;68(3):378–87.

[14] Jöhren P, Enkling N, Heinen R, et al. Clinical outcome of a short-term psychotherapeutic intervention for the treatment of dental phobia. Quintessence Int Berl Ger 1985. 2007;38(10):589.

[15] Wannemueller A, Joehren P, Haug S, et al. A practice-based comparison of brief cognitive behavioural treatment, two kinds of hypnosis and general anaesthesia in dental phobia. Psychother Psychosom. 2011;80(3):159–65.

[16] de Jongh A, Muris P, ter Horst G, et al. One-session cognitive treatment of dental phobia: preparing dental phobics for treatment by restructuring negative cognitions. Behav Res Ther. 1995;33(8):947–54.

[17] Armitage CJ, Reidy JG. Evidence that process simulations reduce anxiety in patients receiving dental treatment: randomized exploratory trial. Anxiety Stress Coping. 2012;25(2):155–65.

[18] Moore R. Dental fear treatment: comparison of a video training procedure and clinical rehearsals. Eur J Oral Sci. 1991;99(3):229–35.

[19] Ng SKS, Chau AWL, Leung WK. The effect of pre-operative information in relieving anxiety in oral surgery patients. Community Dent Oral Epidemiol. 2004;32(3):227–35.

[20] Astramskaitė I, Poškevičius L, Juodžbalys G. Factors determining tooth extraction anxiety and fear in adult dental patients: a systematic review. Int J Oral Maxillofac Surg. 2016;45(12):1630–43.

[21] Sghaireen MG. Effect of Verbal and Visual Information on the Level of Anxiety among Dental Implant Patients. J Contemp Dent Pract. 2020;21(8):846–51.

[22] Wong NSM, Yeung AWK, McGrath CP, et al. Qualitative Evaluation of YouTube Videos on Dental Fear, Anxiety and Phobia. Int J Environ Res Public Health. 2022;20(1):750.

[23] Kurki P, Korhonen M, Honkalampi K, et al. The effectiveness of a diagnostic interview and modified one-session treatment for dental anxiety in primary dental care—A pilot study. Spec Care Dentist. 2023;43(2):174–183.

[24] Humphris GM, Morrison T, Lindsay SJ. The Modified Dental Anxiety Scale: validation and United Kingdom norms. Community Dent Health. 1995;12(3):143–50.

[25] Humphris GM, Dyer TA, Robinson PG. The modified dental anxiety scale: UK general public population norms in 2008 with further psychometrics and effects of age. BMC Oral Health. 2009;9:20-20.

[26] Humphris GM, Freeman R, Campbell J, et al. Further evidence for the reliability and validity of the Modified Dental Anxiety Scale. Int Dent J. 2000;50(6):367–70.

[27] Öst L. One-session treatment of dental phobia. In: Öst, l, Skaret, E, editors. Cognitive behavioral therapy for dental phobia and anxiety. Chichester, West Sussex, U.K.: Wiley-Blackwell; 2013. p. 119–134.

[28] Kurki P, Korhonen M, Honkalampi K, et al. Patients' multifaceted views of dental fear in a diagnostic interview. Acta Odontol Scand. 2021;79(3):194–204.

[29] Marks D, Yardley L. Research methods for clinical and health psychology. London: SAGE; 2004.

[30] MacFarlane A, O'Reilly-de Brún M. Using a Theory-Driven Conceptual Framework in Qualitative Health Research. Qual Health Res. 2012;22(5):607–18.

[31] De Jongh A, Adair P, Meijerink-Anderson M. Clinical management of dental anxiety: what works for whom? Int Dent J. 2005;55(2):73–80.

[32] Berggren U. Long-Term Management of the Fearful Adult Patient Using Behavior Modification and Other Modalities. J Dent Educ. 2001;65(12):1357–68.

[33] Kulich KR, Berggren U, Hallberg LR. Model of the dentist-patient consultation in a clinic specializing in the treatment of dental phobic patients: a qualitative study. Acta Odontol Scand. 2000;58(2):63–71.

[34] Jaakkola S, Lahti S, Räihä H, et al. Dental fear affects adolescent perception of interaction with dental staff. Eur J Oral Sci. 2014;122(5):339–45.

[35] Lahti S, Suominen A, Freeman R, et al. Virtual Reality Relaxation to Decrease Dental Anxiety: Immediate Effect Randomized Clinical Trial. JDR Clin Transl Res. 2020;5(4):312–8.

[36] Tellez M, Potter CM, Kinner DG, et al. Computerized Tool to Manage Dental Anxiety: A Randomized Clinical Trial. J Dent Res. 2015;94(9 Suppl):174S-80S.

[37] Hoffman, B, Erwood K, Ncomanzi, et al. Management strategies for adult patients with dental anxiety in the dental clinic: a systematic review. Aust Dent J. 2022;67(1 Suppl):S3-S13.

[38] Hare J, Bruj-Milasan G, Newton T. An Overview of Dental Anxiety and the Non-Pharmacological Management of Dental Anxiety. Prim Dent J. 2019;7(4):36–9.

[39] Willumsen T, Agdal ML, Hauge MS et al. Psychological Prevention and Management of Dental Anxiety. In: Willumsen T, Lein JPÅ, Gorter RC, et al. editors. Oral Health Psychology: Psychological Aspects Related to Dentistry. Cham: Springer; 2022. p. 179–194.

[40] Yuan S, Freeman R, Hill K, et al. Communication, Trust and Dental Anxiety: A Person-Centred Approach for Dental Attendance Behaviours. Dent J. 2020;8(4):118.

[41] Hally J, Freeman R, Yuan S, et al. The importance of acknowledgement of emotions in routine patient psychological assessment: The example of the dental setting. Patient Educ Couns. 2017;100(11):2102–5.

[42] Corah NL. Dental anxiety. Assessment, reduction and increasing patient satisfaction. Dent Clin North Am. 1988;32(4):779–90.

[43] Dailey YM, Humphris GM, Lennon MA. Reducing Patients' State Anxiety in General Dental Practice: A Randomized Controlled Trial. J Dent Res. 2002;81(5):319–22.

[44] Dailey YM, Humphris GM, Lennon MA. The use of dental anxiety questionnaires: a survey of a group of UK dental practitioners. Br Dent J. 2001;190(8):450–3.

[45] Vasileiou K, Barnett J, Thorpe S, et al. Characterising and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. BMC Med Res Methodol. 2018;18(1):148.

[46] Yuan S, Humphris G, MacPherson L, et al. Development of an interaction coding scheme (PaeD-TrICS) to record the triadic communication behaviours in preventive dental consultations with preschool child patients and families: a video-based observational study. BMC Oral Health. 2019;19(1):162.

Table 1. A description of the classification of dental anxiety management techniques according to Milgrom et al. 2009 [8].

The foundation of psychological management: specific strategies to enhance trust and control	
Building trustful relationship	• Building rapport • Encouraging two-way communication • Expressing concern • Demonstrating competence and ethics • Including significant others
Providing control: information, cognitive change, behavioral control, retrospective control	
Informational control	• Tell-show-do • Time-structuring
behavioral control	• Signaling • Behavioral strategies to control injection pain • Planning rest breaks
Retrospective control or debriefing	
Psychological and pharmacological Management: specific strategies	
Behavioral strategies: Relaxation the body through relaxation breathing	• Muscle relaxation • Physiological monitoring: biofeedback
Cognitive strategies: relaxing the mind	• Altering expectations: redefining success and offering praise • Altering expectations: redefining the experience • Distraction • Guided imagery • Focusing attention • Thought stopping
Practice strategies	• Graduated exposure and its variants • Rehearsals • Systematic desensitization
Pharmacological strategies	• Oral agents • Nitrous oxide • Intravenous sedation

Table 2. Description of fear and anxiety management techniques and their characteristics used during one-session treatment with examples under the main themes and their categories based on the theory-based classification of Milgrom et al. (2009).

Categories under the themes	Techniques and examples
Theme 1: The foundation of psychological treatment: specific strategies to enhance trust and control	
Building a trustful relationship	• **Building rapport:** - **Dentist (D):** *Were you in the waiting room when I left for lunch about half an hour ago? How's it going? Are you still okay? How does it feel to come here today for treatment? I thought that none of them will go* [a friendly comment from the dentist when the patient shared their thoughts after the treatment about removing all teeth] • **Encouraging two-way communication:** - **D:** *Is it okay if you lay down or would you prefer a half-sitting position? Would you like to take a look at a picture of the tooth? Here we have two teeth that need filling, so do you want us to do the smaller one today? Are any of your teeth especially sensitive to cold?* • **Expressing concern:** - **D:** *And I would never do anything by force... let's see how it feels; Is it sore?* [when the patient moves suddenly]; *I'll do it very carefully* [when the patient shows signs of pain]; *Yeah, it's harmless* [an answer to the patient's concern] • **Demonstrating competence and ethics:** - **D:** *This tooth in the upper left moves slightly, can you feel it with your tongue?* • **Including significant others:** - **D:** *But reinforcements are always welcome, so yes, they can come.*
Providing control: Informational control	• **Information about the procedure in lay terms** - **D:** *Let's see if there's any tartar or gingival pockets* [while explaining how the instrument is used]; *I'll check the upper teeth with a light* [shows the fiber-optic light tool to the patient]; *Sometimes there are anatomical differences in people, as there's a hole where the anesthetic needs to go.* • **Information about safety** - **D:** *I'll check the gumline now with this ball-headed instrument* [shows the instrument]*; It's not sharp; Then I'll check the mucous membrane*s; *And then we'll check the downstairs.* • **Information about comfort** - **D:** *And while I check them, I will list things and talk to the nurse about them, but it doesn't mean that there's something dangerous or wrong; You can feel slight scraping; So now you will first feel the small puncture... this really is unpleasant* [when the dentist carefully infiltrates the anesthetic into the lower jaw]. • **Telling-showing-doing:** - **D:** *I will now dry and look with the lamp like this, which will be put beside the tooth* [while showing the instrument and thereafter starting the inspection with the lamp]. • **Structuring the time:** - **D:** *And this is the last one; You can swallow in just a moment; For the last thing, I'll just test* [shows the movement with a finger] *if there's any mobility in the tooth; Why don't we continue in these shorter stretches, okay? I'll drill just a little and then we'll take a break; Now I'm already done with the drilling, I'll then move on to applying the filling.*
Providing control: Behavioral control	• **Agreeing with signaling** • **Planning rest breaks:** - **D:** *And you don't have to keep your mouth open the whole time; And you can swallow every now and again; Just keep your mouth closed please* [when telling the patient that they will check the images in the meantime]. • **Using behavioral strategies to control injection pain:**

	- **D:** *Do you want that we use a topical anesthesia first to numb the mucous membrane?*
Theme 2: Psychological management: specific strategies	
Behavioral strategies: relaxing the body	• **Relaxation breathing:** - **D:** *Really focus on that, we will do the rest and you just remember to keep breathing; Deep breaths through the nose; Remember to breathe, this is just an instrument on your tooth.* • **Muscle relaxation:** - **D:** *Now try to keep your tongue relaxed, and keep breathing through the nose; And then you can keep it relaxed* [during the extra-oral examination]; *And try to keep your shoulders as relaxed as possible* [the dentist touches the patient's shoulder with their hand]; *Just normal regular breathing, and now, if you can, you can try those things that you have learned with X about relaxing* [in the diagnostic interview].
Cognitive strategies: relaxing the mind	• **Altering expectations: Redefining success and offering praise:** - **D:** *You have really clean teeth, you know how to brush them; You have done well, really well* [encouraging, supportive tone]; *I will blow it a bit and take a look with the mirror, and you can turn your head slightly towards me, good; Now bite your teeth gently together please, good, well done, keep breathing slowly through your nose, good, then you can swallow; So, open your mouth wide please, good, and close and open* [friendly tone]; *Excellent, keep breathing just like that* [when the patient takes a slightly deeper breath]; *You have so many good teeth.* - **Dental assistant:** *You speak good Finnish; This has been going well* [towards the end of the filling]; *You're doing great* [in a situation that scares the patient]. • **Altering expectations: Redefining the experience**: - **D:** *And now our goal is to try and change your mind set about the anesthetic not working; Let's take our time and wait until it numbs thoroughly; If we can't finish the filling now, that's okay* [with an approving tone]; *It will numb just fine* [convincing tone]. • **Distraction:** - **D:** *That's Finnish schlager music, do you like it?* [a question to a foreign-born patient, as they agreed at the beginning to play music as a distraction]. • **Focusing attention:** - **D:** *The sounds are so beautiful* [a small child chats in the background in their own language].

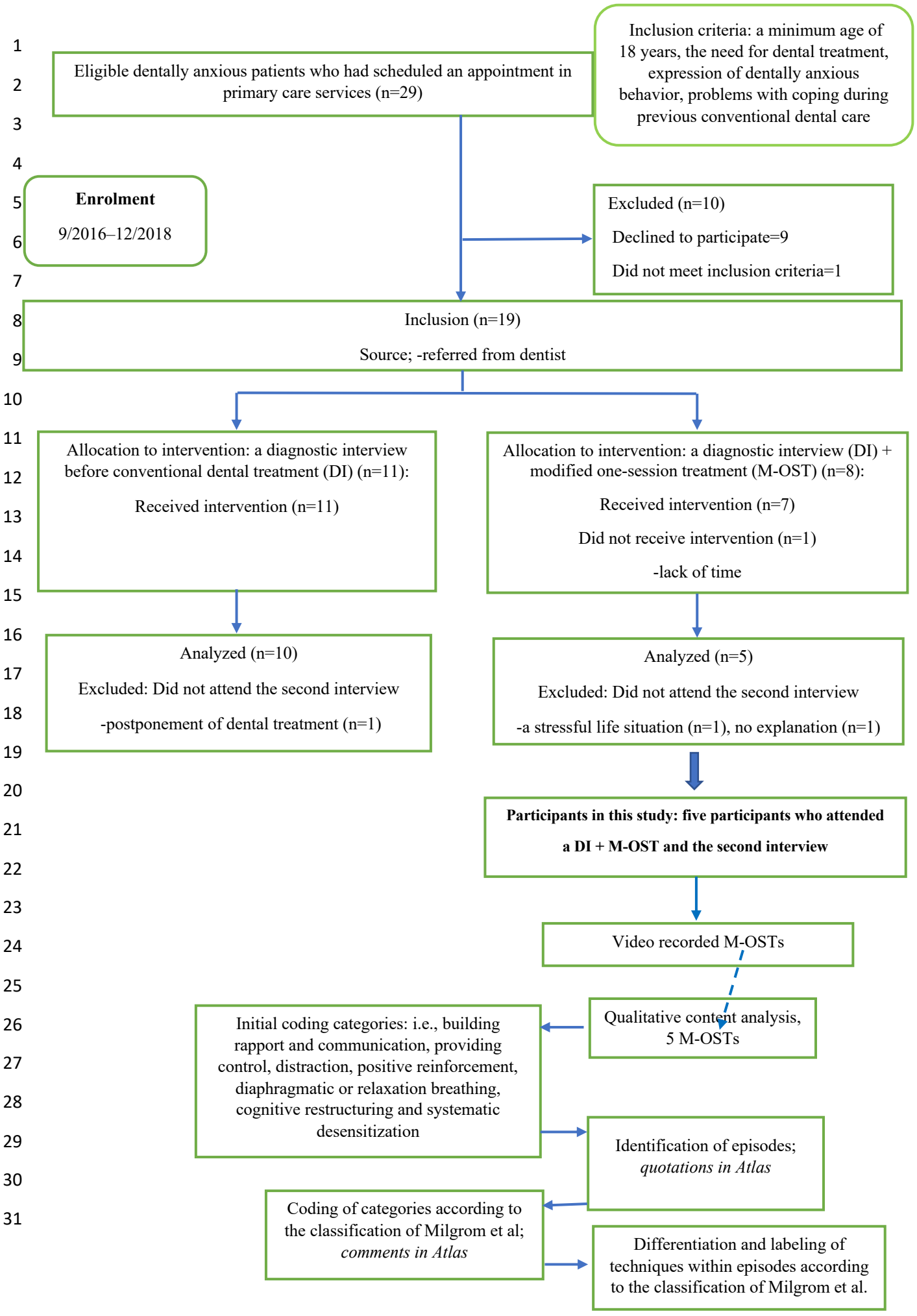
Eligible dentally anxious patients who had scheduled an appointment in primary care services (n=29)
Inclusion criteria: a minimum age of 18 years, the need for dental treatment, expression of dentally anxious behavior, problems with coping during previous conventional dental care
Enrolment
9/2016–12/2018
Excluded (n=10)
Declined to participate=9
Did not meet inclusion criteria=1
Inclusion (n=19)
Source; -referred from dentist
Allocation to intervention: a diagnostic interview before conventional dental treatment (DI) (n=11):
Received intervention (n=11)
Allocation to intervention: a diagnostic interview (DI) + modified one-session treatment (M-OST) (n=8):
Received intervention (n=7)
Did not receive intervention (n=1)
-lack of time
Analyzed (n=10)
Excluded: Did not attend the second interview
-postponement of dental treatment (n=1)
Analyzed (n=5)
Excluded: Did not attend the second interview
-a stressful life situation (n=1), no explanation (n=1)
Participants in this study: five participants who attended a DI + M-OST and the second interview
Video recorded M-OSTs
Qualitative content analysis, 5 M-OSTs
Initial coding categories: i.e., building rapport and communication, providing control, distraction, positive reinforcement, diaphragmatic or relaxation breathing, cognitive restructuring and systematic desensitization
Identification of episodes; quotations in Atlas
Coding of categories according to the classification of Milgrom et al; comments in Atlas
Differentiation and labeling of techniques within episodes according to the classification of Milgrom et al.

Figure 1. A summary of the sample and qualitative content analysis in the study.