

Management of fear and anxiety in the dental clinic: a review

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ABSTRACT

People who are highly anxious about undergoing dental treatment comprise approximately one in seven of the population and require careful and considerate management by dental practitioners. This paper presents a review of a number of non-pharmacological (behavioural and cognitive) techniques that can be used in the dental clinic or surgery in order to assist anxious individuals obtain needed dental care. Practical advice for managing anxious patients is provided and the evidence base for the various approaches is examined and summarized. The importance of firstly identifying dental fear and then understanding its aetiology, nature and associated components is stressed. Anxiety management techniques range from good communication and establishing rapport to the use of systematic desensitization and hypnosis. Some techniques require specialist training but many others could usefully be adopted for all dental patients, regardless of their known level of dental anxiety. It is concluded that successfully managing dentally fearful individuals is achievable for clinicians but requires a greater level of understanding, good communication and a phased treatment approach. There is an acceptable evidence base for several non-pharmacological anxiety management practices to help augment dental practitioners providing care to anxious or fearful children and adults.

Keywords: Dental anxiety, management, treatment, review, non-pharmacological.

Abbreviations and acronyms: ART = atraumatic restorative treatment; CARL = Computer-Assisted Relation Learning; IDAF-4C⁺ = Index of Dental Anxiety and Fear; GA = general anaesthesia; MDAS = Modified Dental Anxiety Scale.

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INTRODUCTION

High dental fear affects approximately one in six Australian adults^{1,2} and this prevalence figure is similar to that of many Western countries around the world.^{3–7} Among some sub-groups of the population, such as middle-aged women, the prevalence of high dental fear may be as high as one in three individuals.¹ The impact that this relatively high level of dental fear in the community can have is appreciable. First, people with high dental fear are much more likely to delay or avoid dental visiting,^{1,8–10} and a number of fearful people regularly cancel or fail to show for appointments. Second, people with high dental fear, children and adults, may prove difficult to treat, require more time, and present with behavioural problems which can result in a stressful and unpleasant experience for both the patient and treating dental practitioner. Research indicates that trying to manage patients with dental fear is a source of considerable stress for many dentists.¹¹ Finally, dentally anxious individuals, because of their avoidant behaviours, often have poorer dental health.^{12,13} In particular, those people

who delay dental visiting for a prolonged time, even if experiencing considerable pain, might have extensive problems that require more complex and complicated treatment.

If patients are not managed appropriately, it is quite possible to establish what has been referred to as a vicious cycle of dental fear.^{14,15} Patients avoid making dental visits because of their fear, which results in a worsening of problems, requiring more intensive and potentially traumatic treatment, which then reinforces or exacerbates the fear, which leads to continued avoidance.¹⁶ In Australia, estimates suggest that about 40% of people with high dental fear fit the vicious cycle profile.¹⁷ In this scenario, the patient, the dental practitioner and the dental care system all lose out.

Given the negative impact of dental fear for all concerned, it is important that patients with dental fear are managed correctly. Like many countries, Australia does not have an established referral pathway for patients identified with dental fear. Certainly, the needs of some patients with high levels of dental fear might best be met if they first receive psychological treatment in a non-dental setting. Additionally,

referral to a dental practitioner who specializes or has an interest in treating fearful patients might be an option which could be discussed with the patient. Often, however, it is the treating dental practitioner who is solely responsible for managing their anxious patients. Fortunately, there are numerous non-pharmacological practices which might be adopted within a clinic or surgery in order to assist fearful individuals better progress through their dental care requirements.

Fear, anxiety, phobia and pain

This paper will mostly use the terms ‘fear’ and ‘anxiety’ interchangeably, and they are very much related, but it is worth noting that there are conceptual differences between these two terms. While there is considerable variability in their usage in the literature, we refer to anxiety as an emotional state which precedes an encounter with a feared object or situation, whereas fear refers to the actual, or ‘activated’, response to the object or situation. It is generally the case, however, that a person will have a fear response to something that they experience anxiety about. Both fear and anxiety can involve physiological, cognitive, emotional and behavioural components, although how these are expressed may well vary from one person to another. In contrast to fear and anxiety, a phobia is more narrowly defined by a diagnosis from an appropriately trained psychologist or psychiatrist as a mental disorder comprising a marked fear or avoidance of a specific object or situation which either significantly interferes with a person’s functioning or which causes considerable emotional distress.¹⁸ While many people experience some anxiety and fear of going to a dental practitioner along a continuum from very mild to extreme, only a relatively small percentage of people will have a clinically diagnosed condition.

The relationship between fear and pain is highly relevant to dental practitioners. While pain is cued by a physiological process it also has a strong cognitive component, and people with dental anxiety can have both exaggerated pain expectancies and pain perceptions.^{19–21} Clinicians need to be aware that managing patient pain is not the same as managing patients’ anxiety and fear. First, the actual act of administering local anaesthesia by intraoral injection is, for many anxious people, one of the most stressful and fear-evoking aspects of the dental experience.²² Second, while it appears that dentally fearful people do report increased fear of pain,²³ the extent of this varies from person to person and there are numerous additional fear-evoking aspects of a dental visit unrelated to pain.^{2,24} There are also more general issues, such as lack of control and the unpredictability of the dental experience, which may be central to the aetiology of a

person’s dental fear, and these are discussed in more detail below.

The nature of dental fear

Before making any decision regarding the use of specific anxiety management approaches, it is important to be aware of the nature of a person’s dental anxiety and fear because this can be a crucial determining factor in managing the problem. While it has generally been regarded that the underlying cause of anxiety is the result of direct negative dental experiences,²⁵ the nature of dental anxiety is more complicated than what is commonly presumed. For example, it has been proposed, and evidence suggests, that how a person perceives the dental environment is a considerably more important determinant of dental fear and avoidance than having had a previous distressing experience at a dental visit.^{25–27} Avoidance of dental care might also be an aspect of some other condition, such as fear of social evaluation (as in social phobia), fear of germs (as in obsessive compulsive disorder) or fear of being away from the safety of home (as in panic disorder with or without agoraphobia). Other psychological conditions, such as depression, might also be related to reduced dental visiting and increased dental need.^{28,29} Current evidence indicates that people considered to have dental anxiety are also much more likely to have various other comorbid psychological conditions.^{30–32} There is also an observed association between dental anxiety and having been the victim of past sexual abuse.^{33,34} All these various factors might be indirectly or directly implicated in a patient’s dental-related anxiety and should be determined when appropriate.

Dental anxiety and fear might also focus on various aspects of the treatment experience, and specific concerns might be independent of other possible concerns. The source of a patient’s anxiety might be in relation to fear of gagging or choking, fear of injection, or a strong aversion to the sight or thought of blood. Patients might have concerns about perceived problems with getting numb, might have a low pain threshold or might have issues with trusting dental practitioners. And there will be differences in the willingness of different patients to talk about these issues. Good communication skills and establishing rapport with the patient are critical in these circumstances (and are dealt with below).

More generally, dental practitioners should be aware that the process of providing a dental examination and carrying out treatment combines a host of potentially aversive situations.²⁶ Patients are generally placed in a reclined position, increasing their sense of powerlessness, and are afforded little control over the situation. Often the clinician’s probing, scraping and

drilling are unpredictable from the patient's perspective, who is unable to see into their own mouth, and this can heighten their perceived lack of control. In addition, the dental practitioner is literally inside the oral cavity of the patient which represents both an intrusion into the patient's personal space and a significant concern for people with heightened disgust sensitivity. And, despite considerable advancements in dental techniques and the modern idea of pain-free dentistry, a recent Australian study found that 85% of the adult population are still at least a little anxious about painful or uncomfortable procedures when they make a dental visit.² These inherent aspects of the current approach to delivering dental care might help to explain the relatively high prevalence of dental anxiety in the population.

Typologies of dental anxiety and fear: guidelines for management approaches

Several typologies have been put forward to explain the different types of dental anxiety which might be seen in the clinic. Different levels, types and characteristics of dental anxiety and fear will dictate different management approaches by the dental practitioner. At perhaps the most basic level, dental anxiety varies across a continuum, from very mild anxiety to severe and debilitating dental phobia which might preclude a person from dental visiting even when they are in severe pain or discomfort. Milgrom and colleagues have identified four different groups of fearful patients who are argued to differ in terms of both their clinical presentation and in the most appropriate treatment approaches.^{2,5} This category system has been labelled 'The Seattle System' and has been validated by Locker *et al.*^{3,5}

Individuals who are *fearful of specific stimuli* can readily identify the aspect(s) of dentistry they find most aversive.^{2,5} While the most common of these stimuli are typically injections, the sound/sight/smell of the drill or handpiece, and pain associated with dental treatment, fearful individuals may identify any number of dental procedures or parts of the dental setting as the one trigger for their dental fear. Treatment for this type of fear involves gradually exposing the individual to the feared stimuli, encouraging the patient to use relaxation strategies throughout to manage their anxiety levels. This method is called 'systematic desensitization' and is discussed below. Typically, once a patient in this category has a number of positive experiences with the feared stimuli, the fear extinguishes over time.

Individuals who are *fearful of medical catastrophe* fear that something will happen during treatment that will cause a medical emergency, such as a heart attack.^{2,5} Often, these patients will report being

allergic to or having had a 'reaction' to local anaesthetics, particularly those that contain epinephrine or similar vasoconstrictor. They may also report concerns that they will not be able to breathe with a rubber dam in place, or that they may choke if too many instruments are placed in their mouths at once. In the case of a 'reaction' to local anaesthetic, the patient may have felt symptoms of autonomic arousal, consistent with increased epinephrine levels (e.g. heart palpitations, shortness of breath, etc.). Patients (and some well-meaning dentists) may interpret these symptoms as an 'allergy to the anaesthetic'. At the next appointment in which anaesthetic is used, the patient is likely to feel increased anxiety in anticipation of having another 'reaction'. The autonomic arousal associated with this anxiety is compounded with any sensations brought about by the epinephrine, leading the patient to feel as though the 'reaction' is worsening over time. Patients in this category will often ask dentists not to use anaesthetic with epinephrine, increasing the risk of inadequate anaesthesia and pain during treatment. Ultimately, patients end up feeling as though they have no choice but to endure painful dental treatment because of their 'allergy' to anaesthetic.

In addressing this type of fear, taking a full medical history, providing education and gradual exposure are key. Although the prevalence of true allergies to local anaesthetics is extremely small and most adverse responses are ultimately determined to be anxiety-related,^{3,6} it is critical to take a thorough medical history to determine if referral to an allergist is indicated. Even in cases where it seems unlikely that a patient has a true allergy to local anaesthetic, referral to an allergist to completely rule this out can be very effective in managing the patient's anxiety. Patients with this fear do not respond well to vague reassurances that 'these allergies are really rare' or 'you'll be fine', but do respond well when dental practitioners take their concerns seriously. After ruling out an allergy, education about the nature of epinephrine and its effects can put the patient's symptoms in context. It can be helpful to explain that epinephrine and adrenaline refer to the same hormone secreted in the body – many people can identify when they've felt an 'adrenaline rush' when they felt excited or scared in the past. As this is found naturally in the body, people are not allergic to epinephrine, but some may feel more sensitivity to its arousing effects (e.g. increased heart rate). After explaining the relationship between anxiety and autonomic symptoms, the dentist may then offer to inject a very small amount of anaesthetic with epinephrine to see how the patient feels. If the patient feels increased autonomic arousal, the dentist should encourage the use of relaxation skills to slow heart rate and breathing. As the patient learns to

control his or her autonomic arousal, the fear of a dangerous reaction gradually extinguishes. For patients who fear choking or suffocating, gradually introducing the feared stimuli in the presence of relaxation skills as described above is helpful, specifically focusing on having the patient practice breathing and swallowing with the rubber dam and/or instruments in place.

Patients with *generalized dental anxiety* experience significant anxiety in anticipation of dental treatment and are not typically able to identify one aspect of dental treatment that is difficult for them.²⁵ In fact, when asked what about dentistry is difficult, many patients in this category will respond, 'it's all terrible'. Many individuals in this category will also report other fears, such as heights, water, and/or flying. Patients with generalized dental anxiety will often report difficulty sleeping the night before an appointment and feeling physically and/or emotionally exhausted after treatment. The key to this category is *worry*: patients will worry about the procedure itself; their own behaviour during treatment and whether they will be able to manage their own anxiety; what future dental treatment they may or may not need; and whether the dentist and dental staff are perceiving them in a negative light because of their fear and oral health.

Patients who fit the generalized dental anxiety category respond very well to reassurance before, during and after the procedure to help alleviate their worry. As these patients will worry about the future, redirecting them to the present is valuable (e.g. 'Let's plan to talk about the root canal after we're finished today; for now, let's focus on this one small filling. This is a very straightforward procedure, and I'm confident you'll do really well and be very happy with the results'). Gradual exposure to the dental setting will be helpful, particularly for patients who have avoided treatment in the past. Feedback from the patient about what he or she considers to be an 'easy' procedure or step will help guide the progress of the treatment plan. Patients in this category will set unrealistic expectations for themselves, wanting to 'push ahead' with treatment before they are able to cope with their anxiety. Training these patients in relaxation strategies and maintaining a gradual exposure to increasingly invasive procedures allows the patient to gain a sense of mastery over his or her anxiety, although they may always describe themselves as a 'nervous patient'.

Finally, patients who are *distrustful of dental personnel* may come across as argumentative or suspicious of the dental practitioners' motives.²⁵ They are concerned about not being in control of their treatment and often complain that prior dentists 'just treated me like a set of teeth' or 'tried to pull one

over on me'. They also worry about dentists and dental staff perceiving them in a negative light, and may use sarcasm or thinly veiled insults. For example, after being presented with an expensive treatment plan, the distrustful patient may 'joke' that he is paying for the dentist's new car or holiday trip. While these patients do not present as fearful in a classic sense, they do fear a loss of control or self-esteem at the hands of the dental providers, leading them to present in a confrontational way to regain control of the situation.

Patients in this final category respond best to information and requests for permission. The dental practitioner should ask the patient if they may tilt the patient back in the chair, use particular instruments, and do an examination. All steps in the process should be explained to the patient so that he or she knows what is happening throughout the appointment. Patients in this category may wish to watch the procedures using a hand mirror, although not all patients will wish to do so. When presenting a treatment plan, all options should be presented verbally and in writing, with the emphasis on the patient's role in ultimately deciding what treatment to pursue. Distrustful patients will respond well to offers to take the treatment plan (and radiographs, if possible) to another dentist for a second opinion; this will provide reassurance to the patient that the dentist is confident in the treatment plan and not simply trying to push the patient into the most expensive treatment options. Of course, all patients – regardless of fear – should be presented with clear treatment options, but distrustful patients will be most likely to want a thorough discussion with the dentist of all possible treatment options and the consequences of each. If the treatment plan should need to change (e.g. instead of a large restoration, an endodontic treatment is now needed), this should be explained to the patient as far ahead of time as possible, rather than having to explain the change in plan in the middle of the procedure. However, once trust is established between these patients and their providers these patients are relatively straightforward to treat.

Identification and assessment

To work successfully with a fearful dental patient, a dental practitioner must first identify that an individual is scared or nervous, and then adopt an appropriate treatment approach tailored to that patient's concerns. Indeed, most dental practitioners will attempt to elicit information from their patients about possible dental concerns, but the approach can be highly variable between dentists and from one patient to the next. However, and despite longstanding recommendations for the use of structured dental fear questionnaires during clinical assessment,³⁷ the use of

dental anxiety measures in general clinical practice is believed to be limited.³⁸ For example, a study investigating the practices of UK practitioners with a declared special interest in treating patients with dental anxiety, found that only 20% used adult dental anxiety assessment questionnaires.³⁹ This is surprising as managing dental anxiety requires a tailored treatment approach which firstly requires the dental practitioner to be efficient at detecting the presence of anxiety.⁴⁰ While the identification of a fearful patient can happen at various points, the earlier a dental practitioner can determine that a patient is fearful, the greater the likelihood of success in working with the patient.²⁵

The UK-based study by Dailey *et al.*³⁹ is the only published paper reporting the use of dental fear screening questionnaires by dentists. In Australia, there is as yet no evidence of their use or non-use among dental practitioners. In terms of addressing the widespread dental fear in the community, this knowledge gap is problematic. Adding to the issue is a concern that chairside assessments of patient anxiety and fear might be inadequate or inaccurate. Evidence out of the US indicates that a dentist's assessment of patient anxiety has only a small-to-moderate correlation with the patient's self-reported anxiety using several different dental fear scales.³⁸

The proper screening of dental anxiety and fear by dental practitioners will determine which treatment approaches to adopt and is a fundamental first step in managing patient anxiety. As stated above, it is recommended that a structured, psychometrically valid scale be used in addition to the dental practitioner's questions for the patient. There are several instruments which are freely available for this purpose, useable for both adults and children.⁴¹⁻⁴³ For example, the Modified Dental Anxiety Scale (MDAS) contains five items, is reliable, and is quick to administer.⁴⁴ Another scale, the Index of Dental Anxiety and Fear (IDAF-4C⁺), contains an eight-item module measuring the physiological, cognitive, emotional and behavioural components of dental fear and an additional 10-item stimulus module designed to assess possible areas of specific concern.⁴⁵ The scale compares favourably to other scales, is short enough to be used for effective screening of dental anxiety, and is flexible enough to allow additional investigation of specific concerns if that is deemed to be warranted. For children, special scales have been developed, such as the Modified Child Dental Anxiety Scale⁴⁶ and the Facial Image Scale,⁴⁷ which use graphical representations of smiling and frowning faces to measure child anxiety. However, even simple single-item questions such as the omnibus item from the Dental Fear Survey²⁵ ('All things considered, how fearful are you of having dental work done?') or the Dental Anxiety Question⁴⁸ ('Generally, how fearful are

you of dentistry?') allow for standardization and ensure that patients have an opportunity to voice an initial concern. There is evidence that using dental fear scales does not raise anxiety in anxious or non-anxious patients.⁴⁹ Further, and even if a decision is made to not formally assess dental anxiety, it is possible that the mere act of asking fearful dental patients to report their level of dental fear prior to treatment may reduce the patients' level of state anxiety.⁵⁰

Matching anxiety management practices to identified anxiety levels

It is generally considered to be the case that when a patient exhibits only mild anxiety and they present without other complications they can be helped by establishing a trusting relationship and by providing realistic information about the dental treatment.⁵¹ Relatively simple anxiety reduction strategies can also be employed, such as providing the patient with a sense of control and predictability in relation to treatment. These various management approaches are discussed in more detail below.

Either greater anxiety or increased treatment need may necessitate other anxiety management approaches.⁵¹ Those people with mild or moderate anxiety but with greater or more acute treatment need may require specific pharmacological support (such as nitrous oxide or oral sedation) in addition to the use of strategies such as distraction, relaxation, or the development of better coping strategies. High levels of anxiety may necessitate some form of cognitive-behavioural intervention (perhaps via referral to a psychologist) such as systematic desensitization, cognitive restructuring or hypnosis. These more complicated approaches involve treating the anxious patient using well-developed psychological practices and might require additional training in order to be successfully employed.

Where the urgency of treatment need is high, in addition to high levels of anxiety, possible approaches to patient management might involve intravenous sedation, conscious sedation or general anaesthesia (GA). Because of the absence of training in and availability of these approaches in many dental surgeries, such cases will often necessitate referral to someone equipped to provide such services. Surgery under GA should be regarded as the last treatment option as there is no evidence that this provides any benefit to the highly anxious patient beyond meeting their immediate treatment needs, but may have negative repercussions such as increasing dental fear and anxiety.^{52,53} However, in some instances, especially if a patient is in severe pain or is suffering from oral malfunction due to considerably deteriorated oral status, a first dental treatment under sedation may be indicated.⁵⁴

Enhancing trust and control

Bernson and colleagues conducted interviews with dentally fearful individuals who were able to seek regular dental care.⁵⁵ When asked what skills they used to be able to complete treatment, two of the four key themes that emerged were ‘trust-filled interaction with staff’ and ‘striving for control’ (p. 375). Building trust in the staff included communicating and cooperating with members of the dental team. Developing a sense of control, meanwhile, involved taking an active role in one’s own care and communicating one’s wishes to the dentist and staff. The overall theme that emerged from these interviews was that fearful individuals see receiving dental care as a mutual effort on the part of both the patient and the dental practitioner, and that *both* parties need to make efforts to make the treatment proceed smoothly. Below, we describe several techniques that both dental staff and patients may use to facilitate the dental treatment process.

Rapport and communication

Early research in dental fear focused on dentist characteristics associated with patient satisfaction and anxiety reduction. Corah and colleagues surveyed patients and found that patient satisfaction was associated, in part, with the rapport patients felt with their dentists.⁵⁶ Specifically, dentists’ friendliness and providing patients with moral support were important factors in patients’ satisfaction with care. With regard to reducing anxiety, patients were most concerned with their dentists’ explicit statements about preventing pain.⁵⁷ Interviews with dentally fearful patients revealed that dentists’ understanding and acceptance of patients’ needs and concerns were more important than their technical competence.⁵⁸

Communication between the dental practitioner and patient is crucial for a productive working relationship that results in competent clinical care. Hamasaki and colleagues found that patients who felt positively about their communication with their dentists had better outcomes related to satisfaction and lower fear than those who felt less positively about their dentists’ communication.⁵⁹

There now exists a considerable body of writing on dentist communication skills^{22,25,60} and it is beyond the scope of this article to adequately cover this material. However, essential elements of good communication involve establishing an effective two-way interaction, genuinely acknowledging (rather than dismissing) patient concerns, attending to non-verbal cues, effective listening and accurate reflection of what the patient says, demonstrating empathy, and using appropriate voice and tone. Related to the development of good communication is what has been called

the ‘iatrosedative technique’, which involves a systematic approach aimed at making the patient calm by the dental practitioner’s behaviour, attitude, and communicative stance.^{61,62} More simply, iatrosedation is a process of communication between the dental practitioner and patient that creates a bond of understanding, trust and confidence.⁶³ Ultimately, rapport, communication and trust form the backbone of any anxiety management approach.

Information

Providing patients with information about procedures can help correct misconceptions patients may have about treatment, such as what sensations can be expected and the anticipated length of treatment. Such information is also helpful in increasing a sense of predictability during the procedure. The usefulness of providing information often relies on the type of information given, when it is given, and patients’ preferences for information.⁶⁴ A distinction should be made between the types of information given to patients. Sensory information tells patients what they can expect to feel (e.g. pressure, vibrations) while procedural information tells patients the order in which parts of the procedure will happen (e.g. administration of the local anaesthetic, followed by placement of the rubber dam, then use of the handpieces). Some patients prefer to know about the procedure generally at the start of the appointment, while others may prefer a ‘play-by-play’ description of the treatment as the appointment progresses. Dentists are well-served by asking patients prior to the start of the procedure what type of information they would prefer and when, so that the correct amount of information is provided at the appropriate time.

Providing control

Tell-show-do

One way of reducing uncertainty and increasing predictability is to use the ‘tell-show-do’ technique. This involves an explanation of what is about to happen, what instruments will be used and the reasons for this (the ‘tell’ phase), followed by a demonstration of the procedure (the ‘show’ phase). The ‘do’ phase is then initiated by carrying out the procedure. Despite its popularity amongst dental practitioners^{65,66} and its widespread acceptance by paediatric patients and parents in several countries around the world^{67–70} the ‘tell-show-do’ technique has not received very much research into its effectiveness.⁶⁴ One study conducted in Venezuela found that children assigned to a tell-show-do condition had no evidence of increased blood pressure in comparison to the increase experienced by the no-psychological treatment group.⁷¹ Tell-show-do

has been shown to be efficacious in reducing anticipatory anxiety in new child patients although it is less useful for children with previous dental experience.⁷² Despite the limited available evidence, it has been recommended for use with any patient and has no specified contraindications.⁷³

Although the 'tell-show-do' technique was originally developed for use with children, it can also be applied to anxious adults where it can foster a sense of both control and predictability. One variation reportedly used with adults is 'explain-ask-show-do', which aims to establish a situation of mutual cooperation.⁷⁴ In this variation, each key stage involves explaining what the dental practitioner would like to happen or suggesting a next step in the patient's care, answering any questions that the patient might have and then, once the patient receives all the information that they need, asking permission to proceed to the 'show' and 'do' stages. This process attempts to balance the fears and phobias of the patient against the desire to make progress while simultaneously respecting where the patient is currently at, both physically and emotionally. However, there has been no known research into the effectiveness of this approach.

Rest breaks

Either the dental practitioner or patient may initiate breaks during a procedure. Many dentally fearful individuals feel the need to continue with a procedure until they 'can't bear it any longer', at which time it is more difficult for patients to calm themselves down enough to continue with the procedure. When the patient initiates a rest break (usually through signalling, as discussed below), being able to pause the procedure can increase the patient's sense of control over treatment. Dental practitioners should be sure to communicate to their patients at the start of appointments that they (the patients) are able to indicate that they would like a break at any time in the procedure.

Dentist-initiated rest breaks are particularly helpful when treating patients who are not assertive or want to 'push through' an appointment as quickly as possible. Some patients do not wish to request a rest break, for fear of appearing to be a 'difficult' patient. Dental practitioners can plan the rest breaks in advance; such as telling the patient they will work for five minutes, then take a one-minute break. This increases the patient's sense of predictability and control over the procedure, as he or she can watch the clock and anticipate the upcoming break. As an alternative, patients can be allowed short breaks (involving closing their mouth and resting) whenever there is a pause in treatment for some reason. Dental practitioners should also take an unscheduled break in procedures if they feel their patients are becoming increasingly anxious

or restless. This may involve checking in briefly with another patient or staff member, or just allowing the patient to stand up or use the bathroom.

Regardless of who initiates the rest break, the idea is to pause the procedure prior to the patient becoming too anxious to proceed. Whether dental practitioners are encouraging their patients to signal for a rest break or scheduling breaks in advance, pausing the procedure allows patients to calm themselves and proceed with treatment. If dental practitioners wait to pause the procedure until their patients are too anxious to proceed, the patients may be unable to calm themselves and the procedure may be terminated prematurely, potentially compromising the quality of care.

Signalling

Being able to signal for the dentist, therapist or hygienist to stop treatment is a key component of building communication and trust between the patient and dental practitioner. Many dentally fearful individuals recall experiences in which they felt their dentists did not know they wanted to stop treatment (e.g. if they felt pain), or did not respond to the patients' requests to stop. By giving the patient a means to communicate with the dental practitioner during the procedure (to which the dental practitioner is sure to respond), the patient's sense of control and trust increases. A signal can be as simple as a raised hand to notify the dental practitioner that the patient would like to stop the procedure. Specific signals can be determined ahead of time; e.g. a raised hand means stop, while a raised index finger may ask the assistant to use the suction device (an alternative is that the patient is allowed to control their own suction). Singh and colleagues provided patients with an electronic communication system that allowed patients undergoing endodontic therapy to communicate that they: (a) were feeling pain; (b) were feeling giddy or light-headed; (c) needed additional suction; (d) were feeling tiredness in their jaws from prolonged mouth opening; or (e) wanted to know how much longer the procedure would take.⁷⁵ Patients using this system reported significantly lower dental fear scores after treatment than patients being treated in a usual manner. While the signalling technique may be as simple or complex as is desired by the dental practitioner or patient, the key component to signalling is to facilitate communication and to enhance the patient's trust that the clinician will respond appropriately to their signal.

Other psychological approaches to managing dental anxiety

In addition to the relatively simple techniques such as providing information, tell-show-do and signalling,

there are several psychological approaches to managing dental anxiety and fear which can be used in the clinic. These range in complexity from those that are relatively easy to carry out to others requiring specialized training.

Distraction

There is evidence that focusing attention on specific alternative visual or auditory stimuli in the dental clinic might be beneficial for patients with mild to moderate dental anxiety. While several options are available for the clinician, ranging from background music to television sets to computer games to 3D video glasses for watching movies, there is currently mixed evidence regarding the effectiveness of these distraction practices in the dental clinic. For example, while a meta-analysis of 19 randomized clinical trials found that music therapy reduces pain and anxiety for children undergoing medical or dental procedures,⁷⁶ a recent study of adults undergoing third molar extraction found only small reductions for a music-treated group in interoperative anxiety and no difference in pain perceptions compared to a non-music control group.⁷⁷ The results of an early study by Corah and colleagues indicated that musical programmes, at best, resulted in a placebo effect.⁷⁸ A more recent study of German dental patients found that although music distraction reduced dental anxiety significantly compared to a control group, the effect was significantly less than that produced by a brief relaxation method and that it worked only for mildly anxious patients, having no clinical relevance for highly anxious patients.⁷⁹ Nonetheless, given the ease of introducing music distraction into the clinic, and the absence of any known deleterious effects, the potential for positive outcomes and stated patient preference would recommend it for more systematic and widespread use.

Both visual and auditory distraction is now available through the use of goggles capable of showing 2D and 3D vision accompanied by surround sound. While immersive virtual reality goggles have been found to reduce blood pressure, pulse rate and pain ratings in patients undergoing periodontal scaling and root planing procedures,^{80,81} another series of studies by Benson and colleagues found that video glasses did not alter perceived pain intensity of either restorative dental treatment⁸² or dental scaling.⁸³ More research is required to explore whether the effectiveness of this type of distraction is perhaps dependent on patient-related factors, such as personality attributes related to desire for predictability or control. There is evidence, however, that audiovisual distraction might be beneficial for children who are anxious or uncooperative in the clinic.⁸⁴

Positive reinforcement

Particularly in relation to children, but also for adults, positive reinforcement in terms of small tangible rewards or verbal acknowledgement might provide a useful incentive for cooperation or appropriate behaviour. In relation to children, it is believed that it is not possible to have too much reinforcement, although the clinician should attempt to be genuine in their offering.⁸⁵ Positive reinforcement, and positive feedback in particular, is considered to be a universally accepted behaviour management technique when providing dental care to children⁸⁶ and is based on longstanding psychological principles that have been consistently demonstrated to be effective.⁸⁷ Many dental practitioners are encouraged to use positive reinforcement to obtain cooperation with dental procedures. However, the effect of positive reinforcement in relation to dental self-care behaviours, or behaviour when visiting a dental professional, has received little scientific evaluation.⁸⁸

A related anxiety management procedure makes use of the often powerful motivation of anxious individuals to 'escape' the fear-inducing situation. In this technique, which is similar to signalling, brief periods of 'escape' from ongoing dental treatment are provided to a person contingent upon cooperative or appropriate behaviour. Positive verbal reinforcement and a brief period of escape (5–10 seconds) are rewarded for the patient lying still and being quiet, while disruptive behaviour delays escape until cooperation is regained.⁸⁹

Diaphragmatic or relaxation breathing

One exercise which is believed to be of benefit to almost every fearful patient is relaxation through paced breathing.²⁵ The physiologic changes accompanying relaxation breathing, or diaphragmatic breathing, effectively form a counterpart to, and are therefore incompatible with, the emergency 'fight or flight' reaction characterizing anxious individuals.⁹⁰ It is difficult to be tense and to breathe from your abdomen at the same time.⁹¹ Because of this, relaxation breathing has been used effectively across a wide range of situations to combat anxiety. However, while it is believed that relaxation breathing can also be effective in reducing perceived pain,⁹² the evidence has been more equivocal than that for anxiety reduction. While a systematic review covering the period 1996–2005 found no association between rhythmic breathing relaxation and pain relief in a single identified study,⁹³ one recent study has shown that relaxation breathing does appear to lower both anxiety and perceived pain.⁹⁴ This is, perhaps, not surprising as the association between greater anxiety and increased pain perception is now well established

in the dental literature.^{95–98} Anxiety is known to upregulate the sympathetic nervous system which, in turn, is believed to decrease the pain threshold.⁹⁹

There are several variations on relaxation breathing. For example, Milgrom *et al.* describe a procedure whereby patients are taught to take slow, deep breaths, holding each breath for approximately 5 seconds, before slowly exhaling.²⁵ Slow, steady breathing for 2–4 minutes is regarded as effective in reducing a patient's heart rate and making anxious patients noticeably more comfortable. Ackley, on the other hand, advises that patients should be asked to breathe so slowly that if a feather was under their nose it would not move.¹⁰⁰ These breathing techniques can be taught quite easily at the dental clinic and can be practised at home by the patient prior to an initial examination. Physiological monitoring of breathing via a heart rate monitor or some other bio-feedback device might be useful for both the patient and dental practitioner,²⁵ and has demonstrated effectiveness in reducing dental anxiety and negative feelings regarding a dental injection.¹⁰¹

Progressive muscle relaxation

Progressive muscle relaxation is a systematic technique initially developed several decades ago¹⁰² and subsequently standardized for use by therapists and researchers.¹⁰³ The procedure has been widely, and successfully, used to manage and treat a variety of anxiety disorders.¹⁰⁴ In addition, it has been shown to be effective when treating people with dental anxiety. For example, in comparison to a cognitive therapy, progressive muscle relaxation has been found to result in a more significant reduction in dental fear and general anxiety.¹⁰⁵

The process of progressive muscle relaxation is based on the basic principle of muscle physiology, that when a muscle is tensed, releasing the tension then causes relaxation in the muscle. Further, a muscle that is tensed and then relaxed does not merely return to its pretension state, but becomes even more relaxed, especially if it is allowed to rest. The basic process of progressive muscle relaxation requires the patient to focus on specific voluntary muscles and, in sequence, tense and then relax the tension in that muscle. As the tensing and relaxing sequence progresses, other aspects of the relaxation response also naturally occur: breathing becomes slower and deeper, heart rate and blood pressure declines, and vasodilatation in the small capillaries of the extremities may occur, creating a subjective sense of calmness and ease.¹⁰⁶

The procedure used in progressive muscle relaxation is relatively simple but will require an investment of time, firstly to teach the patient and then for the patient to practice at home (once or twice per day for

1–2 weeks), in order to master the technique.²⁵ There are several specific muscle sequences that can be used for practising progressive muscle relaxation but, regardless of the sequence, each muscle is tensed to approximately 75% of full tension, held for between 5 to 10 seconds, and then relaxed for about 10 seconds, with attention focused on the feeling of tension and then the specific sensations of muscle relaxation.¹⁰⁶ Even if the full sequence of steps are not used, smaller or fewer steps may still produce benefits such that teaching the patients and using this technique at the clinic is worth trying.

Guided imagery

Sharing similarities with distraction, guided imagery involves patients mentally taking themselves to a pleasant or relaxing place. This technique removes the focus on the dental procedure and can usefully be combined with relaxation techniques. To train the patient to use imagery, patients should practice in an office and should be encouraged to sit quietly, slow their breathing, relax their muscles and then to picture a place of peace and relaxation that they find to be particularly pleasant for them. The dental practitioner, using a calm and relaxed manner, guides the patient through the scene, attempting to engage as many of the patient's senses (sight, sound, touch, smell) and memories as possible. Once this technique is mastered, it can then be used while the patient is in the dental chair with the dental practitioner again guiding the patient through the imagined scene.

Cognitive restructuring

While distraction and guided imagery aim to shift a patient's attention away from the fear-evoking situation, cognitive restructuring aims instead to alter and restructure the content of a person's negative cognitions as well as to enhance the individual's control over such thoughts. The process involves identifying the misinterpretations and catastrophic thoughts often associated with dental fear, challenging the patient's evidence for them, and then replacing them with more realistic thoughts. Evidence for the potential effectiveness of cognitive restructuring in dental fear has mostly come from studies of dental patients seeing clinical psychologists^{105,107} but there is some evidence that the skills required to carry out cognitive restructuring are within the reach of dental practitioners, through special training and supervision.¹⁰⁸

Systematic desensitization

Systematic desensitization involves gradually exposing a fearful individual to the aspect of dentistry they find

frightening while encouraging them to use relaxation strategies to reduce their anxiety. For example, for a patient who is fearful of injections, the dental practitioner may first show him or her the syringe and explain its parts and purpose (e.g. most dental syringes are long and thin to allow access to the rear of the mouth) until the patient is able to view and hold the syringe with little to no anxiety. Next, the dental practitioner may place the syringe with the needle capped in the patient's mouth to simulate the injection, holding the syringe in place for the length of a typical injection. The patient should be encouraged to use relaxation strategies to manage the inevitable anxiety caused by this exercise, and this step is repeated until the patient expresses little to no anxiety. The dental practitioner may then place the syringe with the needle uncapped, reassuring the patient that they will not move ahead with the injection without the patient's permission. Similar to the 'cap-on' step, the patient practices relaxation skills and the step is repeated until the patient feels little to no anxiety. Finally, the dental practitioner – with the patient's permission – may proceed with the injection, replicating the location and length of time demonstrated in the previous steps.

Systematic desensitization has been shown to be effective. For example, Hakeberg and colleagues found that dentally fearful patients completing a systematic desensitization programme showed greater fear reduction and an improvement in mood after receiving dental treatment compared to those patients pre-medicated with diazepam prior to dental treatment; these results remained consistent at 10-year follow-up.¹⁰⁹ The process of exposure can be further systematized by using video-based exposure. As an example, a computer-based systematic desensitization programme named CARL (Computer-Assisted Relaxation Learning) has been developed to help reduce fear of dental injections.^{110,111} Individuals view a series of video segments in which a fearful patient is taught coping skills (including diaphragmatic breathing and progressive muscle relaxation, as described above) and then taken through the gradual steps of a dental injection. In a randomized clinical trial, individuals completing the CARL programme showed greater fear reduction than individuals receiving an informational pamphlet about dental injections,¹¹² and fearful patients have found CARL to be an acceptable way to reduce their dental injection fear.¹¹³ Whether done in person or via computer, systematic desensitization allows patients to learn to reduce their anxiety while taking 'baby steps' through procedures.

Hypnosis

Hypnosis has been defined as an interactive process whereby a hypnotist attempts to influence a person's

perceptions, feelings, thinking and behaviour by asking them to concentrate on ideas and images in order to evoke an intended effect.¹¹⁴ During hypnosis a person enters into a particular frame of mind characterized by focused attention and dis-attention to extraneous stimuli which is not entirely dissimilar to that experienced when a person is lost in thought, in a daydream, or being absorbed in a book.¹¹⁵ While hypnosis can be used for a large number of dental issues, its benefit for managing dental anxiety is that 'suggestions' can be made to a patient which result in behavioural, cognitive or emotional change. Specifically, it can be used to understand why dental anxiety developed, resolve feelings about past experiences, rehearse and help desensitize future treatments, overcome embarrassment, and can be used to complement local anaesthetics.¹¹⁵ While hypnosis has been demonstrated to be effective it needs to be matched to the right patient and, if used inappropriately, can lead to a loss of confidence in the dental practitioner and the treatment process.¹¹⁶ In addition, hypnosis requires specialized training and experience beyond that provided in a standard university curriculum.¹¹⁷ For those dental practitioners who are interested in incorporating hypnosis into their clinical practice, training opportunities through local dental societies or universities should be sought.

Clinical practice and treatment approaches for managing dental anxiety

The clinic environment

Some patients are believed to associate the distinctive sights, sounds, smells and sensations of the dental environment with feelings of anxiety and anticipation of pain.¹¹⁸ It has been suggested that reducing these stress-triggers is an effective procedure for managing anxious patients.^{119,120} Indeed, studies have found that changing aspects of the clinic environment, including appearance and odour, can have an effect on perceived anxiety. For example, a randomized-controlled trial carried out in the UK found that dental patients exposed to a lavender scent while waiting for a scheduled appointment exhibited lower state anxiety than did control patients.¹²¹ This study is consistent with the results of earlier studies using lavender or orange scent in dental waiting rooms.¹²²⁻¹²⁴

Altering the physical environment may also affect anxiety. For example, a study of dentally anxious students found a stated preference for offices with adorned rather than bare walls and for a slightly cooler temperature.¹²⁵ In a more extensive environmental change involving a partially dimmed room with lighting effects, vibroacoustic stimuli and consistent body pressure (a so-called Snoezelen environment),

greater relaxation resulted than in a standard operatory for children undergoing a scale and polish by a dental hygienist.¹¹⁸ It should be noted, however, that the literature in this area is sparse and considerably more research is required before specific recommendations can be made in relation to altering the clinic environment in order to reduce dental anxiety.

Alternative methods for tooth preparation

It has been argued that newer methods of restorative dentistry, such as atraumatic restorative treatment (ART), air abrasion, and infrared lasers, may reduce some of the painful or uncomfortable aspects of dentistry, therefore reducing anxiety and fear of pain during treatment.^{119,120} This makes intuitive sense, given that the 'drill' has long been listed as one of the most anxiety provoking items in the dental office.^{126,127} More recently, a study by Oosterink and colleagues found that 'dentist drilling your tooth or molar' was the seventh most anxiety-provoking stimuli out of a list of 67 potentially anxiety-provoking stimuli.²⁴

While the effectiveness of ART has received much research attention, results for the role of ART in reducing anxiety have so far yielded inconclusive results. While two studies of 6–7-year-old children have found no difference in anxiety between children undergoing ART and those undergoing traditional restorative treatment for caries,^{128,129} a study of children and adults in South Africa concluded that ART leads to lower dental anxiety in contrast to traditional restorative techniques.¹³⁰ Similarly, while one review of the literature on ART suggests 'that it is a suitable approach to be used in children, the elderly, special needs patients, or patients who demonstrate fear and anxiety towards dental treatment' (p. e672),¹³¹ another review concludes that the association between different restorative procedures and dental anxiety, pain and discomfort is contradictory and requires further investigation.¹³²

For people who feel anxiety in relation to the noise, vibration, discomfort or pain of a standard rotary drill, air abrasion offers another worthwhile alternative. In addition, it reduces the need for anaesthesia, which is a source of concern for many anxious children and adults. As a result, using air abrasion is highly marketable by clinical practices.¹³³ Again, although air abrasion is assumed to be anxiety reducing because of its operational properties, little research has been conducted to test this assumption. However, one paper from the UK did find that air abrasion produced appreciably less pain and anxiety than the use of local anaesthetic and drill.¹³⁴ The study reported that the most welcome aspect of air abrasion was that it was pain-free, quick, avoided unpleasant aspects of the drill such as the noise and

vibrations, and that it avoided local anaesthetic injection and continued numbness, which have been found to be sources of considerable anxiety.¹³⁵

Treatment planning

It is strongly recommended that treatment planning for highly anxious people be both flexible and introduced to the patient in phases.²⁵ The important element here is not to overwhelm anxious individuals who may already be catastrophizing about the dental visit, including the extent of treatment required.¹³⁶ Phasing treatment also allows time for the patient to learn and practise some of the behavioural strategies suggested in this article. The sequence and timing of treatment phases needs to be flexible. This means that should a patient begin to show high levels of stress or fear during a treatment session, it may be advisable to halt treatment and set mutual and more realistic goals for future appointments.¹¹⁷

It is recommended that the treatment sequence commence with techniques that are the least fear-evoking, painful and traumatic.¹¹⁷ The initial treatment phase should be restricted to procedures designed to increase the patient's ability to tolerate treatment and desensitize the patient to the dental environment, helping to build trust with the dental professional. One example is the common practice of undertaking tooth cleaning coupled with oral medication and other effective pain control. More extensive or complex procedures, such as tooth extraction or root canal treatment, is better left to the second or third phase of treatment.²⁵

Using a phased treatment planning approach, considerable care must be taken to assist the patient complete treatment. A study among highly anxious UK patients referred for sedation at a special treatment clinic found that while attendance for treatment planning and initial treatment was high, only 33% of the referred individuals ended up completing treatment.¹³⁷ Given the significant reluctance of anxious individuals to attend a dentist, it is important to lower the perceived barriers to treatment. This might mean determining management approaches such as proceeding slowly, having rest breaks, applying muscle relaxation, or using some form of distraction.²⁵ Also important, given the often significant concerns regarding the cost of dental treatment,⁹ is that the estimated costs and insurance coverage for the initial treatment phase is openly and realistically discussed and agreed on by the patient.

Scheduling appointments

It is generally recommended that fearful individuals schedule appointments for a time when they are not rushed or stressed. Early in the morning is often a good

time because it circumvents a patient stressing about the visit all day and avoids the likelihood that there will be a delay in being seen when the patient arrives at the clinic. It might be worthwhile for the anxious patient to bring a close friend or relative along to the first appointment, to act as both an advocate and social support for them. In between appointments, it is worthwhile that additional contact be made in order to support the patient in committing to attending the next scheduled appointment. It should be noted, however, that while these recommendations relating to scheduling appointments might make intuitive sense there is currently no empirical research which establishes the effectiveness of appointment scheduling practices on either dental anxiety or appointment cancellation. Therefore, there remains a need for considerable research effort in order to establish an evidence base in this area of dental anxiety management.

Management of dental fear and anxiety in children

Much of the preceding discussion of non-pharmacological management approaches for dental fear and anxiety is as applicable to children as it is to adults. However, children also present their own set of unique challenges for the clinician. Also, the effectiveness of some of the abovementioned approaches will be greater or lesser when working with children. In this regard, the developmental level of the child might be of critical relevance. In particular, reinforcement and distraction might work well for all children while providing more information about the treatment procedures might be less valuable depending upon the age and interest of the child. There are also behaviour management approaches which are particularly suitable for children rather than adults, and these shall be discussed below.

Modelling

The idea behind modelling is that one person's behaviour can be altered as a result of them observing another person performing a given behaviour.¹³⁸ Modelling in other health settings has been well studied¹³⁹ and research has demonstrated that children can also benefit from viewing other children or their parents undergoing dental treatment, without fear reactions or aversive consequences.^{139–141} It has also been suggested that modelling might be particularly efficacious as a preventive measure with children who have not had previous exposure to dental treatment.¹⁴² Modelling can be easily presented for viewing on televisions, computers or handheld devices or can be done live using a parent or significant other person in the child's life. Filmed modelling can be considered a particularly economical approach as it does not require extensive chairside time.⁸⁶

Distraction

Although distraction techniques have been discussed in relation to adults, there are several additional methods of distraction that might be employed with children. For example, if the child is playing with a toy in the waiting room, it is possible that the toy might also serve to distract the child in the dental chair.⁸⁵ Engaging with a child in a discussion about a pleasant topic, asking the child to visualize a pleasant experience, or giving the child a counting task might be beneficial distracters.⁸⁵ In a 1991 study of dentists who were members of the Australian and New Zealand Society of Paediatric Dentistry, relatively high percentages indicated that they furnished play materials in waiting areas (63%) or let the child hold a toy, mirror etc. (53%) as an approach to managing anxious or difficult children.⁶⁵ While the effectiveness of these individual anxiety management approaches has not been assessed, a study which gave children the option to choose between a range of audio distractions (e.g. music, soundtracks, audio stories) had significantly fewer uncooperative and more satisfied children than in the control group.¹⁴³ Other studies have demonstrated benefits for using contingent distraction, where access to a distracter, such as a personal music player, is dependent upon cooperative behaviour and is removed (negative reinforcement) for uncooperative behaviour.^{144,145} These studies found decreased levels of disruptive behaviour compared to either a non-contingent distraction group, or control group. It is worth noting, however, that these studies are now three decades old and that replication of these results among today's children is necessary to assess their continued validity.

Cognitive restructuring

There is evidence that information provided about a medically-relevant event, after the event has occurred, may influence both the memory of that event and the future.^{146,147} Only one study has so far been carried out in a dental setting, which aimed to restructure fear and pain memories of 6–7-year-old children receiving restorative treatment.¹⁴⁸ In that study, an intervention comprising four components attempted to alter cognitions around a dental experience. At the beginning of the second visit of a course of care, children were: (1) shown pictures of themselves smiling during the first visit two weeks prior; (2) asked to verbalize to their parents how brave they had been previously; (3) provided with concrete examples of their previous positive behaviours; and (4) provided a sense of accomplishment for their past effort. After the second visit, children in the intervention group had decreased memory of fear and pain at the first visit

and had appreciably improved behaviour. It is suggested that such an approach is easily adaptable to clinical practice and can be used both as a preventive behaviour management technique and also as a backup in case of a failure of traditional behaviour management techniques.¹⁴⁸

Restraint

There are several behavioural management techniques which involve the forced restriction of a child's movement, also somewhat euphemistically called 'protective stabilization'.⁸⁶ These include mechanical restraints such as the 'papoose board method' and physical restraints such as the hand-over-mouth exercise, or holding the child down by the dental practitioner or parent. It should be noted that all restraint methods are considered controversial and are not uniformly accepted.¹²⁹ While the American Academy of Pediatric Dentistry, for example, recommends the use of restraint only in instances where safety might be a concern and when 'no other alternatives are available', there is a contrary opinion that unless the situation is potentially life-threatening, the process is entirely unacceptable, perhaps even inhumane.¹⁴⁹ In Australia, while the use of hand-over-mouth to control serious behavioural disturbances in children has not been practised for decades, there has been greater, albeit only occasional use, of gentle restraint or getting parents to restrain their children.⁶⁵ Leaving aside the professional, legal and ethical issues of forced restraint, there is no evidence that any form of this procedure is beneficial for children with dental fear. Indeed, physical restraint by a dentist has been implicated as a significant cause of dental anxiety.^{150,151}

Voice control

Voice control is a punishment technique involving a controlled alteration of voice volume, tone, or pace which, more specifically, equates to issuing commands in a loud voice in order to reduce a child's disruptive behaviour.¹⁵² The American Academy of Pediatric Dentistry recommends voice control as an approach to influencing and directing children's behaviour.⁷³ This is consistent with findings from both the UK, indicating that many dentists are comfortable using voice control¹⁵³ and use it frequently,¹⁵⁴ and evidence from US dentists indicating that voice control is preferred as the first alternative to the now unacceptable hand-over-mouth exercise as a behaviour management technique.¹⁵⁵

While there is some evidence indicating the effectiveness of voice control,¹⁵⁶ changing societal expectations about how children can be acceptably treated may mitigate against its use. Clearly, cultural issues might be relevant in this regard. While studies

of parents in Brazil¹⁵⁷ and Israel,¹⁵⁸ for example, have found strong support for the use of voice control, studies in the US⁶⁷ and Saudi Arabia¹⁵⁹ found voice control to be one of the least accepted techniques by parents. Also relevant is how children feel about voice control. One study of children in England found not only low acceptability (29%), but relatively high unacceptability (29%), and children with higher fear were the least accepting of the technique.¹⁶⁰ Given the importance of trust when managing children with dental fear, it is important to weigh up not only the estimated effectiveness of the technique and its acceptability to parents, but also assess what effect voice control might have on the larger issue of the child's level of trust with the dental practitioner. Certainly, some adults with dental phobia express concerns regarding social powerlessness associated with embarrassment or distrust of dentist behaviours often stemming from being poorly treated by a past dentist.¹⁶¹ If using a raised voice works in the short term to gain compliance in the dental chair, but leads to lasting feelings of resentment and distrust in the child, the process may do more harm than good when it comes to managing dental anxiety. Certainly, more research is needed in this area before definitive recommendations can be made.

CONCLUSIONS

The preceding discussion demonstrates that there is a broad range of techniques that may be applicable for the non-pharmacological management of dental fear and anxiety. Ideally, these techniques should not be applied in a 'cookbook' fashion, but should be integrated into a broader and more comprehensive approach to patient management. Some dental practitioners may find that many people with low or moderate fear can be effectively managed with good communication skills, empathy, careful treatment and some basic non-pharmacological approaches such as relaxation or distraction. More fearful individuals may require more time and effort, employing different techniques, before they are prepared to undergo treatment and then successfully return to receive treatment in the future. While not covered in this article, some patients may find the use of sedation to be desirable and effective in managing their fear, at least in the short term.

Ultimately, the choice of anxiety management approaches to learn and practice must be left to the dental practitioner. However, such choices should always be based on an understanding of the particular patient, their particular history, their particular concerns, and their particular capacity for change. This deeper understanding requires first identifying the patient's concerns and anxieties, then exploring the bases for them, and then working with the patient

to manage their fears so that a phased treatment plan can be successfully carried out.

While many of the anxiety management techniques and practices described here have an established evidence base, others have received either little or mixed research support. Some techniques rely on dated research and others rely on findings in other medical settings which may or may not be generalizable to dentistry. There is a great need for further scientific assessment of a number of anxiety management practices and for a quantification of the extent of any benefit provided. Of course, in a dental setting, it is also the case that what works for one patient might not work for another. There is a need for flexibility when dealing with anxious individuals who, because of their unique backgrounds and concerns, will require a tailored management and treatment approach.

A number of the techniques recommended here for dentally anxious people would be beneficial for all dental patients, regardless of their level of anxiety. Such basic procedures as good communication skills, establishing rapport and providing control, should be a standard approach for all patients and would be expected to contribute substantially to a mutually respectful dentist-patient relationship and, ultimately, to enhanced patient satisfaction. While the practice of dentistry entails the use of an array of clinical skills, varying from simple to very complex, at its heart dentistry is a service industry involving an interaction between the dental professional and the patient. And while a patient has the reasonable expectation that their oral health problems will be competently and successfully addressed, they are also entering into a relationship with the dental provider with expectations that they will be treated in a caring and respectful manner. For the dental practitioner, there is much job satisfaction to be had from successfully managing both a patient's dental anxiety and their oral health. And for those people with dental fear, given the strong association between anxiety and dental visiting, helping the patient manage their anxiety will also be going some way towards helping them improve their oral health.

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