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Conscious sedation- the only tool in the box?

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Introduction

In 1990, the Standing Dental Advisory Committee published its influential report, known as the Poswillo Report, on General Anaesthesia, Sedation and Resuscitation in Dentistry, to reduce the risk of fatalities and adverse events within primary care facilities (Poswillo, 1990). The report's recommendations, and subsequently published guidelines (General Dental Council, 1998), aimed at placing general anaesthesia (GA) for dental procedures within a safer framework. In consequence, the treatment option of choice for dental anxiety and phobia that did not respond to basic behavioural management techniques, is conscious sedation. This paper looks at some underlying assumptions made about the management of dental phobia and the ramifications of this modality as being the preferred method employed with anxious patients.

The prevalence of dental anxiety

Dental anxiety is a common problem. The Adult Dental Health Survey: Oral Health in the United Kingdom 1998, showed that 55% of dentate women and 43% of dentate men reported always feeling anxious about going to the dentist (Kelly *et al*., 2000). Furthermore, 10% of people avoid dental treatment due to anxiety or fear (Todd and Lader, 1991).

Severe dental anxiety is categorised as a specific (isolated) phobia of the Blood-Injection-Injury or Situational Type (American Psychiatric Association, 1994; World Health Authority, 2007). It is a marked and persistent fear, recognised by the patient as excessive or unreasonable, cued by the presence or anticipation of a specific object or situation. Though the triggering situation is discrete, exposure to the stimulus provokes an anxiety response, and it is avoided or endured only with immense anxiety or distress. The anticipation, avoidance, or distress interferes with the patient's normal routines, occupational functioning, social activities or relationships (American Psychiatric Association, 1994).

The benefits of conscious sedation

The treatment option of choice for patients with severe dental anxiety and phobia that do not respond to basic behavioural management techniques is most often conscious sedation. Conscious sedation, as employed in the United Kingdom, is defined as

'A technique in which the use of a drug or drugs produces a state of depression of the central nervous system enabling treatment to be carried out, but during which verbal contact with the patient is maintained throughout the period of sedation. The drugs and techniques used to provide conscious sedation for dental treatment should carry a margin of safety wide enough to render loss of consciousness unlikely. (Department of Health, 2003)'.

Conscious sedation is an excellent treatment modality for the dentally anxious patient. The delivery of pharmacological agents that can remove anxiety and create dissociation during treatment facilitates delivery of improved oral health to a significant portion of the population. Conscious sedation has many benefits over GA: ASA I & II patients can be treated in primary care settings; once the operator is appropriately trained it is simple to use; it is a safe procedure; it has a high success rate. Organisations such as the Society for the Advancement of Anaesthesia in Dentistry (SAAD), the UK Association of Dental Anaesthetists (ADA), and the UK Dental Sedation Teachers Group (DSTG), by training undergraduates and postgraduates, are promoting a treatment option that a greater number of general dental practitioners ideally will make available to their patients. The most basic techniques used for conscious sedation are inhalation sedation with nitrous oxide and oxygen gases, and intravenous sedation with the benzodiazepine midazolam (Dental Sedation Teachers Group, 2005; Department of Health, 2003).

Universal training and competence in sedation could be equated, as a technique in its simplicity and availability, to that of local anaesthesia. This would allow conscious sedation to be available to all who require it, provided by all dentists, as a routine adjunct for pain and anxiety management, moving it out of the specialist realm, and into general practice as part of the duty of care to provide anxiety and pain control.

The limits of conscious sedation

If the provision of sedation were compared to local anaesthesia this would imply frequent use. Indeed, practitioners are recommended by the DSTG to undertake 100 cases of sedation per annum to maintain competence (Dental

Sedation Teachers Group, 2005). However one limit of treatment under sedation is an unwillingness of practitioners to provide this service. In Scotland, less than half of general dental practitioners, without a secondary referral service available, provided conscious sedation for anxious patients (Foley, 2002). In secondary care provision, although Consultants in Restorative Dentistry recognise the need for conscious sedation, only one third of those who responded to a survey provided conscious sedation themselves (Morgan and Skelly, 2005). As a self-selecting group, the respondents to such a questionnaire are more likely to be the more motivated individuals. This highlights one side of a debate about conscious sedation, that there is a genuine need to encourage further awareness, training, and motivation within the dental profession to provide conscious sedation. Treatment need is currently addressed by a minority of practitioners. Consequently, it also means that there is a responsibility on those currently offering sedation to provide cost-effective treatment and focus limited resources appropriately.

Whilst conscious sedation is a safe alternative modality to general anaesthesia, which maintains the patient in a conscious state, a limitation of conscious sedation is its failure to address one of the underlying philosophies of GA: the idea of removing all of a patient's unpleasant experience rather than just the truly intolerable. As there is a loss of consciousness with general anaesthesia, all the patient's awareness of treatment, and therefore anxiety, is removed. Conscious sedation may also remove anxiety rather than reducing it to an acceptable level sufficient to allow treatment, and the learning process of graded exposure is not achieved.

Related to this, it is debatable whether conscious sedation falls into the same trap as general anaesthesia, of only treating the symptoms of fear and not treating the cause. Although patients are conscious throughout their dental treatment, it is questionable whether they are learning to cope better with the stress that they feel. Patients may still be being provided with just another 'quick fix'. Conscious sedation treatment may provide a short term solution to their anxiety, allowing improvement to their immediate dental health without tackling the aetiology of their feelings towards dental treatment. This approach to anxiety management reflects the shortcomings of the mechanistic medical model: offering a 'magic pill' as the solution to every problem which according to Midgley (2004) : "l*eads many enquirers to propose biochemical solutions to today's social and psychological problems… rather than asking what made them unhappy in the first place*" .

Memory and attitude change

Whilst nitrous oxide and midazolam create dissociation from the reality of treatment, an additional component in intravenous sedation with midazolam is the anterograde amnesia produced. If patients have no memory of a positive experience, they may be unable to learn anything different from their pre-treatment expectations. Indeed, having no memory of the actual treatment may cause them to recall solely the anticipatory fear when evaluating their experience of dentistry. Healthcare professionals are motivated to believe that they encourage patients to become healthier both through direct intervention, and additionally through education and encouragement of patients to take responsibility for their own health. This model presupposes that the patient is constantly learning ways of exercising this responsibility. However, with conscious sedation, it can be argued that what is being provided is a 'short-cut' to health, rather than an encouragement along the long and sometimes difficult path of learning that previously unpleasant experiences can be made acceptable.

The 'Elaboration Likelihood Model' (ELM) of attitude change (*Figure 1*) (Petty *et al*., 1981) states that under the influence of persuasive communication, for example, a patient being told by their dentist that the treatment they require will not be painful or frightening, a person makes an unconscious choice about how this persuasion will be processed. This may be to use the 'central route' where the person assesses the rational quality of the argument, 'Yes, I see that the way you have described the treatment is not a threat to me'. Alternatively a person may use the peripheral route of processing the argument based on the consequences and persuasive cues present: 'Yes, I accept what you are saying because you are the expert, and we are in a setting in which I feel less in control than I usually do'. The ELM model further explains that the type of attitude shift in the first instance will be more 'robust', lasting longer, less likely to change over time, and more likely to lead to predictable behaviours; 'Since the treatment last time was not threatening, I will consult my dentist sooner when I become aware of a problem'. The ELM therefore would indicate that conscious sedation is less likely to create the desired central attitude shift, and is more likely merely to perpetuate a cycle of temporary, peripheral attitude shift, followed by a return to the 'normal' beliefs and attitudes. There are no positive previous experiences upon which to build the motivation to process the persuasion through the central route, because the sedation places the patient in a passive, non-learning state.

Memory theory also suggests that psychological and physiological states represent strong cues for the retrieval of memory. We remember those things that occurred when we were in a similar state much more readily than those memories from another state. Psychopharmacological studies on alcohol and marijuana, have shown that memory loss is greater for subjects going from an affected to a 'normal' state compared with those going from a 'normal' to an affected state (Darley, 1973; Goodwin, 1969). By implication, this means that patients will remember more

acutely the feeling they had when going from a normal to sedated state ('I was nervous until the sedative began to work') than the feelings they had as they returned from a sedated to normal state ('As the sedative wore off I realised the treatment had not been as bad as I feared'). For long-term loss of phobia or fear, it is necessary for the patient to remember the second, relieved set of feelings just as clearly. Sedation with midazolam then, seems to be counter-intuitive in the necessary process of patients 'unlearning' their fear.

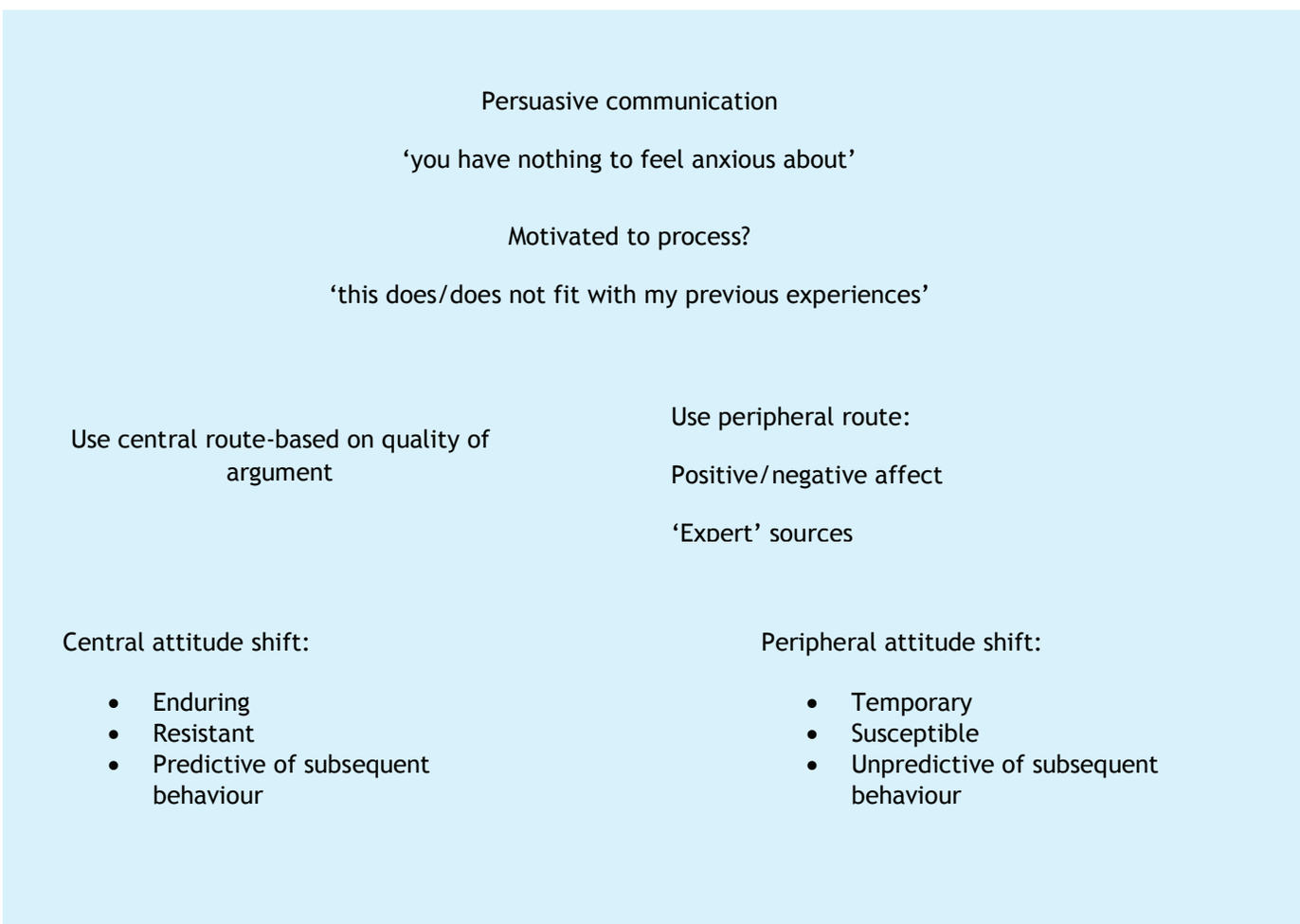
Passivity and learning

Seligman and Maier discovered that when individuals are passive or unable to be active, and have no control over circumstances, this can produce a state of 'learned helplessness' (Seligman and Maier, 1967). This is multiply resistant to relearning, even when noxious stimuli have long since ceased. Overcoming learned helplessness requires experience of agency, but the motivation to experience this will probably need to come from the inducement, encouragement, and goading by another individual. This demonstrates a further drawback in the use of conscious sedation. Both the noxious stimuli and the passivity need to cease, and this over multiple occasions, for fear to be truly 'unlearnt'. Conscious sedation can be demonstrated to remove anxiety, but is a much more mentally passive experience than receiving treatment under local anaesthesia only.

Is conscious sedation always necessary?

By their nature, dental procedures can be psychologically as well as physically traumatic for patients. Surgical dental procedures, whether removal of lower third molars, apicectomies or gingival surgery all have the potential to invoke distress in patients. Some patients may require one-off sedation to allow them to cope with this kind of unpleasant treatment. A good example of this would be patients who are normally comfortable with restorative treatment, but need some help to cope with surgical removal of mandibular wisdom teeth. In this situation a course of treatment

FIGURE 1
THE 'ELABORATION LIKELIHOOD MODEL' OF ATTITUDE CHANGE
(Adapted from (Bennett 2000)



performed whilst the patient is unaware, unconcerned, and unable to remember afterwards, will prevent them from developing a fear of dental procedures.

However, not all patients routinely require sedation even when these procedures are performed. Many patients have coping mechanisms that allow them to have this treatment. A briefing paper published by the British Psychological Society (BPS) points out that although about 30% of the adult population would prefer treatment to be carried out in an unconscious or dissociated state, often sedation or GA is not necessary as the amount of true distress is less than that anticipated (British Psychological Society, 1996). A study of secondary care referrals in Scotland showed that of 115 referrals in a 16 month period only two requested non-pharmacological treatment. On review of treatment received, approximately 29% of patients were managed without pharmacological interventions (McGoldrick *et al*., 2001).

The long-term effects of conscious sedation

The short term use of conscious sedation is useful in managing acute problems without creating significant effects. The long term use of conscious sedation may have significant effects for both the patient and the service provider.

Dependency

Many patients feel they require sedation for ongoing treatment. A good example of this would be the patient who attends for restorative treatment over many visits, numerous treatment plans, and years, who needs sedation during this continuing care. These patients may end up 'institutionalised', conceptualising themselves as a 'sedation patient'. Ideally, dental practitioners would, over courses of treatment, hope to 'wean' patients off sedation until finally patients can attend without the need for such an adjunct. The treatment of dental anxiety with conscious sedation, whilst providing a context to start desensitisation and acclimatisation, runs the risk of developing dependency. If patients are not consciously acclimatised through subsequent treatment plans, they may end up 'stuck' on an unnecessary treadmill of treatment, using conscious sedation as an adjunct.

Resource management

In general, patients are keeping their teeth for longer (Kelly *et al*., 2000). As 'sedation patients' get older, dentists may end up with lists of patients who are unfit for sedation due to complicated medical conditions and poly-pharmacy, but who still require dental treatment and who are still dentally phobic. In addition, as the population grows, the number of phobic patients attending may also proportionally increase, and providers of sedation services run the risk of becoming inundated with increasing demand and unmatched resources. There needs to be a strategy to reduce the number of patients relying on conscious sedation, as well as increasing access to dental care services.

Research carried out on patients requiring continuing care for restorative procedures under sedation, compared the effects of sedation as against psychological intervention (Jöhren *et al*., 2000). It appeared that patients treated with the benzodiazepine midazolam did not show long term improvement in their attitude to dental treatment or a reduction in their need for subsequent sedation. Conversely, patients receiving psychological intervention showed improvement in their management of their fear, and 70% subsequently continued with dental treatment without sedation. In other words, whilst the sedation helped the patients short-term oral health, it did not help their holistic health nor removed their fear of dentistry.

A meta-analysis of studies supporting this evidence showed that, on average, 77% of patients with high dental fear who underwent some form of psychological or behavioural intervention (to be differentiated from behavioural management) continued in dental care more than four years later (Kvale *et al*., 2004).

Interventions are best if matched to the needs of the patient. Whilst 'procedural information' has been found to be of significant use in diminishing fear and aiding recovery in a general population, this is not the case for those who are particularly anxious. Patients with high anxiety scores respond better to unstructured interventions involving the exploration of their feelings and to practising coping strategies. The procedural information, so useful in reducing stress about treatment in a 'normal' group, is ineffective with this particular group of patients (Hathaway, 1986).

Clearly these studies show there is no 'one size fits all' approach with psychological intervention. On average, 23% of patients receiving behavioural interventions did not show long term change and for a significant percentage of patients pharmacological help was required for treatment. However, for many of the patients, an approach purely using pharmacological interventions such as midazolam would have been unnecessary. This clearly has ethical as well as financial implications. It could be argued that had psychological treatment been attempted, not only would unnecessary treatment have been avoided, but the long-term cost of sedation would be reduced for those patients. This could enable a sedation department to see more patients, improving access for others on the waiting list, and of improving oral health for a greater number of patients.

Educating new dentists

During dental education, part of the development of competency in clinicians is the transformation of outlook. When learning new skills, for example cutting cavities, it is easy for students to become over-focussed on the task in hand, rather than treating the patient as a whole. Over their course, students change from a simple atomistic view of technical problems needing solutions, towards holistic management of the patient, appreciating the interconnectedness of treatment modalities, medical health, personal motivation and social factors. The management of dental fear is more complex than the treatment of caries, as it involves the human psyche rather than the mechanical manipulation of teeth. It may be that this development of a holistic view is aborted prematurely within conscious sedation settings, as clinicians focus on the understandable, the relatively simple technical solutions of pharmacological management, rather than developing the skills to manage the more demanding psychological interactions. In a survey of anxiety management teaching in the UK, only five dental schools mentioned any teaching of psychological treatment (Bell, 2006). Given the efficacy of this intervention, it is surprising that it is not a more substantial part of the undergraduate curriculum. The General Dental Council document 'The First Five Years' states that: "…students should be able to assess the suitability of the various methods of managing and controlling anxiety" and be able to "advise patients on the advantages, limitations and advisability of different forms of pain and anxiety control appropriate to treatment" (General Dental Council, 2002).

If graduates were more skilled at anxiety management then the number of patients requiring sedation might be less, reducing the demand on the current services. Individuals might also feel more comfortable using these skills rather than sedation skills both in terms of competency but also the financial costs involved in the setting up of sedation services.

It would be impractical for all dentists to be professionally trained in the psychological management of dental fear. An alternative would be for primary care trusts and local health boards to have referral centres and clinics for the psychological management of severe dental phobia and anxiety. The British Psychological Society estimates that for each 1,000 of the population, about 700 hours per annum of a clinical psychologist's time would be required to advise on and treat dental phobia (British Psychological Society, 1996). By employing a clinical psychologist, the costs of sedation and general anaesthesia would be reduced to the Trust, and in the long-term, patients would benefit. If this reduced the costs for NHS Trusts in the short-term then this would be even more beneficial.

Dentistry is a practical profession. The vast majority of treatment involves determination and solution of problems followed by correction of any identified pathological process. By applying that approach to patients, clinicians risk over-simplifying the cause of their patients' phobias to try and understand them. One generally held view is that dental fear is due to traumatic treatment in the past. It may be anticipated that a patient with previous traumatic treatment as a cause of their fear would be straightforward to treat through gradual re-education and 'graded exposure' therapy. However, if there has been a history of abuse, some patients may have problems with various aspects of dentistry, including the feeling of losing control, which may be exacerbated by conscious sedation (Howes, 2006). These patients may not be treatable with pharmacological dissociation approach. What such patients may require is careful exploration of their past by appropriately trained professional counsellors, and a context in which to work through the effects of the past in order to develop a new approach to what is happening in the dental surgery.

The limits of behavioural intervention

Not every patient successfully completes treatment with behavioural modification. Qualitative research of dentally phobic patients has shown ambivalence in coping with dental fear (Abrahamsson *et al*., 2002). This ambivalence is between avoiding treatment and readiness to act. It would be reasonable to expect this ambivalence to apply to engaging in psychological and behavioural modification of anxiety. In addition to this, other factors have been shown to correlate with failure in therapy for dental fear. Studies have shown that some scales have a statistically significant predictive value for success at psychological intervention (Eli *et al*., 2004; Kleinhauz *et al*., 1992). If a patient is unlikely to benefit from psychological intervention, then pharmacological treatment, whilst not ideal, will enable treatment of oral disease. "*Prolonged fruitless attempts at behavioural modification postpone treatment and further contribute to the deterioration of the patient's oral health*" (Eli *et al*., 2004).

The future

It is easy for the two approaches described for treating patient fear, pharmacological sedation and psychological interventions, to be thought of unconsciously in a kind of dualism. Clinicians may be aware that there are some psychological treatments available from other sources but conceptualise themselves as a 'sedation dentist'. Similarly, a reactive stance against conscious sedation could narrow down interventions to purely the psychological. Treatment for dental fear should not be 'either/or' but both. A complete range of treatment options needs to be

available for patients so that they have the opportunity to take a proactive role in their healthcare.

A more rounded approach to anxiety management needs to be developed in the future. An increased awareness of the individual efficacy and actions of pharmacological and psychological interventions, and understanding of the interaction between the two approaches needs to be developed (Scottish Dental Clinical Effectiveness Programme, 2006). This would build upon the strengths of each approach to provide tailored treatment for patients that reflect this synthesis. Clinicians need to have several different approaches in their 'toolkit'.

Advances in the field of conscious sedation include the development of the use of low doses of the anaesthetic agent propofol (2,6-diisopropylphenol) (Chapman *et al*., 2006; Leitch *et al*., 2003; Leitch *et al*., 2004). This sedative has been reported as having a less amnesiac effect than midazolam (Leitch *et al*., 2004). There is mixed evidence to support these (Veselis *et al*., 2004), but if patients can remember their treatment without anxiety this may help in the long-term deconstruction of their fear. Due to the narrow safety margin of propofol and the complexity of its use continuous infusion sedation with propofol is considered an advanced technique (Dental Sedation Teachers Group, 2005).

In the psychological field, there are several approaches available that have shown efficacy. These include:

- Graded exposure

This approach combines two principles. The first is the gradual exposure to fear-inducing stimuli, increasing in intensity at each step. The other is the principle that the arousal will decrease over time. If this occurs in the presence of the stimuli, rather than on its withdrawal, then future anxiety associated with the stimuli will be decreased.

- Clinical hypnosis

This approach allows suggestion, and reframing of perspective, whilst the patient is in a dissociated state. It often ties in or 'anchors' conflicting feelings with the fear-inducing stimuli to separate the stimuli from the feeling of anxiety. It may allow patients to go through graded exposure in their imagination rather than reality. Although this method as previously mentioned has the potential to affect memory it allows reframing of experiences at a deep level.

- Cognitive behavioural therapy

This approach and allied therapies seek to affect the Feeling-Thought-Action interaction. Through a cognitive approach challenging 'negative automatic thoughts' it changes the subsequent feeling and thereby the resultant actions. This critical thinking seeks to reframe experiences to diminish and normalise the feelings previously associated with them.

Recent proposals for higher degrees may provide a model for holding the two approaches to anxiety management in balance, teaching clinicians to assess patients fully and to formulate plans to manage their dental anxiety in terms of psychological models and approaches. Interventions are then adapted to the needs of the patient. This may mean straightforward behavioural management, hypnosis, cognitive behavioural therapeutic techniques, or conscious sedation.

Underlying principles for both pharmacological and psychological interventions

Whilst meeting the objective of removing dental anxiety via different routes, both conscious sedation and behavioural interventions should share some key principles. Possible principles could be:

- Clearly defined and evaluated patient populations

Treatment that is aimed at managing dental anxiety must only be for those individuals who meet specific criteria. It is important that valid and reliable measures such as structured clinical interviews or the Modified Dental Anxiety Scale (Humphris et al., 1995) are used routinely in diagnosing individuals who will be included in any treatment programme, and used periodically to check on progress/efficacy.

- Adequate training

As well as using very good assessment measures, it is imperative that the dentists who are using all types of treatment are appropriately trained.

- Reproducible, specific treatment protocols

Detailed treatment manuals help to ensure consistent treatment delivery across patients by the same dentist, and from different dentists. They allow the treatment regime to be employed in a day-to-day healthcare setting.

- Informed negotiated treatment assignment

Since it has been previously demonstrated that passivity in the process of receiving treatment prevents learning, it would appear to be most efficacious to allow the patient to be not only informed about all the treatment options for dental anxiety that are available, but also encouraged to take an active part in choosing when to change the approach. Clinicians should also be active in gently challenging patients to move beyond their 'comfort zone'.

- Treatment adherence

Practitioners and patients both need to be committed to the treatment type on offer. If a clinician does not fully

subscribe to the underlying philosophy of a treatment modality it will affect both they way they offer and deliver the service. Patients who are not committed to a treatment modality will probably not show any long-term benefit from it. Flexibility in treatment decisions may also fail to clearly communicate boundaries.

- Clinical evaluation of effectiveness and audit of procedures

A process for each dental practice and hospital department to regularly review the treatment available for anxious patients will help to ensure quality and evaluate the comparative effects of different treatment types. This will give providers information for resource management and clinical governance. If treatment delivery follows a universal protocol, large amounts of long-term data could be collected for efficacy studies as well as clinical audit.

The only tool in the box?

The availability of conscious sedation is beneficial for a number of dental patients, enabling treatment that could not otherwise be tolerated. However, unless treatment centres specialise in anxious patients, conscious sedation is not likely to be a frequently offered intervention. In addition, relying on sedation provision alone may not be achieving the long-term outcome that clinicians desire and may be providing a short-term solution to a long-term problem. It does not guarantee that patients will develop reduced anxiety, as it affects memory and learning. Not all patients who express a desire for sedation require it, therefore as well as encouragement and training in conscious sedation the dental profession needs to see holistic training in anxiety management as a key objective. A balanced approach, with development of psychological as well as pharmacological knowledge will enable better diagnosis and appropriate treatment. To achieve this clinicians will benefit from increased training in psychological treatment both at undergraduate and postgraduate level to enable them to treat patients on an individual basis and to make appropriate informed referrals. Secondary and tertiary care centres should offer this dual approach to referred patients and Primary Care Trusts should consider a long-term strategy of employing clinical psychologists to work with dentally phobic patients to enable them to receive standard treatment in primary care settings without sedation.

A builder's toolbox contains all the equipment needed for the task. The builder can adapt to each job and problem in the appropriate way. Whilst some tools have more than one use or can be adapted, a variety of tools give a degree of ease and sophistication to the job. Hitting a screw into a piece of wood with a hammer, whilst eventually achieving some sort of outcome will not bring about the long term goal in the easiest, most effective, or desired way.

It may be true that conscious sedation is sometimes the only tool appropriate for treating the anxious patient. However, it may just be that sedation is the only tool we own or will consider owning. This article does not distract from either the unmet need of anxious patients, or the ability of conscious sedation to make treatment acceptable for them. If more practitioners explicitly offered appropriate anxiety management options for patients then maybe more patients would find it possible to attend for treatment. However, the key words are 'appropriate' and 'options'. Each of our patients will have different needs and problems and these will change on an appointment by appointment basis. We should adapt by having a range of tools appropriate to meeting those needs. When all you have in your toolbox is a hammer though, the whole world is a nail.

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