

Update of Non-pharmacological behaviour management guideline

Clinical Guidelines in Paediatric Dentistry

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Non-pharmacological behaviour management

Background to updated guideline

The first National Clinical Guideline on non-pharmacological behaviour management techniques (NPBMT) was published on-line through the Royal College of Surgeons of England [http://www.rcseng.ac.uk/publications/docs/non_pharmacological.html] in 2002. Since that time there has been a considerable amount of research conducted in this area.

The aim of this guideline review was to carry out a thorough review of the literature and subsequently provide an update with respect to recommended NPBMT and the level of evidence to support these methods. This guideline is intended for use by all dental care professionals who provide care to the paediatric dental population and includes dentists, dental therapists, dental hygienists and dental nurses. For ease of reading the term 'dentist' will be used herewith in this guideline to encompass all dental care professionals.

A comprehensive search strategy was devised (Appendix 1) and run on Medline, Embase and PsycINFO. Abstracts were equally divided and reviewed for inclusion by CC, FS and ABN independently. The inclusion criterion for this review was that the publication must investigate either the aetiology of dental behaviour management problems (DBMPs) or a NPBMT in the paediatric dental population (18-years-old and under). The full publication was retrieved for all those abstracts which met these inclusion criteria, as subjectively determined from the abstract by the reviewer. The full publication was also retrieved where insufficient information was available from the abstract to ascertain if the abstract should be included or excluded. Where uncertainty arose regarding suitability for inclusion then discussion between CC, FS and ABN took place to facilitate agreement.

In total 176 full publications were retrieved and reviewed for suitability for inclusion. Full publications were evenly divided between CC, FS and ABN. All papers were assessed independently for final inclusion and subsequent assignment of a level of evidence as per SIGN levels of evidence (Appendix 2). Where uncertainty regarding either suitability for inclusion or level of evidence arose discussion between CC, FS and ABN took place to facilitate agreement. In total, 57 publications were deemed suitable for inclusion and were reviewed and assigned a level of evidence (Appendix 3) and articles cited in the previous version of the guideline were also reviewed and assigned a level of evidence as per SIGN evidence levels (Appendix 4). Of note, the previous guideline was not based on a systematic review of the literature; the authors acknowledge that as a result some articles published prior to 2000 which may have been suitable for inclusion may not be included in this guideline.

Whilst updating this guideline it became apparent that further high quality research is required in the field of NPBMT for use in the child population. Such research will ensure NPBMT and guidance is up-to-date and continues to evolve.⁽¹⁾ Furthermore, the authors acknowledge that while this guideline aims to be as evidence based as possible and as such presents the scientific foundation for NPBMT, behaviour management itself remains a clinical art form.

1. Introduction

1.1 Aim of behaviour management techniques

The aim of behaviour management is to instil a positive dental attitude and create a long-term interest on the patient's part so as to facilitate ongoing prevention and improved dental health in the future.^(2,3) To do this the dentist must establish a relationship based on trust with the child and accompanying adult to ensure active involvement with preventive regimes and treatment (the treatment alliance).^(4,5)

No one method will be applicable in all situations, rather the appropriate management technique(s) should be chosen based on the individual child's requirements and the individual dentist's experience and expertise in NPBMT.

1.2 Classifying children's behaviour

Children's behaviour may be characterised in three ways: co-operative, potentially co-operative and lacking co-operative ability with the term "potentially co-operative" being preferred to the inaccurate term "unco-operative".⁽²⁾ Children who lack co-operative ability include the very young with whom communication cannot yet be established (pre-co-operative), and children with specific disabilities with whom co-operation in the usual manner may never be achieved. These two groups are outside the scope of this guideline and as such the techniques described in this guideline are appropriate for co-operative and potentially co-operative children.

1.3 Communication skills

Good communication is essential with all patients if an effective treatment alliance is to be formed. In children the communication pathway is, however, more complex than the simple one-to-one communication that exists with most adult patients. The child, dentist, parent/carer and dental nurse are all potentially involved. The younger child can only concentrate on one individual at any given time and when problems occur it is often potentiated by unhelpful communication between the child and

parent/carer. Each member of the dental team and the accompanying adult must understand their role and remit to help create an effective treatment alliance.

2. Factors affecting child anxiety

Dental anxiety is a reaction to an unknown danger. Anxiety is extremely common, especially when treatment never experienced before is proposed. Dental fear is a reaction to a known danger, which involves a fight-or-flight response when confronted with the threatening stimulus. Dental phobia is the same as fear, only much stronger. The fight-or-flight response occurs when just thinking about or being reminded of the threatening situation. Adults with a dental phobia will *avoid* dental care at all costs until either a physical problem or the psychological burden of the phobia becomes overwhelming. Children may not be able to avoid the dental environment as they are taken by their parents. Dental anxiety/fear/phobia for this publication are used interchangeably to communicate a child with dental anxiety who presents with anxiety related behaviour in the dental environment.

Anxiety is a recognised personality trait, but there are some factors which have been found to increase the likelihood of anxiety related behaviour/DBMPs. Publications relating to the aetiology of dental anxiety and their evidence levels are summarised in Table 1.

2.1 Previous Medical History

Children who have had negative experiences associated with medical treatment may be more anxious about dental treatment.⁽⁶⁻⁸⁾

When taking a medical history the dentist should include questions about previous hospital/medical contact/treatments and the child's response to them as this may allude to possible DBMPs.

2.2 Previous Dental History

Fear sustained from previous unhappy dental visits has been related to poor behaviour at subsequent visits.^(7,9) Some children with low fear have experienced more check-up visits prior to invasive treatment than high fear individuals thus providing clinical evidence for the latent inhibition theory and supporting regular attendance from a young age.⁽¹⁰⁾ Poor cooperation has also been linked to a history of toothache, recent local anaesthetic experience, previous poor behaviour and poor oral health status.⁽¹¹⁻¹³⁾

When taking a dental history the dentist should include questions about previous dental pain/contact/treatments and the child's response to them as this may highlight specific dental anxieties and allude to possible anxiety related behaviour.

2.3 Social history factors

There is conflicting evidence with respect to the relationship between sociodemographic status and dental anxiety/DBMPs.^(14,15) There is some evidence to suggest that many children referred to dental behaviour management clinics have a troubled life and family situation.⁽¹⁶⁾

When assessing the patient's social history the dentist should take into account the patients socioeconomic status and family situation as this may relate to DBMPs.

2.4 Parental anxiety

A relationship between maternal anxiety and difficulties in child patient management at all ages has been shown,^(5-8, 17-19) and is particularly important for children less than four years old.^(6,7) The relationship between maternal/paternal anxiety and child anxiety is, however, not apparent in all cultures.⁽²⁰⁾

Dentists should take into account the effects of parental anxiety and cultural differences when providing care for the paediatric dental patient. When a parent is unable to contain their own dental anxieties it may increase their child's own anxiety.

Strategies used to reduce anxiety related behaviour in children may also help reduce anxiety in the accompanying adult. These could include written preparation, desensitisation and relaxation strategies. In some cases tactful exclusion from the surgery or finding an alternative accompanying adult who is less fearful may be helpful.⁽⁵⁾

2.5 Parenting styles

There is conflicting evidence with respect to the influence of different parenting styles on child behaviour in the dental setting.⁽²¹⁻²³⁾ Dentists should therefore take into account the effects of different parenting styles when providing care for the anxious child. Where the parenting style appears to be detrimental to behaviour management in the dental environment consideration might be given to an alternative accompanying adult whose parenting style is more helpful.

2.6 Parental presence

Research suggests that generally children's behaviour is unaffected by parental presence or absence.^(4,24-27) The exception to this is young children (less than four years) who behave better with their mothers present.⁽⁴⁾ Involving the parent in the planning stage and outlining their role as a passive but silent helper may provide a comforting presence without unhelpful interference.⁽⁴⁾ It is essential that individual practitioners explain their practice policies on parental presence to parents at the initial appointment.⁽²⁸⁾

2.7 Child awareness of a dental problem

Children who know they have a dental problem are more likely to exhibit anxiety related behaviours at their first dental appointment.^(6, 7) Dentists should therefore take into account that a child presenting with a dental problem may be less co-operative than a child without a dental problem.

2.8 Behaviour of dental staff

Previous poor relationship with dental staff has been reported by parents of anxious children which may, in turn be a potential cause of dental anxiety.⁽¹⁹⁾

Dental staff should, as always, endeavour to have a positive relationship with all patients and their guardians.

2.9 Child temperament

Some children referred for DBMPs have been found to differ from children in 'ordinary' dental care, not only in terms of dental fear levels but also in personal characteristics.⁽²⁹⁾ Dental staff should attempt to identify the most suitable behaviour management tool(s) for each individual child in relation to their level and type of dental fear/anxiety and their temperament.

3. Recommendations for non-pharmacological behaviour management techniques

There are a number of non-pharmacological behaviour management techniques that aim to help prevent and/or manage DBMPs. Some methods aim to improve the communication process; others are intended to eliminate inappropriate behaviour or reduce anxiety. While the techniques are described individually, they are often used in combination. For example, the language used should always be age appropriate, as should non-verbal communication, which occurs continuously. Behaviour shaping utilises positive reinforcement and works well combined with tell-show-do for the majority of patients who seek information when under threat i.e. 'monitors'. The exception to this being those patients who use distractive strategies when under threat i.e. 'blunters'.⁽³⁰⁾ These patients respond best to general information but find detailed information off-putting. It is also important to ensure that the accompanying parent/guardian knows, as part of the informed consent process, what strategies the dentist is likely to adopt and is prepared for these e.g. if they know that the dentist may raise their voice under certain circumstances (voice control) and why, the

parent/guardian will react appropriately should it occur. These behavioural techniques are summarised in Table 2 with evidence levels assigned.

3.1 Preparatory information

Strategies used to decrease parental anxiety, such as pre-appointment letters, may also help children.^(8, 31, 32) These are usually in the form of a letter welcoming the new patient and family to the practice. Such letters inform them about what will happen at the visit, give advice on preparing the child and help to reduce parental anxiety.⁽³²⁾

This technique may be particularly useful for patients who are 'monitors'.

3.2 Non-verbal communication

This form of communication occurs continuously and may reinforce or contradict verbal signals. Such communication includes having a child-friendly environment and a happy, smiling team.⁽³⁾ Reassurance has been shown to be ineffective as a method of controlling distress. In contrast, reinforcement, i.e. enquiring how the child is feeling or gentle pats and squeezes has been found to minimise distress.⁽³³⁾ These non-verbal cues and signs are used to give positive encouragement and enhance other management techniques.

This technique may be useful with all patients.

3.3 Voice control

Voice control techniques use a controlled alteration of voice, volume, tone or pace to influence and direct a patient's behaviour. Young children especially may often respond to tone of voice rather than the actual words.⁽³⁾ Such techniques aim to improve attention and compliance as well as to establish authority; e.g. an abrupt change from soft to loud to gain attention of a child who is not complying. Voice control has been shown to decrease disruptive behaviours without producing long-

term negative effects.⁽³⁴⁾ While reported as widely used by dentists⁽³⁵⁾ it may, however, not be acceptable to all parents⁽³⁶⁾ or clinicians.⁽³⁷⁾

The technique is useful for inattentive but communicative children. However, it is not appropriate for children too young to understand or with intellectual or emotional impairment.

3.4 Tell-show-do

This technique is widely used to familiarise a patient with a new procedure.⁽³⁵⁾ The 'tell' phase involves an age appropriate explanation of the procedure. The 'show' phase is used to demonstrate the procedure, for example demonstrating with a slow handpiece on a finger. The 'do' phase is initiated with a minimum delay, in this case a polish. It is important when using this technique and in general, that the language used is appropriate to the child's age: many dentists use a personal version of this 'childrenese' (Table 3) and the whole dental team must adopt the same approach. Specifically, emotive or negative words are avoided. It has been shown to be an effective way of reducing anticipatory anxiety in new child patients.⁽³⁸⁾

The technique is useful for all patients who can communicate. There are no contraindications.

3.5 Enhancing control

This technique provides the patient a degree of control over their dentists' behaviour through the use of a stop signal. Such signals have been shown to reduce pain during routine dental treatment⁽³⁹⁾ and during injection.⁽⁴⁰⁾ The stop signal is usually raising an arm, which can be rehearsed and the dentist should respond quickly when it is used.

The technique is useful for all patients who can communicate. There are no contraindications.

3.6 Behaviour shaping and positive reinforcement

Behaviour shaping consists of a defined series of steps towards ideal behaviour.⁽⁴¹⁾ This is most easily achieved by selective reinforcement. Reinforcement is the strengthening of a pattern of behaviour, increasing the probability of that behaviour being displayed again in the future.⁽⁴²⁾ Anything that the child finds pleasant or gratifying can act as a positive reinforcer e.g. stickers or badges at the end of a successful appointment. The most powerful reinforcers are social stimuli, such as, facial expression, positive voice modulation, verbal praise, approval by parent/carer in the form of a hug.⁽⁴³⁾ A child centred, empathic response giving specific praise, for example, “ I like the way you keep your mouth open” has been shown to be more effective than a general comment such as “Good girl.”⁽⁴³⁾ As with “Tell-Show-Do” the use of age specific language is important.⁽³⁾

The technique is useful for all patients who can communicate. There are no contraindications.

3.7 Modelling

This technique is based on the psychological principle that people learn about their environment by observing the behaviour of others. This can be achieved by using a model, either live^(44, 45) or by video^(46, 47), who exhibits the appropriate behaviour in the dental environment. This technique may decrease the target child’s anxiety by showing a positive outcome following a procedure that the target child requires themselves and will also illustrate the rewards for appropriate behaviour.⁽⁴⁸⁾ For best effects models should be the same age as the target child, should exhibit appropriate behaviour and be praised. They should also be shown entering and leaving the surgery.⁽⁴⁸⁾

The technique is likely to be useful for all patients. There are no contraindications.

3.8 Distraction

This approach aims to shift the patient's attention from the dental setting to some other situation or from a potentially unpleasant procedure to some other action. Cartoons have been shown to reduce disruptive behaviours in children when combined with reinforcement, which is when children knew the cartoon would be switched off if they did not behave.⁽⁴⁹⁾ This reinforcement technique is also effective with audio distraction.⁽⁵⁰⁾ However, audio distraction, although proven effective for adults, has been shown to have variable success in children.⁽⁵¹⁻⁵⁴⁾

Short term distracters such as diverting attention by pulling the lip as a local anaesthetic is given or having patients raise their legs to stop them gagging during radiography may also be useful. Verbal distraction e.g. the dentist who talks while applying topical paste and administering local anaesthetic, can also be effective.⁽³⁾

The technique is useful for all patients who can communicate. There are no contraindications.

3.9 Systematic desensitisation

This technique helps individuals with specific fears or phobias overcome them by repeated contacts. A hierarchy of fear-producing stimuli is constructed with patient input and the patient is then exposed to these fear-producing stimuli in an ordered manner, starting with the stimulus posing the lowest threat. In dental terms, fears are usually related to a specific procedure such as the use of local anaesthetic. First, the patient is taught to relax, and in this state exposed to each of the stimuli in the hierarchy in turn, only progressing to the next when they feel able.⁽⁵⁵⁾ An example of a hierarchy for local anaesthetic is shown in Table 4.

The technique is useful for a child who can clearly identify their fear and who can verbally communicate.

3.10 Negative reinforcement

Negative reinforcement is the strengthening of a pattern of behaviour by the removal of a stimulus which the individual perceives as unpleasant (a negative reinforcer) as soon as the required behaviour is exhibited. The stimulus is applied to all actions except the required one, thus reinforcing it by removal of a negative stimulus. It should not be confused with punishment, which is the application of an unpleasant stimulus to inappropriate behaviour.

A well-known example of negative reinforcement in dental practice is selective exclusion of the parent (SEP). When inappropriate behaviour is exhibited the parent is asked to leave. When appropriate behaviour is exhibited the parent is asked to return, thus reinforcing that behaviour.⁽²⁴⁾ Good practice for this technique includes gaining specific informed consent for the technique and the parent should be able to hear, but be out of sight of, the child.

With respect to the negative reinforcement technique 'hand-over-mouth' (HOM) the British Society of Paediatric Dentistry guideline on the use of physical intervention states that any physical intervention should only be used by properly trained personnel with consent and when all other options have been explored.⁽⁵⁶⁾ With this in mind the indications for this technique are extremely rare and as such it is not a recommended technique.

3.11 Empathy

The use of an empathetic approach has been shown to be more likely to result in treatment completion than other methods of verbal communication.⁽⁵⁷⁾

The technique is useful for all patients who can verbally communicate. There are no contraindications.

3.12 Coping strategies

Cognitively based coping strategies appear to be more efficacious in older children with younger children benefitting more so from coping strategies which offer emotional support. Older children show more coping behaviour when staff or parents

make coping promoting statements. Examples of these coping behaviours include relaxation and rationalisation.⁽⁵⁸⁾

The technique is useful for all patients who can verbally communicate. There are no contraindications.

3.13 Alternative methods

3.13.1 Magic trick

The use of a magic trick has been shown to be an effective alternative behavioural management strategy in strong-willed young children.⁽⁵⁹⁾

The technique is useful for all patients who can verbally communicate. There are no contraindications

3.13.2 Motivational interviewing

Motivational interviewing (MI) is a type of counselling which can be employed by individuals trained in this technique and within the behaviour science literature has been found to be especially effective at overcoming adolescent ambivalence to behaviour change.⁽⁶⁰⁾ The technique is useful for all patients who can verbally communicate. There are no contraindications but additional training is required.

3.13.3 Memory restructuring strategy

Memory restructuring is a technique which aims to help children develop positive memories of their dental treatment and as such may be effective in reducing fear and improving behaviour.⁽⁶¹⁾

The technique is useful for all patients who can verbally communicate. There are no contraindications but additional training is required.

3.13.4 Hypnosis

Hypnosis is an artificially induced altered state of consciousness in which the individual becomes more susceptible to suggestion. One study has reported that the use of hypnosis has a greater impact on younger children and was associated with less undesirable behaviour during the dental procedure.⁽⁶²⁾

The technique is useful for all patients who can verbally communicate. There are no contraindications. Dentists are advised to receive training in hypnosis prior to using this as a NPBMT.

3.13.5 Snoezelen environment

Snoezelen environment consists of a partially dimmed room with lighting effects, vibroacoustic stimuli and deep pressure. Shapiro et al. demonstrated that a snoezelen environment had a positive effect on children.⁽⁶³⁾

The technique is useful for all patients including those who cannot verbally communicate. There are no contraindications.

3.13.6 Child centred approach

A child centred approach involves all members of the dental team who interact with the child. This approach is employed from the moment the child enters the clinic e.g. play activities in the waiting room, to encouraging examination and treatment e.g. 'Simon says sit in the chair'. This technique helps to: establish rapport, build trust, shape the child's behaviour and provide initial examination.⁽⁶⁴⁾

The technique is useful for all patients who can verbally communicate. There are no contraindications

EXPLANATORY NOTES

2. Factors affecting child anxiety

2.1 Medical History

Studies from Scandinavian populations have shown that dental anxiety is directly related to some medical conditions such as history of recurrent ear infection^(65, 66) and asthma.⁽⁶⁶⁾ Specific questions about past medical experiences and how the child coped may identify children who may be more anxious than normal,⁽⁶⁻⁸⁾ with pain experienced during medical appointments, or at least the parents' beliefs about the pain experienced, having been found to correlate well with their children's behaviour in a dental setting.^(6, 7, 17) Fear of pain may be a major concern for the children themselves.⁽⁸⁾ Previous unpleasant medical experiences may significantly affect a child's subsequent ability to accept dentistry with children who have had positive medical experiences perhaps being less apprehensive in the dental surgery.⁽⁷⁾ A study with 18-year-old Norwegian adolescents has shown that dental anxiety is related to a phobia of blood, injury and injections.⁽⁶⁷⁾

2.2 Dental History

Parents of children who have experienced painful dental treatment with anxiety related behaviour believe this to be a significant conditioning factor to their child's dental fear.⁽⁶⁸⁾ Adolescents with a history of sedation and physical restraint for dental treatment in early childhood have been shown to have a higher level of dental anxiety as compared to adolescents without such a history.⁽⁶⁹⁾ Workers have reported that children with high dental fear had received more dental extractions than those with less dental fear.⁽⁷⁰⁾ Other workers report similar findings in 5 year-old children with children with histories of extraction and/or irregular, symptomatic attendance more likely to be anxious with respect to dental treatment than those with no history of extraction and/or regular attendance⁽⁷¹⁾.

2.3 Sociodemographic and cultural factors

A suburban Nigerian study reported that while age, gender and socio-economic status were not related to dental anxiety, the type of school that the child attended was, with children in public schools reporting greater dental anxiety.⁽¹⁴⁾

In contrast a study of children from Turkey found that while gender was not related to perceived dental anxiety, younger age and lower socio-economic status were.⁽¹⁵⁾

It has also been shown that many children and adolescents referred to behaviour management clinics in Sweden have a troubled life and family situation.⁽¹⁶⁾

2.4 Parental anxiety

The importance of maternal anxiety has been recognised for over 100 years⁽⁷²⁾
and the relationship between maternal anxiety and child behaviour is well documented.^(6-8, 73) *While a definite relationship between the child's behaviour and their anxiety as assessed by the mother has been shown at all ages*⁽⁸⁾ *the affect is greatest on children under four years of age.*^(6, 7)

Parents' predictions of the likely behaviour of their children have been shown to be accurate and in many cases this is based on previous medical and dental experience, child temperament and the dentist's behaviour.^(17, 67, 73) *Interestingly, some workers have shown them to be less accurate if their children had not previously seen a dentist.*^(6, 7) *Typically, the child reflects their parents own perceptions, experiences and anxieties. Thus, the children of anxious parents are more likely to exhibit anxiety themselves.*^(7,32) *In addition, parents' attempts to resolve their children's anxieties may actually make the situation worse.*⁽⁸⁾ *In other words, strategies which help the parents to cope will also assist the child.*

2.5 Parenting styles

Some authors state that parenting styles can influence child behaviour in the dental setting. In one study parents who gave in to their child and set few limits on their

behaviour were found to be significant predictors of disruptive behaviour.⁽²¹⁾ The ability of parents to form positive, consistent and nurturing interactions with their children have been found to be central to the ability of children to cope appropriately and contain their anxieties during dental treatment.⁽²²⁾ Conversely, other authors have found no support for the relationship between parenting styles of the primary care giver and child behaviour during dental treatment.⁽²³⁾

2.6 Parental presence

There are polarised views on whether a parent should be present when dental treatment occurs. Many dentists have firm views on whether a parent should be present when dental treatment is carried out with many practitioners preferring to work without parents present.^(28, 74) The major concern for dentists is the potential of the parent to disrupt treatment by inappropriate communication or by exhibiting anxiety themselves. The desire to exclude parents may also reflect the fact that many dentists are used to a one-to-one relationship with patients and find the three-way interaction threatening.^(5,75) Indeed, a relatively recent investigation of paediatric dentists in the UK found that more recently qualified dentists were less accepting of parental presence than those qualified for a significant period of time.⁽⁷⁶⁾ However, parents also have views and many prefer to be present during treatment, especially if their child is young or at an initial visit.^(28, 76) Most research in this area shows no significant differences in the behaviour of children with or without their parents present.^(4, 24, 27) In young children, however, separation anxiety is a normal developmental stage and so young children are best treated with a parent present.⁽²³⁾ Frankl, et al. found that children below the age of four years behave better with their mother present, however, parental presence or absence did not seem to significantly affect the behaviour of children older than four.⁽⁴⁾ A clinical study using one-way mirrors found that 4- to 8-year-olds exhibited more negative behaviours than 9- to 12-year-olds and that parental presence made no difference.⁽²⁴⁾ Interestingly, the same study noted that parents who observed via a one-way mirror were as satisfied as parents who were in the surgery for treatment. Kotsanos

et al. while using parental presence/absence as a behavioural management technique found no significant difference between study groups.⁽⁷⁷⁾ However, a randomised controlled trial of children aged 3- to 8-years old demonstrated that parental presence did affect the child's behaviour at an initial dental visit. The behaviour was better when the parent was excluded.⁽⁷⁸⁾

Based on the available literature it would appear that for young children parental presence is important, for older children parental presence appears not to have such a clear effect on child behaviour but may be important to the parent.

2.7 Child awareness of dental problem

Children who attend the dentist for the first time and who know they have a dental problem (whatever it may be) have a tendency to anxiety related behaviour at the first dental visit.^(6,7) Ashkenazi et al. demonstrated that children attending due to pain and/or dental cavities had higher fear reports than those attending for routine appointments.⁽⁷⁹⁾ Wright has suggested that transmission of maternal anxiety may be partially responsible.⁽²⁾

2.8 Behaviour of dental staff

Parents of anxious children have reported poor previous relationships with dental staff.⁽¹⁹⁾ Experience of the dental practitioner appears to play a role in child anxiety with those who are more experienced practitioners being more likely to reduce child anxiety than inexperienced practitioners.⁽⁸⁰⁾

2.9 Child's temperament

Arrrup et al. noted that it is important to consider children's temperament. Specifically, looking at reactivity (intensity and promptness of their reaction to different stimuli) and regulation (ability to regulate and control their responses) in the development of dental behavioural management problems. They found the dual impact of emotional dysregulation and emotional reactivity in children referred

because of dental behaviour management problems differed from children in ordinary care not only in dental fear levels but also in personal characteristics.⁽²⁹⁾

3. Recommendations for behaviour management techniques

3.1 Preparatory information

Since parental anxiety is closely associated with children's behaviour, strategies that aim to decrease parental anxiety may also improve children's behaviour. Helping the parent to understand what will happen allows them to prepare the child and improves the treatment alliance.⁽⁵⁾ Preparatory information sent prior to first appointments produced improved behaviour compared to children whose parents had not received information^(31,32) and mothers also reported that the information was helpful.⁽³²⁾ An unexpected benefit may also be a reduction in broken appointments.⁽⁸¹⁾ Other formats of preparatory information have also been shown to be effective, with the use of a preparatory computer package prior to dental general anaesthesia reducing anxiety and hence improving patient behaviour at induction compared to a control group.⁽⁸²⁾ In a smaller study, showing children and adolescents positive dental images versus neutral images prior to dental treatment also appears to result in a reduction in anticipatory dental anxiety. However, in this study anxiety reduction was comparable to the control group not the child's own baseline level.⁽⁸³⁾

3.2 Non-verbal communication

Non-verbal aspects of communication impact on the emotional quality of a relationship, for example indications of friendship seem to depend more on non-verbal than verbal behaviour.⁽⁸⁴⁾ Messages are conveyed by the environment as well as by individuals. Posters depicting the effect of disease aimed at adults may frighten children.⁽⁴¹⁾ The importance of non-verbal messages was confirmed by an observational study of 3- to 5-year-olds undergoing dental treatment which suggested that gentle patting of a fearful child may reduce the likelihood of such

behaviour continuing, while holding and restraining are more likely to increase such behaviour.⁽³³⁾

3.3 Voice control

McKnight et al⁽³⁵⁾ suggested that 98% of American dentists used voice control although parents may find the technique marginally acceptable.⁽³⁶⁾ The dentist's personality may also be important as some individuals will always be unhappy to raise their voices.⁽³⁷⁾ Parent/carers' acceptance of this technique is variable with one survey reporting this technique as unacceptable.⁽⁸⁵⁾ The authors of this study acknowledged, however, that these results may have been influenced by the aggressive tone of the operators on the videotape shown to the parent/carers. Conversely, a survey of 400 carers of children with cleft lip and/or palate reported that 96% felt the technique to be acceptable. These results are likely to have been influenced by the previous exposure of such children to paediatric dentistry as part of their multidisciplinary care.⁽⁸⁶⁾

Although the technique has been shown to be effective⁽³⁴⁾ it has been suggested that facial expression may also be an important component.⁽⁸⁷⁾

3.4 Tell-show-do

Tell-show-do is a technique using several concepts from learning theory first reported by Addelston.⁽⁸⁸⁾ It is widely used in children's dentistry^(35,36,89) and well accepted by parents.⁽⁹⁰⁾ The technique works well combined with behaviour shaping but there is little research relating to its use. Howitt & Stricker⁽⁹¹⁾ evaluated the approach concluding that it was useful in children with low anxiety levels but found no evidence to support its usefulness with very anxious children. More recently it has been shown to reduce anticipatory anxiety in new child patients. However, it was less useful in children with previous dental experience.⁽³⁸⁾ A recent randomised

controlled trial by Samara et al demonstrated a reduction in physiological signs of anxiety in children aged 6- to 15-years-old when tell-show-do was applied.⁽⁹²⁾

It is often not clear whether it is appropriate for the child to be shown the syringe prior to injection as it is perceived that this might increase anxiety. However, Maragakis has shown that showing or hiding the syringe in a randomised manner did not affect the behaviour of the paediatric patients in this study, demonstrating that the children who were co-operative when the needle was hidden were just as co-operative when it was shown; mother's fears and other fears correlated with the child's behaviour.⁽⁹³⁾ The Wand® has been found to be preferred by most children in comparison to plastic injectors, with metal injectors least preferred.⁽⁹⁴⁾

3.5 Enhancing control

Control in this sense does not imply the possibility of avoiding the situation but rather the possibility of influencing how it is experienced. Wardle⁽³⁹⁾ interviewed two groups of patients after treatment. The first group had been given a stop signal the second had not. Only 15% of patients using the stop signal reported any pain during treatment compared with 50% of the group without the signal.

It is important that a stop signal is not introduced too early in the fear hierarchy, as this may actually increase fear levels with the offering of a stop signal potentially implying that there is something to be concerned about. Thus for the 'normal' or moderately fearful patient this signal should be offered for restorations while for the terrified, particularly fear of choking, or the intensely distrustful it should be offered at the beginning of treatment.⁽⁹⁵⁾

A small cohort study investigated the use of a brief escape from dental treatment provided on a regular fixed time schedule, independent of child behaviour. The intervals were signalled by an electronic timer worn by the dentist. The study showed regular breaks from active treatment an effective means of reducing disruptive behaviour in young children undergoing restorative dental treatment.⁽⁹⁶⁾

3.6 Behaviour shaping and positive re-inforcement

Young children may be insecure when faced with a new situation, particularly in a strange environment such as a dental surgery. They do not necessarily know how to behave or what is required of them. The dental team therefore needs to guide the child towards a pattern of behaviour that allows dental treatment to be completed and with ideal behaviours positively reinforced/rewarded.

Reinforcers work best when applied directly after the appropriate behaviour.^(33, 97) In the surgery this means continuous praise at each stage from beginning to end. In contrast, behaviours which are not reinforced are less likely to occur again. Selective reinforcement of appropriate responses, and ignoring inappropriate responses, guides the child at their own pace towards ideal behaviour. Un-rewarded responses tend to be extinguished when appropriate behaviour is immediately reinforced.⁽³³⁾ A study of 300 children aged 8- to 10-years-old concluded that children who received prizes (stickers) regularly reported less dental fear. Of interest, receiving dental prizes irregularly correlated with increased dental fear more than not receiving prizes at all.⁽⁷⁹⁾

3.7 Modelling

This technique is useful where an appropriate model is available. Modelling effectiveness can be increased by using a coping model rather than a mastery model as coping models express their fears and difficulty with the situation rather than showing mastery over the situation.⁽⁹⁸⁾

Short, 12 minute, video presentations of treatment similar to that about to be undertaken have been shown to decrease disruptive behaviours compared to a control group.^(46,47) Videos used prior to restorative work have shown to greatly reduce disruptive behaviour in 5- to 9-year-olds with little dental experience.⁽⁴⁸⁾ A later study found that children viewing a film with a model reported fewer fears and showed less disruptive behaviour than children viewing films demonstrating equipment.⁽⁹⁹⁾ The same study found the best results where the model's age was close to that of the observer, the child was shown entering and leaving the surgery and was praised for their behaviour.⁽⁹⁹⁾ A school-based pilot study has shown that

viewing a video of a child receiving local anaesthetic versus a non-dental video reduced fear of needles.⁽¹⁰⁰⁾

Stokes and Kennedy⁽⁴⁵⁾ used live models to demonstrate behaviour to previously disruptive children. The patients arrived 15 minutes early and watched the 'model' children being praised and rewarded for good behaviour. Over four visits disruptive behaviour decreased by two thirds. Ghose et al⁽⁴⁴⁾ used an older sibling to model for a younger child. Interestingly the effects were positive for 4-year-olds but not 3- or 5-year-olds.

While the benefits of modelling are demonstrated in the literature and reported in many standard texts on behaviour management, studies suggest that it is not widely used by practitioners, for example, a study of 267 Australian dentists found 85% never used modelling.⁽¹⁰¹⁾

3.8 Distraction

Playing tapes have been shown to help anxious adult patients,^(102,103) but its usefulness in children is not as clear.⁽¹⁰⁴⁾ Ingersoll et al⁽⁴⁹⁾ found that if cartoon tapes were played continuously during treatment disruptive behaviour was the same as in the control group with no distracter. However, one group was told that if they were uncooperative the tape would be switched off and disruptive behaviour almost halved. This finding supports work that suggests negative reinforcement decreases disruptive behaviour.⁽³³⁾ Distraction using audio taped stories has been found to be even more effective as children closed their eyes to concentrate excluding both the sights and sounds of treatment.⁽⁵⁴⁾ Studies using both music and virtual reality have shown this behavioural technique to be ineffective for younger children although 90% of children in the music distraction group stated they enjoyed the music and would like to listen to it at their next visit.^(50,51) In contrast, a systematic review in older children documented music as an effective technique in reducing pain and anxiety in children undergoing medical and dental procedures.⁽⁵²⁾ Prabhakar et al. have demonstrated that in anxious patients aged 4- to 8-years-old audiovisual distraction techniques may be effective in their management, as compared to audio distraction

and the normal dental set-up.⁽⁵³⁾ The use of a manual stimulation distraction device has also been found to reduce stress and pain during local anaesthetic administration.⁽¹⁰⁵⁾ The literature would suggest that distracters may be effective if there is an incentive, but that the type of distracter is also important.

3.9 Systematic desensitisation

Systematic desensitisation uses two elements, firstly gradual exposure to the fear-inducing stimulus and secondly the induction of a state incompatible with anxiety. It is based on the understanding that relaxation and anxiety cannot exist at the same time in an individual.⁽¹⁰⁶⁾ The relaxation phase is critical and may take several visits to achieve.⁽¹⁰⁷⁾ The best known method of relaxation is based on progressive muscle relaxation, usually starting with the feet and working up the body, coupled with slow controlled breathing.⁽¹⁰⁴⁾ For true phobias several relaxation sessions with a psychologist or dentist who has received training in relaxation or hypnosis techniques may be required.⁽³⁾ Indeed one reported case required nine hour-long sessions with a therapist.⁽⁵⁵⁾ However, a similar approach can be used for children who have had a negative experience in the past.⁽⁸⁹⁾ Older children also benefit from graded exposure by commencing with simple to increasingly difficult procedures.⁽¹⁰⁸⁾

3.10 Negative re-inforcement

Hand over mouth (HOM) is perhaps the most controversial of all behaviour management techniques used by dentists.⁽³⁷⁾ There are individuals who believe it to be effective and kind^(109,110) and others who condemn it.⁽¹¹¹⁾ HOM is used by North American paediatric dentists^(7,112,113) although 74% of dentists in an Australian study reported the technique to be unacceptable.⁽¹⁰¹⁾ One American study has also found the technique to be unacceptable to the majority of parents.⁽⁹⁰⁾ Concern also exists regarding the legality of HOM,⁽¹¹³⁾ which has not been tested in Europe or North America.⁽⁹⁰⁾ In a questionnaire to evaluate parental attitudes to behaviour

management techniques, HOM was the only technique that was found to be unacceptable.⁽¹¹⁴⁾ Additionally, Crossley and Joshi found by questionnaire that only 3% of dentists were comfortable with using HOM.⁽¹¹⁵⁾ HOM is no longer recommended for use by paediatric dentists in the 2008 AAPD guideline⁽¹¹⁶⁾ with other workers also having branded its use as non-justifiable.⁽¹¹⁷⁾

3.11 Empathy

A cross-sectional survey revealed that the empathetic approach showed the most significant correlation with cooperation, treatment success and the child's mood compared with other approaches e.g. permissive.⁽⁵⁷⁾ This technique is good for establishing rapport with the child being helped to feel that, as an individual, he or she has been acknowledged with the use of open, personal questions bringing about a trustful relationship.

3.12 Coping strategies

One study has reported that cognitively based strategies were the most frequently used coping strategies and those reported to have the greatest efficacy in 8- to 13-year-old children. Younger children tended to use more behavioural coping strategies that offered emotional support. The more dentally anxious children who had had a higher frequency of previous painful dental experiences had a greater propensity for using behavioural (destructive) coping strategies.⁽⁵⁸⁾

3.13 Other methods

3.13.1 Magic Tricks

A randomised controlled trial demonstrated that the use of a magic trick behavioural strategy for the management of strong-willed 3- to 6-year-old children was an effective alternative behavioural management strategy.⁽⁵⁹⁾ The time taken to sit on

the dental chair was significantly quicker for those shown a magic trick and radiographs were taken in 91% of those shown a magic trick compared with 54% of those not shown a magic trick.

3.13.2. Motivational Interviewing

MI is a type of counselling intended to deal with an individual's resistance to behaviour change and is essentially a combination of cognitive and behavioural techniques. It uses the stages of change theory in which patient's ambivalence, the pros and cons associated with the decision to change, are assessed. MI provides empirically based strategies to move patients from ambivalence to change. It also provides personalised feedback, and is especially effective at overcoming adolescent ambivalence to behaviour change. The use of the MI technique within paediatric dentistry has been published in only one pilot-study with a sample of fifty 18-year-olds who had missed one or more dental appointments in the previous four years. The key investigator of this study had received training in brief MI techniques.
(60)

3.13.3 Memory restructuring strategy

A randomised cross over trial in forty-five children aged 6- to 9-years-old found that those in the intervention group remembered fear and pain as less than reported previously when compared with controls fear. Behaviour subsequent to memory restructure was better at the second visit than that in the control group.⁽⁶¹⁾

3.13.4 Hypnosis

In a review paper with results extrapolated, a randomised cross-over trial of twenty nine children aged 4- to 13-years-old was undertaken (over two restorative appointments), with study children given hypnotic instruction and control children not given hypnotic instruction. Significant differences were detected in child pulse rates compared to baseline, with 4 beats/min for hypnotised children and 10 beats/min for children without hypnosis. This study concluded that hypnosis had a greater impact

on younger children and was associated with fewer undesirable behaviours during dental procedures.⁽⁶²⁾

3.13.5 Snoezelen environment

A random cross-over intervention pilot study of children aged 6- to 11-years-old demonstrated, by means of behavioural and physiological parameters, that the SDE had a positive effect on children.⁽⁶³⁾

Acknowledgement

We would like to thank Dr Helen Marlborough, retired Senior Assistant Librarian, Glasgow University Library for her help with the search strategy.

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Table 1 Summary of evidence base regarding factors affecting child dental anxiety aetiology

	Factor	Evidence Level & Paper Numbers				Grade of Evidence Summary	Strength of Recommendation
		1	2	3	4		
2.1	Previous medical history	1	2	3	4	2	B
			7				
2.2	Previous dental history	1	2	3	4	2	B
			8		1		
2.3	Social factors	1	2	3	4	2	B
			3				
2.4	Parental anxiety	1	2	3	4	1	A
		1	10		1		
2.5	Parenting Styles	1	2	3	4	2	B
			2		1		
2.6	Parental Presence	1	2	3	4	1	A
		3	7		2		
2.7	Child awareness of dental problem	1	2	3	4	2	B
			3		1		
2.8	Behaviour of Dental Staff	1	2	3	4	2	B
			2				
2.9	Child Temperament	1	2	3	4	2	B
			1				

Table 2 Summary of evidence-based clinical recommendations regarding - Non Pharmacological Behaviour Management Techniques

	Management Technique	Evidence level & Paper Numbers				Grade of Evidence Summary	Strength of Recommendation
		1	2	3	4		
3.1	Preparatory Information (1-X 1)	1	2	3	4	1	A
		4	2		1		
3.2	Non-verbal Communication	1	2	3	4	2	B
			1		2		
3.3	Voice Control (2- X 2)	1	2	3	4	2	B
			3		3		
3.4	Tell-Show-Do (1- X 2) (2- X1)	1	2	3	4	1	A
		5	1				
3.5	Enhancing Control	1	2	3	4	2	B
			1		1		
3.6	Behaviour Shaping & Positive re- inforcement	1	2	3	4	1	A
		1	2		4		
3.7	Modelling (1- X 3) (2- X 2)	1	2	3	4	1	A
		5	2	2			
3.8	Distraction (1- X 4)	1	2	3	4	1	A
		7	1	1	2		
3.9	Systematic Desensitisation	1	2	3	4	1	A
		1		1	2		
3.10	Negative Reinforcement	1	2	3	4	1	A
		1	2	2	8		
3.11	Empathy	1	2	3	4	2	B
			1				
3.12	Coping Strategies	1	2	3	4	2	B
			1				
3.13	Alternative methods	1	2	3	4	1	A
		5			1		

Table 3: "Childrenese" terms for dental equipment:

Mr Tickle/Rumble or tooth tickler	slow handpiece
whizzy brush or Mr Whistle or tooth shower	airotor
magic wind	triplespray/inhalation sedation
jungle juice or sleepy juice	local anaesthetic
spray your teeth off to sleep	giving a local anaesthetic
rubber raincoat	rubber dam
clip / button /sparkly ring	rubber dam clamp
tooth paint	fissure sealant
hoover / thirsty straw	suction
silver star	amalgam
princess crown or soldier's helmet	stainless steel crown
white tooth elastoplast or magic white cream	composite
superhero toothpaste	fluoride varnish

Based on Fayle *et al.* 1997⁽⁸⁹⁾

Table 4: **Systematic desensitisation hierarchy for phobia related to dental local analgesic injections.**

1. Instructions on muscle relaxation and or relaxation breathing
2. Explanation of components of local anaesthetic equipment
3. Look at an assembled dental syringe
4. Explanation and demonstration of effect of topical anaesthetic
5. Information and facts about local anaesthetic administration
6. Hold an assembled dental syringe on the palm of the patient's hand
7. Hold an assembled dental syringe by the patient's face
8. Hold an assembled dental syringe inside the patient's mouth
9. Hold an assembled dental syringe (needle guard removed) on the palm of the hand
10. Hold a syringe (guard removed) by the side of the face
11. Hold the syringe inside the mouth (guard removed)
12. Replace the guard and hold the end of the syringe against the mucosa overlying the injection site
13. Press the syringe (guard in place) over the injection site
14. Place topical anaesthetic
15. Remove the guard and hold the syringe inside the mouth
16. Place the needle in contact with the mucosa over the injection site.
17. Place the needle in contact with the mucosa and insert some pressure
18. Hold the needle in contact with the mucosa and inserting enough pressure for the needle to penetrate the mucosa
19. As in 14, but deliver a minute amount of local analgesic solution
20. As in 14 but deliver a normal amount of local analgesic solution

Levitt *et al.* 2000⁽⁵⁵⁾