

# Minimum intervention oral healthcare for people with dental phobia: a patient management pathway

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## Key points

People with dental phobia often present with a poorer oral health status which compromises their oral health-related quality of life.

An outline of the application of the minimum intervention oral healthcare (MIOC) framework for patients with dental phobia is described, which has the potential to be particularly beneficial for the oral healthcare of this group of patients.

An assessment tool is presented which provides an overview of important points for a practitioner to consider when assessing patients with dental phobia using MIOC.

## Abstract

Dental phobia is relatively common among adults and often associated with poorer oral health as a consequence of delaying dental treatment until advanced disease has caused intolerable symptoms. The increased rates of active disease may also have an impact on oral health-related quality of life (OHR QoL).

Minimum intervention oral healthcare (MIOC) combines four key domains: detection and diagnosis, prevention and control of oral disease, minimally invasive (MI) operative interventions and review/recall. Team delivery and patient-focused care are the underpinning tenets to these four domains. The MIOC approach offers advantages to both patients with dental phobia and the oral healthcare team involved in their long-term management. This paper presents an adaptation of MIOC for patients with dental phobia, which is founded on a comprehensive assessment approach followed by the provision of dental care with behavioural management techniques in combination with conscious sedation. This approach has the potential to provide a comprehensive personalised patient management pathway for delivering better oral health for this vulnerable patient group in a primary care setting.

## Introduction

According to the Adult Dental Health Survey (ADHS) (2009), almost 12% of the adult population has a level of dental anxiety that is indicative of dental phobia.<sup>1</sup> While many people experience mild or moderate levels of anxiety when attending the dentist, dental phobia represents a significant degree of anxiety which has consequences for the health and wellbeing of the person affected. According to the *Diagnostic and statistical manual of mental disorders* (DSM-5),<sup>2</sup> dental phobia is classified as a specific phobia which is 'a disproportionate fear in the presence

or anticipation of the feared object eliciting a marked anxiety response, of which the individual is aware, and which has a marked impact on the individual's normal life and/or wellbeing'. Aside from social and psychological repercussions,<sup>3</sup> dental phobias will have an impact on oral health and oral health-related quality of life (OHR QoL).<sup>1,4,5</sup> This patient group present with greater numbers of teeth with active disease (dental caries),<sup>5</sup> fewer restorations, and increased bleeding and plaque indices in comparison to people with no dental phobia.<sup>1,4</sup> However, people with dental phobia are not a homogenous group and the impact of their phobia might vary (for example, dental attendance).

Another negative influence on oral health is their attendance behaviour, where many would avoid and/or delay visiting a dentist. In addition to the common 'universal' barriers (including the cost of/access to dental care), other contributing factors are unhealthy oral health-related behaviours and lack of motivation to seek care.<sup>4,6</sup> This explains, in part, why this patient group commonly report poorer oral health. This, in turn, may place constraints on the available oral healthcare options when people with a dental phobia manage to present for treatment, such as

provision of more involved, complex restorative care that requires optimum oral maintenance, patient commitment to attend multiple visits,<sup>5,7</sup> cooperation, and understanding of their engagement with all members of the oral healthcare team in improving dental phobia and oral health.

A national UK study identified that the most common dental management approach for people with dental anxiety/phobia under conscious sedation (CS) included simple restorations, periodontal care and extractions.<sup>8</sup> Bearing in mind the complexity of managing patients with dental phobia and the specific needs of each individual with this diagnosis, such care plans might merely reflect the complicated presentation of many active advanced carious lesions in a higher risk/susceptibility population.<sup>3,5</sup> Indeed, dentists' care planning has been shown to be based on patients' dental needs rather than their phobic status.<sup>9</sup> Therefore, there is a need to remove perceived professional barriers considering limited funding and imposed restriction on provision of complex care (such as molar endodontics and implants in 'local policies') for people with dental phobia under

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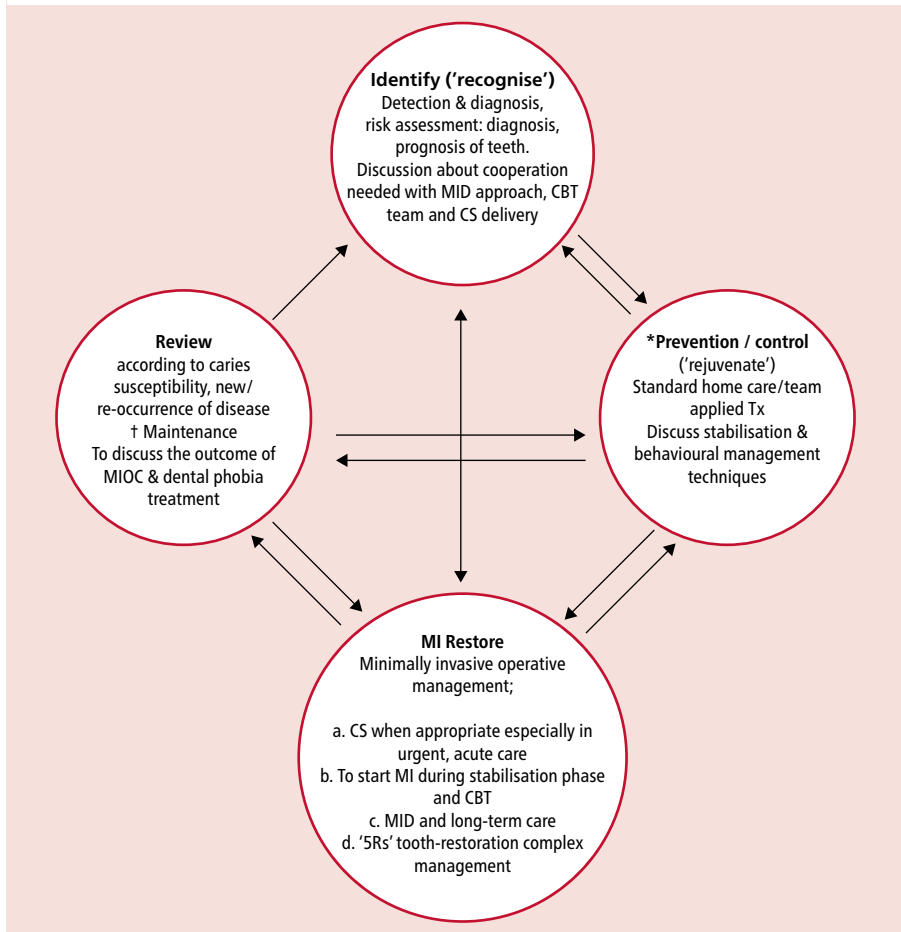
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**Fig. 1** The four interlinking domains of MIOC delivery for people with dental phobia.  
 \* = people with dental phobia commonly present with poor oral health-related behaviours that need to be addressed prior to and/or during the 'restore' and 'review' domain of MIOC.  
 † = patients' maintenance of good oral hygiene and oral health-related behaviours (eg dental attendance) and restorations are important for good oral health. The maintenance of controlling dental anxiety and following the learned coping strategies are equally important in this regime. Note that the direction of the pathways might change depending on specific presenting factors (eg pain) in each individual patient. Adapted with permission from A. Banerjee, 'MI'opia or 20/20 vision?, *British Dental Journal*, 2013, Springer Nature<sup>35</sup>



CS.<sup>8</sup> One option is to develop the minimum intervention oral healthcare (MIOC) pathway, involving patients in their preventive journey, in combination with the use of cognitive behavioural therapy (CBT) to rehabilitate the dental phobia. As far as the authors are aware, the MIOC pathway for people with dental phobia has not yet been researched.

**MIOC pathway**

MIOC involves a holistic, team care-delivered approach to help maintain long-term oral health with preventive, patient-focused, behaviour-related care plans, combined with the dutiful management of patients' needs, desires and expectations.<sup>10,11,12</sup> In MIOC, four domains interlink in a dynamic cycle, all playing an equally important role (Fig. 1).

The pathway starts with 'identification of oral disease' (for example, caries), leading to an emphasis on acute stabilisation (if required) and then 'prevention' of the progress of existing carious lesions and control of the caries process. The next step involves 'minimally invasive operative restorative dentistry' (MID), where the importance of restoring the tooth's structure/function in the most tissue-preserving manner is practised. In the 'review and recall' domain, the patients are seen at appropriate time intervals based on the individual's susceptibility to develop oral disease. All domains in MIOC delivery are patient-focused and the entire oral healthcare team (for example, dentists, dental care professionals [DCPs], receptionists, dental nurses, oral health promotion educators, hygienists and therapists, and psychologists/

CBT-trained members of staff) are involved. This paper proposes modifications to the 'content' of these four domains, more applicable to this dentally anxious patient group.

**Patient-focused care**

In patient-focused care, an underlying principle tenet of the MIOC domains, the patients' views, understanding and appreciation of their own oral health and involvement in the decision-making process should be at the forefront of each of the oral healthcare team members' minds. Besides the entire oral healthcare team that are involved in care provision, in people with dental phobia, other team members (for example, clinical psychologists and those with CBT training) are also involved to address patients' dental phobia. The dentist will take the lead coordinating role as to when and who will be involved during the patients' oral healthcare journey. In the case of staff with dental phobia, clinical psychologists and people with CBT training might also start their involvement with the patients in their acute stabilisation and/or prevention phase.

In order to obtain the maximum benefit from MIOC, the oral healthcare team needs to work collaboratively with their patients to ensure that the benefits are aligned with the patients' perceived needs, values and expectations. The patients, on the other hand, need to understand their role in valuing their oral health and taking ownership of their personal oral health. A patient's first step would be to address common risk factors (for example, smoking and unhealthy diet habits) that play an important role in health, and appreciate the motivation and persistence that this requires.

Patient-focused care also incorporates the acquired skills in motivational interviewing and gathering patient information to help and motivate patients to challenge their targeted risk factors, with help and guidance from the oral healthcare team members. This can be achieved using behaviour management techniques including the COM-B model and tied into the patient's risk/susceptibility assessment.

**Dental phobia and proposed patient management using MIOC**

The MIOC pathway has potential benefits for individuals with dental phobia who present for dental treatment. Furthermore, the minimum intervention focus matches well with the graded exposure elements of CBT for the rehabilitation of dental fear.

**Table 1 Factors to consider in the initial clinical assessment of people with dental phobia when planning using the MIOC pathway<sup>11,17,18,19</sup> (cont. on page 420)**

Assessment items	Investigation outcomes	Explanation
Medical history	<p>a) The main conditions</p> <p>b) Assessing the patient's physical fitness according to the ASA classification:</p> <ul style="list-style-type: none"> <li>• Specific attention should be paid for respiratory, cardiovascular, liver, kidney and infectious diseases</li> <li>• To help in determining the suitability of patients that can be treated in 1) primary care under the care of general dental practitioner (GDP) (patients with ASA I and II; adequate staff training/availability, appropriate surgery designs and equipment compliant with guidelines [IACSD 2015 and SDCEP 2017])<sup>17</sup> and 2) a specialist centre (ASA III and IV)</li> </ul> <p>c) At this stage, it is also important to ask about:</p> <ul style="list-style-type: none"> <li>• Healthcare professionals' views about patients' oropharyngeal airways and intravenous access</li> <li>• The date of the last GA and the reasons for it</li> </ul> <p>d. Allergies to benzodiazepines</p>	<p>For pharmacological care, the mentioned items (b, c and d) are essential as they can have an impact on choice of CS therapy and the setting where the care can be provided</p> <p>In obesity cases, the BMI needs to be calculated and the dental chair's capacity investigated. Any cardiovascular and respiratory disease can have an impact on the chosen technique. Generally, inhalation sedation might be more appropriate</p>
Dental history	<p>To investigate about:</p> <p>a) Dental attendance: regularity or irregularity? When was their last dental visit and what was the treatment that was provided then?</p> <p>b) OH habits: how often do they brush? Interproximal cleaning? Use of mouthwash? Any other types of OH aids used?</p> <p>c) Diet: sugary snacks or drinks? Type and frequency? Risk/susceptibility assessment required</p>	<p>The last dental visit will also highlight the type of treatment that can be possible to provide for this group. This will give the clinician an idea about a patient's OHR behaviours</p> <p>This new gained information can help the GDP to devise an individual prevention regime and allocate where other members of the team can be involved</p>
Social history	<p>a) Employed or unemployed?</p> <p>b) The type of occupation and their insurance policy? (For example, train driver)</p> <p>c) Dependent? How many? Age?</p> <p>d) Escort? How feasible is it?</p> <p>e) Smoking habits and alcohol consumption</p> <p>f) The impact of dental phobia: to use OHIP-14 to assess OHR QoL (for example, embarrassment)</p>	<p>A patient's social circumstances can have an influence on the suggested sedation type; for example, when a patient has dental treatment with inhalation sedation, the need for having an escort is less than sedation with midazolam where having an escort is mandatory</p> <p>It is useful to identify what areas of poor oral health have the most impact on the patient's QoL. If it is a broken anterior tooth that is causing the patient embarrassment and discomfort, then starting the treatment with that particular tooth can improve the patient's QoL</p>
Assess (recognise the signs of dental phobia; urgent treatment need)	<p>a) The severity of anxiety can be determined using the MDAS levels of anxiety (<math>\geq 19</math> would be considered as dental phobia)</p> <p>b) Appearance: not sitting still, pale, agitated and/or refusing to sit on the dental chair, crying, tearing tissues, quiet, distracted appearance, etc</p> <p>c) Communication: no eye contact, quiet or talking non-stop, in some cases an aggressive behaviour</p> <p>d) Common signs of anxiety include sweaty hands, clenched fists, pallor. Symptoms: dry mouth, need to visit the lavatory, fainting, tiredness and sweating</p> <p>e) Clinical signs: increased respiratory rate, raised BP and HR</p> <p>f) Baseline recording for HR and arterial BP for CS</p>	<p>The levels of anxiety (items a–f) can also be important for deciding where care can be provided</p> <p>It is important to distinguish whether the raised HR and BP is related to patients' anxiety or if there are physiological reasons for it. An appropriate referral to a patient's GMP should be made if the recordings are consistently high</p> <p>The baseline recording is important to compare the coming clinical sessions readings to this recording. Any negative changes should also be considered</p>
Explore anxiety triggers	<p>This visit also helps to determine:</p> <p>a) Patients' concerns, needs and specific causes of fear or anxiety</p> <p>b) The anxiety factors: eg, injection: intraorally, in the arm/back of the hand?</p> <p>c) Previous experiences of CS intervention? Type? Success rate?</p>	<p>This information will inform the clinicians about their ability to provide care according to the patient's needs</p> <p>The specific anxiety-provoking stimuli can be avoided when possible; for example, to use intranasal sedation before inserting the cannula in the patient's arm</p> <p>The previous CS experiences can also guide the clinicians in choosing the CS methods in combination with non-pharmacological methods for the patient</p>
Extraoral examination	<p>Overall assessment:</p> <p>a) BMI (height and weight), gait, cyanosis</p> <p>b) Walking aids: stick, wheelchairs</p> <p>c) Oropharyngeal airway assessment: choose a suitable scale and pay attention to the patient's neck (for example, circumference, mobility)</p> <p>d) Potential difficulties in intravenous access – suitable veins: where?</p>	<p>The levels of BMI can also be important for deciding where care can be provided in a primary care setting or if a referral is necessary. It also has an impact on whether CS is possible and, if so, which method is recommended</p> <p>With any physical disability, appropriate care (especially aftercare) needs to be considered</p>
Intraoral examination*	<p>a) Soft tissues: palate (hard and soft), buccal areas, tongue</p> <p>b) Hard tissue</p> <p>c) OH: mild/moderate/severe</p> <p>d) Periodontal diagnosis and staging</p>	<p>*A thorough dental examination of patients with dental phobia might not be possible at the initial assessment appointment. This will make a conclusive dental treatment plan difficult to formulate at the initial assessment</p> <p>A brief visual inspection, radiograph investigations and an adequate history about previous dental needs might help to make a provisional assessment of patients' dental treatment needs and of the dental care complexity</p> <p>A complex assessment and examination might need to be performed later with CS</p>

**Table 1 Factors to consider in the initial clinical assessment of people with dental phobia when planning using the MIOC pathway<sup>11,17,18,19</sup> (cont. from page 419)**

Assessment items	Investigation outcomes	Explanation
Investigations	a) Radiographs (consider different types; for example, DPT) b) Previously mentioned investigations: <ul style="list-style-type: none"> <li>• Oxygen saturation and BP</li> <li>• Anxiety questionnaire</li> <li>• Patients' body language, tone of voice, interaction with staff</li> <li>• Caries susceptibility assessment</li> </ul>	DPT might be preferred as it might be considered as a less invasive approach
Explore patients' views	Patients' views about: a) A referral to the clinical psychologists and CBT-trained members of staff b) Acclimatisation and systematic exposure c) Stabilisation period	This will inform the clinicians about their opportunity (for example, CBT-trained, can apply the MIOC principles etc) to provide care according to the patient's needs A referral to oral healthcare team and CBT-trained colleagues can be considered This element is particularly important for building a successful relationship that is based on mutual trust

**Key:**  
 ASA = American Society of Anaesthesiologists; GA = general anaesthetic; CS = conscious sedation; OH = oral hygiene; OHR = oral health-related; OHIP = Oral Health Impact Profile; QoL = quality of life; MDAS = Modified Dental Anxiety Scale; BP = blood pressure; HR = heart rate; DPT = dental panoramic tomograph; CBT = cognitive behavioural therapy; MIOC = minimum intervention oral healthcare

**Clinical assessment (incorporated into the first MIOC domain: 'identify')**

An initial clinical assessment enables the clinician to design the appropriate intervention(s) for their patients. In order to build trust and confidence, it is advisable to start with the simplest and least/non-invasive treatment, invasive treatment, especially when trying to alleviate acute symptoms which might have been the trigger for anxious patients to attend in the first place.<sup>13</sup> Table 1 outlines a list of factors to consider in the initial assessment of people with dental phobia when planning MIOC.

In the presenting acute phase, an assessment of the urgency of immediate dental care is recommended as it will have an impact on choice of final care plan (for example, non-pharmacological approach).<sup>14</sup> Urgent/acute care might include the relief from dental pain and/or infection, perhaps adding to the anxiety experienced with the already perceived traumatic experiences. During urgent care provision and while assessing the patients' suitability and willingness to cooperate with a more comprehensive, holistic MIOC approach, CBT may commence to aid with anxiety management and increase patients' cooperation with suggested care plan items.<sup>15</sup> In a meta-analytic and systematic quantitative review, patients who participated in early behavioural intervention for dental fear showed a significant reduction in their fear/anxiety, with the beneficial effects commonly long-lasting.<sup>16</sup>

Where pharmacological management of the patient's anxiety is considered to be appropriate, the practitioner/team should consider the additional requirements for such an approach. CS is an important potential management adjunct for patients with dental phobia, with

**Table 2 An overview of the overarching care pathway for people with dental phobia**

Area	Components in the care pathway
<b>GDP/oral healthcare team – the team will provide part of (shared care) or all of the recommended care plan</b>	
Dental treatment	a) Urgent care to be provided b) Discuss to treat difficult/long/complex dental procedures with pharmacological intervention (CS) c) Long-term care plans
Dental phobia treatment	a) Non-pharmacological: <ul style="list-style-type: none"> <li>• Building rapport, voice control, distraction, modelling, memory reconstruction and environmental change</li> <li>• Referral/liaison with CBT services</li> </ul> b) Non-pharmacological and pharmacological approach: <ul style="list-style-type: none"> <li>• Preparatory information</li> <li>• CBT</li> <li>• CS (inhalation sedation and intravenous sedation) in primary care in patients with ASA I and II</li> <li>• Alternative anxiety management options other than CS (inhalation sedation and intravenous sedation) should be sought</li> </ul>
Positive views about MID so that the remaining dental procedures can be provided according to the MIOC principles	a) Identify ('recognise') the disease and the risk factors associated with it. For detection and classification of caries, an evidence-based clinical scoring system such as the ICDAS may be recommended, among others that are available b) Prevention and control ('rejuvenate') c) 'MI' restore: <ul style="list-style-type: none"> <li>• Non-operative/non-invasive</li> <li>• Operative (minimally/micro-invasive): MID approach challenges – complexity and prognosis of remaining teeth and rehabilitation of dentition</li> <li>• Repair: '5Rs' approach to maintaining the tooth-restoration complex</li> </ul>
Review/recall	a) Review of patients' oral health behaviours during/after their patient care journey b) Maintenance of restorations provided (ensure prevention regime has been followed) c) Review periodicity of recall appointments depending on susceptibility re-assessment

**Key:**  
 CS = conscious sedation; CBT = cognitive behavioural therapy; ASA = American Society of Anaesthesiologists; MID = minimally invasive operative restorative dentistry; MIOC = minimum intervention oral healthcare; ICDAS = International Caries Detection and Assessment System

an associated requirement for appropriate professional training (relevant knowledge and skills) to assess patients' suitability for CS, administer sedation techniques and assess the risks associated with it.<sup>17</sup> A careful CS assessment of patients (medical, dental and social evaluation) is important for providing safe and successful

treatment sessions.<sup>18</sup> General anaesthesia (GA) might be recommended for an individual with more comprehensive and complex dental treatments, compromised oral health (pain and facial swelling), medical concerns and social circumstances. Appropriate assessment of these factors and referral needs to be made.

The overall holistic assessment should be based on each individual's risk/susceptibility of developing oral disease, current general health, prognosis of remaining teeth, rehabilitation possibilities and dental phobia status. The appropriate validated investigations tools (for example, the Modified Dental Anxiety Scale [MDAS]) can aid in this process. The outcome of these investigations would steer the clinician's and the team's decisions about a patient's care pathway (Table 2), considering:

1. Dental treatment – urgent and/or routine; difficult/long/complex dental procedures
2. Dental anxiety/phobia treatment – patient's level of anxiety to decide whether a patient can be treated in a primary or specialist centre or shared care options; patient's wishes/expectations/needs
3. Patient's views about MID – positive or negative.

The care pathway must provide a personalised care plan and therefore needs to consider, and be adapted to each patient and their needs. The pathway might also vary between clinicians depending on the skills, availability of resources (trained oral healthcare team) and cost.

A comprehensive assessment contributes to formulation of a provisional care plan. It attempts to include discussions about all the domains of MIOC, various interventions (non-pharmacological and pharmacological) to address dental phobia, and a required flexibility to review its elements during the care provision episode (Fig. 1). In a discussion with each individual patient, information can be included about these MIOC stages and its order of delivery, and a possible alteration depending on several factors (for example, pain). After the clinicians have discussed the above with the patients and have also considered the three points above, they can decide on provision of care in a primary care setting with full patient/team engagement or a referral.

Once the decision to refer has been made, the clinician and their team should identify the appropriate setting for care provision (dental and dental phobia treatment) when writing a comprehensive referral letter. The reasons for a referral can be several. The patient's factors might include a medical condition that can be exacerbated because of their increased dental anxiety levels. The patients might also present with multiple dental needs (such as several carious lesions, missing teeth, compromised occlusion and advanced periodontal

treatment) and wish to have their dental care with the aid of both non-pharmacological and pharmacological interventions. This request is made as delivery of care can be facilitated, or in some cases is only possible, when the oral healthcare team uses both pharmacological and non-pharmacological techniques in conjunction with each other. In this case (and when appropriate), the clinicians might wish to refer the patients because of lack of services/experience/availability of staff to address patients' dental phobia and/or provide care with these techniques. A shared care approach between a specialist and the primary care general dental practitioner (GDP) team can be beneficial for service providers and patients alike. The practice will gain patients' confidence as the clinicians take a holistic view on patient care and the patients do not need to travel far for many specialist appointments, with associated financial implications.

### Prevention of lesions and control of oral disease (second MIOC domain)

Successful behaviour modification (for example, regular and effective tooth brushing) can be achieved in the 'prevention/control' domain, through modifying patients' capability to engage in the behaviour (by enhancing their knowledge and skills in COM-B model), motivating the patient by identifying the benefits for the patient in terms of their valued goals and planning interventions to create the opportunity for their long-term behaviour change.<sup>19,20,21</sup>

It is important to emphasise and appraise the oral health promotion advice given at each appointment, as the MIOC central preventive ethos is to enhance positive and protective behaviours (Table 3). Its success depends on patients retaining the information (which is difficult as patients' anxiety might make its retention challenging) and involvement in all prevention phases (primary, secondary and tertiary).<sup>10,22</sup>

While primary prevention emphasis is placed on preventing new cases of oral disease by addressing the risk factors,<sup>23</sup> secondary prevention and treatment focuses on individual patients' dental caries management by ensuring that the disease does not establish/progress.<sup>23,24</sup> The caries management process of arresting carious lesions on a professional level is imperative,<sup>25</sup> as one of the most common reasons for tooth-restoration complex failure is secondary caries,<sup>26</sup> especially in high caries-risk patients such as those with dental phobia.

In tertiary prevention, both parties' aims are to prevent recurrence of disease and address preventive and restorative care failures.<sup>23,24</sup>

The stabilisation phase can be utilised for reinforcing prevention advice, providing elective dental treatment with CS, when appropriate, in combination with gradual exposure to stimuli while seeking help (via CBT) to tackle dental phobia. The patient's newly gained confidence (as a result of improved dental anxiety levels and oral health) should be reinforced by all members of the oral healthcare team. Patients' understanding of the causes of oral diseases, with provided tools to maintain good oral health, can reduce their risk for acquiring future disease. However, an appropriate periodic re-assessment and review of people with dental phobia oral health status is recommended, especially if the patient has had to wait for a period of time between appointments. The time period will depend on the findings (for example, new lesions, levels of anxiety and maintenance of previous treatment) and the patient's level of commitment to improve their current and future care.

### MI operative intervention – MI restore (third MIOC domain)

MID has been described as 'an operative concept that can embrace all aspects of the profession. The common delineator is tissue preservation, preferably by preventing disease from occurring and intercepting its progress, but also removing and replacing with as little tissue loss as possible.'<sup>27</sup> The MID approach can also delay and/or prevent the 'initiation of the destructive dental restorative cycle and lead to teeth retention in clinical function for as long as possible.'<sup>28</sup> An example of MID includes atraumatic restorative treatment (ART).<sup>11</sup> ART's two components, the preventive ART sealant and ART restoration, will benefit patients by maintaining and protecting the pulp-dentine complex (Table 3).<sup>11</sup> Once this complex has been compromised (for example, during an ongoing restorative cycle), it must be restored. In the 'MI restore' domain of the MIOC pathway, the preserved tooth tissue can be restored optimally to protect the tooth but also to enable function and improved aesthetics. This ethos of controlling the caries process and removing the irreversibly damaged active carious tissue while maintaining pulp sensibility has been summarised by the International Caries Consensus Collaboration.<sup>25,28</sup>

**Table 3 A summary of ‘prevention/control’ and ‘minimally invasive restore’ domains of the MIOC<sup>10,22,25,28,29,36</sup> pathway and the potential benefits of each element for people with dental anxiety/phobia**

Type of intervention	Details	Benefits for people with dental phobia
<b>Prevention and control:</b> oral health promotion by all members of the oral healthcare team who can be involved in the care delivery		
Non-invasive prevention of lesions/control of the disease process	<p>At periods agreed by the oral healthcare team and the patients Based on biofilm control, diet and surface chemical agents to disrupt biofilm and remineralise susceptible tooth surfaces<sup>35</sup> Based on disease susceptibility assessment. The CRA can be based on existing, established CRA protocols Recommendation for:</p> <ul style="list-style-type: none"> <li>• A diet that is low in sugar</li> <li>• Tooth brushing twice a day with a fluoridated toothpaste</li> <li>• Additional fluoride supplements: fluoride mouthwash and tablets</li> <li>• Sugar-free gums</li> <li>• The team can provide fluoride gel/varnish in the surgery</li> <li>• Smoking cessation</li> <li>• Less alcohol consumption</li> <li>• Medico-legal knowledge and documentation</li> </ul>	<p>The oral healthcare team: reception staff, dental nurses with extended duties, oral health educators, therapists, hygienists and dentists who are aware of patients’ phobic status. Therefore, patients would feel more comfortable generally. Psychologists (CBT-trained team) who can offer treatment for patients’ phobic status The patients can develop a relationship with all members of the oral healthcare team and receive integrated clinical care Using COM-B model in communication, behavioural management of the patients, motivational interviewing skills to gather information from the patients and tailor-made prevention advice given</p>
Fissure sealant (therapeutic/preventive) – micro-invasive	<p>Fissure sealants: sealing remaining pits and fissures Place sealants (resins) or GIC over clinically intact enamel or enamel with signs of early breakdown No carious dentine tissue removal Infiltration techniques/agents</p>	<p>A sealant-restoration benefits Can reduce discomfort/pain and dental anxiety Hand instruments for carious tissue removal Local anaesthesia is seldom needed; therefore, a common fear-provoking stimulus is avoided Usually a high-viscosity glass hybrid/GIC is used. GIC has a hydrophilic nature that does not require a high level of moisture control. Therefore, rubber dam that is difficult to place because of patients’ anxiety/fear of choking etc can be avoided Generally, has a good outcome. Patients can be reassured by that and therefore less anxiety might be felt Use resin-based materials where moisture control/patient compliance can be achieved</p>
<b>Minimally invasive restore:</b> protect the pulp-dentine complex; restore the function, form and aesthetic appearance of the vital tooth; more emphasis on adhesive, bioactive reparative materials and selective tissue-preserving operative technologies; only soft ‘infected’ dentine is removed and ‘affected’ dentine retained, minimising the risk of unnecessary pulp exposure		
Minimally invasive approach/ART restoration (selective carious tissue removal/invasive)	<p>Micro-cavitation, shallower lesions up to middle third of dentine radiographically Pulpally, excavate to firm dentine in shallow lesions and to ‘leathery’ softer dentine in deep lesions Peripherally, excavate to firm, sound enamel/dentine where possible Restore cavity and seal available pits and fissures with adhesive bio-interactive material Preserve non-demineralised and remineralisable tissue</p>	<p>Hand instruments for carious tissue removal can also reduce anxiety Usually a high-viscosity glass hybrid/GIC (HVGIC) is used. GIC has a hydrophilic nature that does not require a high level of moisture control. Therefore, rubber dam that is difficult to place because of patients’ anxiety/fear of choking etc does not need to be used necessarily Has generally a good outcome. Patients can be reassured by that and therefore less anxiety might be felt Use resin-based materials where moisture control/patient compliance can be achieved</p>
Selective removal of soft infected dentine (invasive)	<p>Clear cavitation, deeper lesions approaching the pulp radiographically The most appropriate dentine carious tissue removal methods Pulpally, remove carious tissue until soft dentine is reached in deepest lesion with vital pulp Enough tissue is removed to place a durable bio-interactive restoration Avoid pulp exposure Periphery of cavity, clean to firm/sound enamel/dentine (as above)</p>	<p>Chemo-mechanically applied gel or a metal hand excavation for the removal of soft dentine close to the pulp especially. This method will limit the use of rotary instruments that are commonly one of the most anxiety-provoking stimuli Preservation of tooth and restoration will lead to less tooth loss which is beneficial, especially in this vulnerable group</p>
‘5Rs’ tooth-restoration complex management (minimally/non-invasive)	<p>Maximise longevity of the tooth-restoration complex:</p> <ul style="list-style-type: none"> <li>• Review, refurbish, re-seal, repair and replace (‘5Rs’)</li> <li>• Repair only the affected areas rather than complete replacement of restorations</li> </ul>	<p>Less time spent restoring the teeth means less exposure to anxiety-provoking stimuli (for example, rotary instruments) Preservation of tooth and restoration will lead to less tooth loss Simplified procedures</p>
<p><b>Key:</b> CRA = caries risk/susceptibility assessment; CBT = cognitive behavioural therapy; GIC = glass-ionomer cement; ART = atraumatic restorative treatment</p>		

‘Newer’ selective tissue-removing technologies (for example, air abrasion and chemo-mechanical carious tissue removal) can also potentially limit the need for two of the most commonly feared stimuli for this patient group: intraoral injections and the

dental drill. Besides the dislike of the high-pitched noise of the rotary device and sight of drills,<sup>3</sup> other contributing factors to fear and discomfort include ‘the sensitivity of vital dentine, the pressure and vibration on the tooth caused by mechanical stimulation of

the tooth by rotary devices, bone-conducted noise/vibration and development of high temperatures at the cutting surface (thermal stimulation).<sup>11,29</sup> These stimuli can provoke an immediate anxiety response, which may take the form of a situationally predisposed panic

attack. MID has clear potential to reduce patients' negative experiences of such stimuli.

Once a minimally invasive (MI) restoration has been placed, the longevity of the tooth-restoration complex needs to be maximised. Using the '5Rs' MI approach for the deteriorating/failing tooth-restoration complex, operative interventions can be stratified for the operator and, ultimately, made more tolerable for the phobic patient. The '5Rs' include: review, refurbish, re-seal (the margins of the restorations), repair (only the affected areas) and ultimately replacement of the complete restoration, using tissue-preserving methods and bio-interactive materials.<sup>22,30</sup> A modification to an existing restoration will enhance its further retention, stability and longevity, hence reducing risk of tooth loss, which is more common in people with dental phobia. Tooth loss will have an impact on function and aesthetics, leading to a reduced OHR QoL. Therefore, the MI approach can have a permanent positive impact on the patient's quality of life.<sup>31</sup>

Additionally, the complete replacement of extensive, failing existing restorations (most commonly due to tooth-restoration fracture or secondary caries) can be challenging in this group. The use of local anaesthesia and rotary instrumentation during the procedure when the patient is lying down on the dental chair might provoke anxiety in this patient group. The use of resin-based restorative materials to replace the failing restoration requires patient compliance so that adequate moisture control techniques can be achieved.

### Recall/review consultations (fourth domain of MIOC)

The importance of this domain must not be overlooked in the management of any patient, including those suffering from dental anxiety/phobia. The purpose of this domain is to review the quality of any treatment provided in the previous care episode and to re-assess patient behavioural change/adherence towards preventive behaviours. The periodicity of such recall consultations (often incorrectly termed 'check-up' appointments) should include team members and the patient, and will depend upon the aforementioned patient and clinical factors and disease susceptibility re-assessment. This must be carried out dynamically and longitudinally to enhance patients' understanding of the complexity of such interactions, and their important role and responsibility in maintaining their own oral health in the long term.<sup>10,12</sup>

## Discussion

There are potential limitations of this proposed MIOC pathway for dentally anxious patients. The most important would be the additional time required for the holistic assessment and management process.<sup>32</sup> This might be challenging for some phobic patients as a result of the extra commitment, engagement and courage that would be required of them while addressing their phobias. It is, therefore, important that a discussion takes place with the patients, carefully explaining the long-term benefits of a comprehensive holistic approach for care provision (dental phobia and treatment) in terms the patient can appreciate. The patient's decision regarding the care they wish to receive in a secondary care setting might be influenced by the information they received from the healthcare professional who initially referred them. These expectations may create subsequent barriers for specialists when suggesting other potential treatment modalities (for example, MID and non-pharmacological options).<sup>32</sup> Therefore, it is recommended that the clinicians seek information with regards to the various interventions available at the referral centre before making a referral.

The availability of services that provide CBT for dental phobia might be challenging, particularly in certain parts of the country. While not ideal, the MI management of the caries process could still be adopted for phobic patients in the absence of a rehabilitative approach for their phobia such as CBT. The advances in technology, such as virtual reality, where a real-life environment or situation can be created artificially by computer,<sup>33</sup> can assist and ease possible provision of CBT services in dentistry. Virtual reality exposure therapy (VRET) offers the hope of an accessible form of CBT-based therapy for dental phobia. In one randomised controlled trial with a small sample, VRET was associated with a decrease in dental anxiety and behavioural avoidance when compared to subjects who received informational pamphlets.<sup>34</sup> Currently, the efficiency and treatment outcome of VRET for patient care is in its infancy and shows promise but requires further research.

Further education such as the distance-learning Masters programme (for example, Advanced Minimum Intervention Dentistry MSc hosted by the Faculty of Dentistry, Oral and Craniofacial Sciences, King's College London) or shorter continuing professional development (CPD) courses for

oral healthcare teams to learn about (and how to implement) the MIOC approach and behavioural management techniques are available to support team members. Other barriers include the current remuneration system, financial restraints<sup>30</sup> and local/regional/national policies.<sup>35</sup> As more clinical research,<sup>36,37</sup> particularly practice-based research, demonstrates the effectiveness of the MIOC approach for all patients, including those with dental phobia, it is hoped that a drive to use such approaches to improve dental care for all patients will be created. This concept has become even more pertinent during the COVID-19 pandemic. One of the Chief Dental Officer for England's visions for the post-pandemic care model is an integrated oral healthcare team actively applying MIOC principles.<sup>38</sup> The possible risks associated with aerosol generating procedures in dental practice and virtual oral healthcare delivery offers an opportunity to inform patients about MIOC benefits and to promote their engagement in prevention regimes through shared decision-making processes.<sup>38</sup>

## Conclusions

This paper proposes an MIOC holistic care pathway model for people with dental phobia based on an initial clinical assessment, followed by an MIOC pathway that incorporates team-delivered, patient-focused care centred around prevention/control of disease and the MI operative restorative management of presenting lesions. The MIOC pathway suggests a modification to existing practice to improve the dental experience of patients with dental phobia. Urgent short-term and complicated care may benefit from pharmacological interventions in addition to more structured psychological interventions.

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