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Wolters Kluwer

Acute procedural anxiety and specific phobia of clinical procedures in adults: Treatment overview

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Literature review current through: **Oct 2023**.

This topic last updated: **Aug 17, 2023**.

INTRODUCTION AND TERMINOLOGY

Acute procedural anxiety is an excessive fear of medical procedures resulting in acute distress and often interferes with completion of needed medical care. Avoidance of clinical procedures can have negative health consequences [1-7]. Patients may experience anxiety in anticipation of or during procedures used for screening (eg, mammography), diagnosis (eg, amniocentesis or endoscopy), and treatment (eg, angioplasty or major surgery). Acute procedural anxiety is not a diagnosed disorder in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) [8].

Specific phobia of clinical procedures is diagnosed when the patient's anxiety and fear are specific to the procedure and its immediate effects, and this fear causes significant distress or impairment. The most common specific phobias of clinical procedures are dental phobia, blood-injection-injury phobia, and magnetic resonance imaging (MRI) claustrophobia. Specific phobias of clinical procedures are diagnosed as a specific phobia in DSM-5-TR with a specifier indicating the type of phobic stimulus. (See '[Specific phobia of clinical procedures](#)' below.)

This topic reviews the treatment options for patients with anxiety and phobias related to clinical procedures. The epidemiology, manifestations, course, screening, assessment, and differential diagnosis of acute procedural anxiety are reviewed separately. Treatment of other specific phobias not related to procedures is also reviewed elsewhere.

- (See ["Acute procedural anxiety in adults: Epidemiology, clinical features, assessment, and diagnosis"](#).)
 - (See ["Specific phobia in adults: Epidemiology, clinical manifestations, course, and diagnosis"](#).)
 - (See ["Procedural sedation in adults in the emergency department: General considerations, preparation, monitoring, and mitigating complications"](#), section on 'Definitions'.)
 - (See ["Gastrointestinal endoscopy in adults: Procedural sedation administered by endoscopists"](#).)
 - (See ["Specific phobia in adults: Treatment overview"](#).)
 - (See ["Specific phobia in adults: Cognitive-behavioral therapy"](#).)
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PLANNING TREATMENT

To treat or not to treat — We use shared decision-making in formulating the treatment plan including whether to treat the anxiety or phobia. We review the impact of the symptoms on the patient's quality of life and daily functioning and whether the anxiety is causing avoidance of a needed procedure.

In cases where the symptoms are mild, do not interfere with quality of life, and do not lead to avoidance of the procedure, the individual may decide not to pursue treatment.

General principles of treatment — We use the following principles throughout our treatment of individuals with anxiety or phobias related to clinical procedures.

- We attempt to establish a trusting clinician-patient relationship. We aim to do this over time through our interactions with the patient. We use shared decision-making in treatment planning, coordinate with other providers, involve family members (with patient consent), show empathy and an understanding of the patient complaints, and are readily available for emergencies. A trusted clinician may be better able to explain to the patient why an indicated procedure is necessary and to reassure them of its safety.
- We educate the patient about their condition and the procedure. We review the reasons the procedure is recommended, and what they can expect, as it relates to the expected amount of pain, length of recovery, or disability. We allow adequate time for questions [9-12].
- We address the focus of the patient fear and any preconceived notions or concerns about the treatment. We acknowledge the anxiety and normalize the experience of anxiety. We

do not tell patients not to worry as this may undermine their concerns and imply that they are able to stop their worries at will [12].

- We prefer that patients retain as much control as possible during the procedure. This may include assuring the patient that nothing will happen during the procedure that is not agreed upon in advance. We also allow the patient to interrupt or end the procedure if anxiety becomes intolerable, as long as it is safe to do so [11,12].
- We try to make the patient as comfortable as possible during the procedure. As an example, we allow family members or friends to be present during the procedure if desired by the patient and not clinically contraindicated [11].

Addressing co-occurring anxiety disorders — We prioritize the treatment of co-occurring anxiety disorders such as generalized anxiety disorder or panic disorder. Presenting symptoms may be due to co-occurring disorders which, if treated, may improve the presenting symptoms and overall quality of life. (See "[Generalized anxiety disorder in adults: Management](#)" and "[Management of panic disorder with or without agoraphobia in adults](#)".)

Choosing initial treatment modality — Medication and psychotherapy are effective treatments for anxiety and phobias related to clinical procedures (see '[Specific phobia of clinical procedures](#)' below). We typically choose between these interventions on the basis of patient preference; however, specific factors affect our treatment selection. As examples:

- Circumstances favoring medication treatment include:
 - Clinical need is an emergency or one time rather than recurring
 - Patient's anxiety is too severe to tolerate psychotherapy
 - Psychotherapy is unavailable or was ineffective
- Circumstances favoring psychosocial intervention (see '[Psychosocial management](#)' below):
 - Patient is unable to tolerate the medications or has medical contraindications
 - The patient requires a procedure on a repeated basis

PHARMACOLOGIC MANAGEMENT

Benzodiazepines as first-line medication — For most patients who will be receiving medication for anxiety related to a medical procedure, we suggest first-line treatment with a benzodiazepine rather than other medications. Benzodiazepines commonly used in the

treatment of procedural anxiety are listed on the table ([table 1](#)). (See '[Selecting a benzodiazepine](#)' below.)

Selecting a benzodiazepine — Our choice of the benzodiazepine depends on the pharmacokinetics of individual agents (ie, time to onset, half-life, drug interactions), acuity of the clinical situation (eg, need for immediate relief), the presence of intravenous access, level of monitoring that is available, co-occurring medical conditions, and clinician comfort. Benzodiazepines have established efficacy, a broad range of onset, varied duration of action, and can be administered via several different routes [[13-15](#)]. (See '[Administering benzodiazepines](#)' below.)

Onset and length of effect — When immediate relief of anxiety is desired and intravenous access and monitoring are available (eg, prior to a surgical procedure), a benzodiazepine with a rapid onset (eg, [midazolam](#) 0.01 to 0.02 mg/kg) is favored. Midazolam has a rapid onset, short duration of effects, amnestic properties, tolerable side effects, and is typically acceptable to patients. Dosing of midazolam and other benzodiazepines is found on the table ([table 1](#)).

If pretreatment for anxiety is needed over a longer period of time, we would use oral agents with a slower onset and longer half-life (eg, [lorazepam](#) 1 to 2 mg or [diazepam](#) 2 to 10 mg) approximately one to two hours prior to the procedure.

Route of administration — The route of administration plays a role in the choice of benzodiazepine given. As an example, for minor outpatient procedures where intravenous access is not usually indicated, we favor first-line treatment with oral [diazepam](#) or oral [lorazepam](#). Clinical trials suggest that diazepam is more efficacious in procedural anxiety compared with placebo, but has not consistently been shown to be more efficacious than other benzodiazepines for acute procedural anxiety [[16-19](#)].

- **Oral** – We typically give oral formulations to treat procedure anxiety approximately 30 to 60 minutes prior to the procedure. Most benzodiazepines are well absorbed orally and achieve peak plasma levels within one to three hours. We give them on an empty stomach and in the absence of antacids as these disrupt absorption [[15](#)]. The disadvantage is variability in efficacy and difficulty in dose titration compared with intravenous use.
- **Intravenous** – We give intravenous benzodiazepines 5 to 15 minutes prior to the procedure. Due to the risk of respiratory failure, we give intravenous infusions slowly over 2 to 5 minutes instead of a rapid push. We reserve the use of intravenous medication for in hospital premedication in which there is immediate and adequate airway support. When needed, we increase the dose using small increments to desired effect.

- **Sublingual** – Sublingual administration is typically given 30 to 90 minutes before the procedure. Due to faster absorption and avoidance of first-pass metabolism, sublingual medication has the benefit of more rapid onset of action and better bioavailability as compared with oral dosing [16]. Additionally, sublingual administration confers greater safety and more cost effectiveness compared with intravenous administration. Sublingual administration is a good alternative to oral formulations for patients who cannot swallow or who have a full stomach that would delay absorption of medication. Clinical trials suggest that sublingual administration of benzodiazepines is effective in the treatment of acute procedure-related anxiety [16,17].

Sublingual tablets need to be uncoated and easily dissolvable under the tongue; this product may in some circumstances be unavailable. If sublingual tablets are not available, uncoated regular tablets or solutions intended for intravenous use have been administered sublingually in clinical trials with good effects [16,18,20].

- **Intranasal** – Intranasal benzodiazepine is an effective option when faster onset of action is needed, and intravenous access is not available. Intranasal administration has a faster onset of action than oral administration because it does not undergo hepatic first-pass metabolism. A clinical trial comparing low-dose intranasal [midazolam](#) (1 to 2 mg) with oral midazolam (7.5 mg) in 72 patients with MRI claustrophobia found intranasal administration effectively reduced anxiety, led to fewer MRI cancelations, and resulted in better image quality compared with the oral formation [21].
- **Intramuscular** – Intramuscular administration is not as commonly used given pain at injection site. Intramuscular administration may be chosen for patients when oral absorption is compromised or in patients without intravenous access. [Lorazepam](#), [midazolam](#), and [diazepam](#) are available for intramuscular use and are well absorbed if given in the deltoid muscle [15].

Dosing of benzodiazepines for acute anxiety or phobia of medical procedure are found on the table ([table 1](#)).

Amnestic effects — When minimal recall of details is desired (eg, prior to induction of anesthesia, extraction of molars, bronchoscopy) we favor a benzodiazepine with a stronger amnestic effect such as [midazolam](#). However, as monitoring of the airway is needed with IV midazolam, we only administer this if airway management from a trained professional is available.

Administering benzodiazepines

- **Initial dose** – We use the lowest dose that achieves the desired clinical effect. Higher doses may result in greater side effects [20], longer duration of sedation [22], and longer recovery time [23] without any additional anxiolytic benefits ([table 1](#)).
 - We reduce the initial dose by approximately 50 percent for individuals >60 years, for those premedicated with opioid analgesics, and for those with respiratory or cardiac disease (eg, heart failure). (See '[Side effects and precautions](#)' below.)
 - Individuals with regular benzodiazepine or alcohol use leading to tolerance typically require doses at the higher end of the range.
- **Subsequent dosing** – Some patients may not respond sufficiently to an initial benzodiazepine dose, requiring one or more repeat doses [24].
 - **Oral administration** – If the initial oral dose is ineffective, we repeat it at one half the initial dose after 30 minutes. When multiple doses are needed, we are careful to allow at least 30 minutes between doses and monitor the patient closely for excessive sedation or respiratory depression.
 - **Intravenous administration** – If the initial intravenous dose of medication is ineffective, we repeat it at one-half initial dose 5 to 30 minutes after the first dose. We monitor closely for excessive sedation or respiratory depression.

A table provides information on the pharmacology and dosing of commonly used benzodiazepines in treatment of procedural anxiety ([table 1](#)).

Side effects and precautions — We educate patients about potential side effects of benzodiazepines. These include sedation, drowsiness, dizziness, lightheadedness, cognitive impairment, motor incoordination, respiratory suppression, amnesia, and (with long-term use) dependence. Side effects are reviewed in more detail separately. (See "[Pharmacotherapy for insomnia in adults](#)", section on '[Benzodiazepine hypnotics](#)' and "[Safety of infant exposure to antidepressants and benzodiazepines through breastfeeding](#)", section on '[Benzodiazepines](#)' and "[Benzodiazepine use disorder](#)", section on '[Intoxication](#)' and "[Benzodiazepine use disorder](#)", section on '[Overdose](#)'.)

- **Sedation** – We ensure that patients are evaluated to determine their level of sedation and steadiness of gait prior to discharge. We are careful to warn patients against driving for several hours after administration of benzodiazepines. Additionally, we require all individuals receiving a benzodiazepine to be accompanied by a companion at discharge.

The duration of these effects are affected by dosing, route of administration, drug potency, rates of absorption and distribution, and elimination half-life [25-28].

- **Hemodynamic effects** – Benzodiazepines, particularly when given intravenously, may cause hemodynamic effects with decrease in blood pressure or respiratory depression equivalent to that observed during natural sleep, and rarely may cause abrupt drops in blood pressure or severe ventilatory depression [29]. Individuals with underlying cardiac disease and poor left ventricular function are more vulnerable.
- **Hepatic insufficiency** – For individuals with hepatic insufficiency, we favor treatment with oral [temazepam](#) or intravenous [lorazepam](#). [Oxazepam](#) and lorazepam are reasonable alternatives for oral administration. All three agents (oxazepam, lorazepam, temazepam) are metabolized by glucuronide conjugation and are excreted unchanged by the kidney. Glucuronidation is less affected by hepatic dysfunction [30]. If a benzodiazepine that does not undergo glucuronidation is preferred, we reduce the dose by 50 percent. (See "[Benzodiazepine poisoning and withdrawal](#)", section on '[Pharmacokinetics](#)'.)
- **Older adults** – We use a 50 percent dose reduction in adults older than 60 years, in those who are debilitated, or in those premedicated with opioid analgesics [30]. We also favor benzodiazepines with shorter or medium half-lives, without active metabolites (such as [midazolam](#) or [lorazepam](#)) over benzodiazepines with long half-lives and active metabolites (such as [diazepam](#)) in these populations. (See '[Administering benzodiazepines](#)' above.)
- **Substance use disorder** – We do not consider a substance use disorder as contraindication to a one-time use of a benzodiazepine for acute procedural anxiety. We ensure that the individual is not acutely intoxicated with another sedating substance and that they are closely monitored for respiratory depression. Individuals with regular alcohol or benzodiazepine use leading to tolerance may require a higher than usual benzodiazepine dose.

Efficacy — In most, but not all clinical trials, benzodiazepines appear effective in reducing acute procedural anxiety and/or inducing sedation. Increasing the patient's comfort during the procedure enables the completion of clinical procedures, and increases patients' willingness to repeat the procedure in the future [13,15-17,21-23,28,31-42].

From among the benzodiazepines, most trials support the efficacy of intravenous or oral [midazolam](#) compared with placebo [37,43-47]. While IV midazolam is most commonly used to treat procedural anxiety in adults in clinical settings, 7.5 mg oral midazolam solution has been shown to be effective as well [45].

- In a randomized trial, 88 patients undergoing outpatient surgery were assigned to premedication with 0.04 mg/kg intravenous [midazolam](#) versus placebo. Subject treated with midazolam had lower levels of anxiety, as compared with those receiving placebo, after administration of premedication. Additionally, premedication with midazolam, as compared with placebo, led to fewer reports of postoperative nausea (25 versus 50 percent), and lower percentage of subjects vomiting postoperatively (8 versus 21 percent) [\[44\]](#).
- In separate clinical trials a total of 229 patients undergoing sigmoidoscopy or upper endoscopy were randomly assigned to premedication with 7.5 mg of oral [midazolam](#) versus placebo [\[37,45\]](#). In each study, measures of pain and anxiety during the procedure was lower for the midazolam versus placebo group. Transient asymptomatic hypotension and slightly longer recovery time were reported in those subjects treated with midazolam.

From among the benzodiazepines, [midazolam](#) is found to have similar or better efficacy than other benzodiazepines [\[43\]](#), and is preferred by patients for the treatment of procedure anxiety [\[39,40,43\]](#). For example, in a clinical trial involving 63 patients undergoing bronchoscopy, intravenous midazolam 0.07 mg/kg had stronger sedating and anxiolytic effects than intravenous [diazepam](#) 0.14 mg/kg [\[40\]](#). Midazolam was more likely to cause anterograde amnesia, which is desirable for conscious sedation in bronchoscopy. While patients in both treatment groups were open to future bronchoscopy, more patients treated with midazolam than those treated with diazepam reported acceptability of future bronchoscopy.

Melatonin as alternative to benzodiazepine — For patients in whom benzodiazepines may be undesirable (eg, those with active and severe substance use disorder or cognitive impairments), who are not able to tolerate benzodiazepines, who have medical contraindications to their use, or who have found them ineffective in the past, we suggest treatment of procedural anxiety with melatonin.

Our suggested dose is 3 mg sublingual. If unavailable we use 3 to 10 mg orally; however, the bioavailability of oral melatonin is rather low, at approximately 15 percent [\[48\]](#). We typically give the dose approximately 90 minutes before a procedure, with a repeat dose if there is no effect after 60 minutes.

Several clinical trials have supported the use of melatonin for preprocedural anxiety [\[18,20,49-54\]](#). As an example, in a meta-analysis of 18 trials involving 1264 patients with preoperative anxiety, greater reduction in anxiety with melatonin was found as compared with placebo (mean reduction of 11.7 points on a 100-point scale, 95% CI -13.80 to -9.59) [\[52\]](#). Melatonin was

also found to have a similar effect on anxiety reduction compared with benzodiazepines. However, the certainty in these conclusions was limited by risk of bias in the included studies.

Trials comparing melatonin with [midazolam](#) have found that melatonin given sublingually (3 or 5 mg) or orally (3 to 10 mg) reduces preprocedural anxiety with an efficacy similar to that of midazolam [[18,49,52,54](#)]. Melatonin produces sedating effects with less psychomotor impairment compared with midazolam [[49,52,54](#)]. Melatonin is also less likely to cause amnesia and result in shorter postoperative recovery time compared with midazolam [[5,20,51](#)].

While melatonin is demonstrated to have good efficacy and tolerability, it is still not a preferred choice over benzodiazepines. The class of benzodiazepines has varied pharmacokinetics and routes of administrations that can be chosen based on clinical indication. Benzodiazepines also have long established efficacy for anxiety. Melatonin is considered a dietary supplement and is not strictly regulated by the US Food and Drug Administration (FDA), as such, dosing and quality may be an issue and efficacy may not be achieved consistently.

Medication with limited support — Other medications that have been used as treatment for acute procedural anxiety include beta-blockers [[55,56](#)], [gabapentin](#) [[57,58](#)], and [pregabalin](#) [[59,60](#)]. Clinical experience with these medications in procedural anxiety is limited.

PSYCHOSOCIAL MANAGEMENT

For those patients that will be receiving psychotherapy or other psychosocial intervention for the treatment of anxiety we suggest first-line treatment with brief cognitive-behavioral therapy (CBT) or brief supportive psychotherapy rather than other interventions. The choice between these is based on patient preference and clinician comfort. There are no trials comparing the efficacy of psychosocial interventions in the treatment of acute anxiety or specific phobia of clinical procedures. (See '[Cognitive-behavioral therapy](#)' below and '[Brief supportive therapy](#)' below and '[Other therapy with minimal supporting evidence](#)' below.)

Cognitive-behavioral therapy — CBT is a treatment that incorporates different elements of cognitive therapy and behavioral interventions to reduce symptoms of acute procedural phobia or anxiety. Although more time consuming to administer than a sedating medication, the benefit of CBT may last for months to years following treatment, while a sedating medication's clinical effects are limited to the period immediately following their administration.

Treatment components — Treatment components of CBT may include psychoeducation, cognitive restructuring/therapy, and behavioral interventions such as muscle relaxation or exposure. Each of these components of CBT have been used as monotherapy. (See "[Overview of](#)

[psychotherapies](#)", section on ['Cognitive and behavioral therapies'](#) and ["Generalized anxiety disorder in adults: Cognitive-behavioral therapy and other psychotherapies"](#) and ["Specific phobia in adults: Cognitive-behavioral therapy"](#).)

- **Psychoeducation** – Psychoeducation includes providing additional information, beyond what is typically provided in the informed consent process, and appears to be an effective way to reduce anxiety while educating the patient [61-74]. We make sure that the patient has a full understanding of why the procedure is being done, what to expect both during and after the procedure, expected recovery time, various manifestations of anxiety, and follow-up treatment plan.
- **Cognitive therapy** – Using cognitive therapy, we aim to restructure maladaptive cognitive thoughts. We challenge irrational or unrealistic thoughts about the procedure. We typically use cognitive therapy as part of a multimodal CBT rather than as monotherapy [75]. (See ["Specific phobia in adults: Cognitive-behavioral therapy"](#), section on ['Additional components of treatment'](#).)
- **Muscle relaxation training** – Teaching patients relaxation exercises can address the elevated muscle tension and reduced flexibility of autonomic functioning that often accompanies anxiety [76]. In relaxation training, patients are typically trained to systematically relax different muscle groups until proficiency is achieved in relaxation of the whole body on cue [77]. Relaxation training appears to be more effective for preoperative anxiety than control condition [78,79]. (See ["Specific phobia in adults: Cognitive-behavioral therapy"](#), section on ['Anxiety management'](#).)
- **Exposure therapy** – In exposure therapy, the patient gradually confronts the anxiety-inducing procedure in a safe and controlled manner [80]. This is preferably done using in vivo exposure; however, other forms of exposure (eg, virtual reality, imaginal exposure) have been found to be useful for treatment of acute procedural anxiety or phobia of procedure [81].

Efficacy — Randomized trials suggest that CBT is an effective treatment for acute procedural anxiety.

- A randomized trial of 100 patients awaiting coronary artery bypass graft surgery compared preoperative treatment plus brief CBT with preoperative treatment as usual [82]. Brief CBT consisted of four 60-minute sessions with psychoeducation, cognitive restructuring, and a behavioral intervention. Patients receiving brief CBT experienced reduced symptoms of anxiety and depression after the intervention and at three to four weeks postdischarge compared with the treatment-as-usual group. Patients receiving CBT

also experienced more improvement in quality of life and a shorter hospital stay (7.9 days versus 9.2 days).

- As part of a larger trial, 60 patients undergoing thoracoscopic closure of congenital heart defects were randomly assigned to receive standard preoperative care versus standard preoperative care plus CBT [83]. Patients who received CBT had lower anxiety on the fifth day postprocedure compared with patients who received only standard preoperative care. The CBT treatment consisted of daily 40-minute sessions of CBT and relaxation techniques for two days prior to the procedure and four days subsequently.

Administration — CBT has been provided for acute procedural anxiety in four to five daily sessions of 40 to 60 minutes in length. The conceptual foundation and techniques for providing CBT are described in detail separately. (See ["Social anxiety disorder in adults: Psychotherapy", section on 'Cognitive-behavioral therapy'](#) and ["Generalized anxiety disorder in adults: Cognitive-behavioral therapy and other psychotherapies", section on 'Administering CBT'.](#))

Brief supportive therapy — Supportive therapy is a therapeutic technique that aims to build self-esteem through active listening (eg, openly acknowledging what the patient is saying, prompting for elaboration and clarification), emotional support and validation. It is commonly used in medical practice to help individuals cope with illness. The goals of treatment include alleviation of symptoms, regulation of negative emotions, enhancement of self-esteem, and improvement of adaptive skills and functioning [84]. A limited number of trials utilizing some elements of supportive psychotherapy found that this form of intervention is effective in reducing procedural anxiety [85-88]. Supportive therapy can be provided one-time in as little as 15 minutes [86] or 30 minutes [85] one day before the procedure. (See ["Overview of psychotherapies", section on 'Supportive psychotherapy'.](#))

Other therapy with minimal supporting evidence — Limited evidence suggests that music therapy, spiritual training, or video observation may reduce anxiety associated with clinical procedures.

- **Music therapy** – Music therapy may be helpful in reducing procedural anxiety; however, not all studies support its efficacy [89-117]. Music therapy involves using music (eg, listening, singing, playing, or composing) to reduce stress and improve mood. The studies differ in the types of procedures studied, the types of music played, whether music was chosen by the patient versus standard selection of music or nature sounds, length of the intervention, and timing (played before or during the procedure).
- **Spiritual training** – Connection with spiritual needs may help reduce pre procedural anxiety in some individuals. In a trial of 70 Muslim patients in Iran, patients who received

four to five sessions of spiritual and religious training congruent with Islamic supplication reported lower anxiety compared with those who were given a brief training before undergoing coronary artery bypass graft surgery [118]. When requested by the patient, we encourage this.

- **Video observation** – Video observation of the procedure allows the patient to view live video images of the procedure on a monitor, providing the same view as that of the clinician. Studies examining the use of real-time video observation of various clinical procedures including colonoscopy, ultrasound guided local injection, or colposcopy have shown conflicting results in reducing procedure-related anxiety [119-122].

SPECIFIC PHOBIA OF CLINICAL PROCEDURES

Specific phobias may include phobias related to clinical procedures and their immediate effects. The most common specific phobias of clinical procedures (ie, dental phobia, blood-injection-injury phobia, and MRI claustrophobia) are discussed below. Treatment of these phobias uses many of the same methods used for treatment of acute procedural anxiety. These phobias are diagnosed in the DSM-5-TR using a specifier indicating the type of phobic stimulus [8].

Dental phobia — Dental phobia often leads to avoidance of dental appointments or examinations [123]. Treatment of dental phobia may be accomplished with psychotherapy or pharmacologic management. Despite no evidence of a differential effect between psychotherapy and pharmacologic management, we prefer psychotherapy due to side effects of sedation with medication. Additionally, limited evidence suggests that psychotherapy may have longer-lasting effects as compared with medication [123,124]. This may be useful as dental care is a recurring need.

Psychotherapy — In the absence of comparative trials, our clinical experience favors treatment of dental phobia with in vivo exposure with or without a cognitive component, rather than other forms of psychotherapy or medication. Small clinical trials support the efficacy of cognitive and behavioral therapies in the treatment of dental phobia; however, interpretation is limited due to differences in defining dental phobia, assessment methods, and treatment components [125-129].

- **Cognitive-behavioral therapy (CBT) with exposure** – Cognitive therapy is typically delivered with exposure therapy as part of a multimodal treatment including psychoeducation and applied relaxation. In vivo and virtual reality exposure have been briefly examined for treatment of dental phobia [75,80,125-128,130-134]. As an example,

in a trial, 96 subjects with dental anxiety were randomly assigned to treatment with dentist-administered CBT versus sedation with [midazolam](#) plus an evidence-based communication model. Similar reductions in the Modified Dental Anxiety Scale and the Index of Dental Anxiety and Fear scale were noted with each treatment group [133]. (See '[Cognitive-behavioral therapy](#)' above and "[Overview of psychotherapies](#)", section on '[Cognitive and behavioral therapies](#)' and "[Specific phobia in adults: Cognitive-behavioral therapy](#)".)

- **Other interventions with limited support** – These interventions are typically given as part of a multimodal treatment including exposure, rather than as a stand-alone treatment.
 - **Eye movement desensitization and reprocessing (EMDR)** – This is a type of CBT treatment that incorporates saccadic eye movements during exposure. A small trial including 31 subjects with dental phobia found treatment with EMDR-reduced dental anxiety and avoidance as compared with waitlist group [134].
 - **Progressive muscle relaxation** – In progressive muscle relaxation the patient is instructed to practice tensing (5 seconds) and relaxing (10 seconds) different muscle groups starting from top of the head down to the toes. The patient subsequently learns to relax the entire body on cue [77,135]. Once the patient becomes proficient in muscle relaxation, they are taught to apply the skills of relaxation to anxiety-provoking situations as a coping strategy to counteract the physiological arousal experienced when anxious [77,136]. Limited data support the use of this method in the treatment of dental phobia [136]. (See '[Cognitive-behavioral therapy](#)' above.)
 - **Hypnotherapy** – Clinical trials do not consistently show evidence of efficacy of hypnotherapy for treatment of dental phobia [137-139].

Pharmacotherapy — For individuals who are treated with medication, we suggest the use of [nitrous oxide](#) sedation over general anesthesia or benzodiazepines. General anesthesia can be useful for patients with dental phobia needing major dental work that would require multiple treatment sessions using other sedatives or as a last resort when other methods are not safe, feasible, or have been ineffective.

- **Nitrous oxide** – Despite a paucity of efficacy data, [nitrous oxide](#)/oxygen is the sedation medication of choice in dental practice [140]. Administration of nitrous oxide has been associated with reduced anxiety and avoidance in patients with dental phobia in clinical trials but has not been compared with placebo in this population [141-143].

Contraindications of [nitrous oxide](#) sedation include early pregnancy, chronic respiratory conditions (eg, chronic pulmonary disease and cystic fibrosis), certain illnesses (eg, upper respiratory tract infections, pneumothorax) and following certain surgical procedures (eg, eye surgeries or tympanic membrane repair with graft). Sedation with nitrous oxide is discussed in more detail separately. (See "[Procedural sedation in adults in the emergency department: General considerations, preparation, monitoring, and mitigating complications](#)".)

- **Benzodiazepines** – Benzodiazepines appear to be efficacious for sedation and anxiolysis in dental phobia but have disadvantages compared with other treatments. Clinical experience and limited evidence support the efficacy of benzodiazepines [[123](#)]. Benzodiazepines, however, cause sedation and psychomotor impairment that can last for hours, in contrast to minutes for [nitrous oxide](#) ([table 1](#)). (See '[Benzodiazepines as first-line medication](#)' above.)

Blood-injection-injury phobia — Our preference for first-line treatment for blood-injection-injury phobia is with applied tension, a combination of muscle tensing and exposure therapy. Blood-injection-injury phobia is characterized by the fear of seeing blood, receiving an injection, or of other invasive medical procedures [[144](#)]. (See "[Specific phobia in adults: Epidemiology, clinical manifestations, course, and diagnosis](#)", section on '[Specific phobia specifiers](#)'.)

- **Applied tension** – Applied tension involves repeatedly tensing body muscles to increase blood pressure and prevent fainting. This intervention is used to counteract the vasovagal fainting response associated with blood phobia [[145-147](#)]. The patient is instructed to tense and hold their muscles for a brief period, allow tension to build, then release the hold. Once the technique is mastered, the patient is instructed to use the technique in response to the early signs of a drop in blood pressure (eg, lightheadedness) during exposure practice to feared situations. Small, randomized trials show greater effect with applied tension than exposure or muscle tension alone. Interpretation, however, is limited due to sample size and variable results [[129,147,148](#)]. (See "[Specific phobia in adults: Cognitive-behavioral therapy](#)", section on '[Applied tension](#)'.)

When there is a known history of fainting and the patient has not learned the applied tension technique, we recommend that the patient lie down during a procedure (eg, venipuncture), look away from the site of blood draw, and sit up slowly only after sensations of dizziness and fainting resolve.

MRI claustrophobia — For most patients with MRI claustrophobia, we suggest adjustment of the patient's position in the MRI scanner as the first step.

In patients where this approach is not effective, treatment with benzodiazepines is generally suggested; however, in individuals requiring multiple MRIs, in vivo exposure therapy or cognitive therapy are reasonable alternatives.

- **Benzodiazepines** – We suggest using the same pharmacologic management of MRI claustrophobia as noted for treatment of acute procedural anxiety. There are no controlled trials comparing a benzodiazepine with placebo in MRI claustrophobia. Limited experience suggests that sedating effects of benzodiazepines allow better tolerance of the procedure and completion of the MRI examination [149]. (See '[Benzodiazepines as first-line medication](#)' above and '[Administering benzodiazepines](#)' above and '[Side effects and precautions](#)' above.)
- **Psychotherapies** – For patients with claustrophobia who require repeated MRIs, have medical contraindications to benzodiazepines and/or prefer psychotherapy, treatment with in vivo exposure therapy or cognitive therapy are effective. Cognitive therapy may be easier to implement since in vivo exposure therapy requires conducting the session in an environment similar to that of an MRI suite.

Clinical trials have found in vivo exposure and cognitive therapy to be equally effective in the treatment of claustrophobia with each leading to greater improvement than placebo [150,151]. For example, in a trial involving 46 patients with claustrophobia, symptomatic improvement was maintained for one year in 81 to 100 percent of patients receiving exposure therapy only, and 93 percent of patients receiving cognitive therapy only, but only 17 percent of patients assigned to a waiting list control [151].

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "[Society guideline links: Anxiety and anxiety disorders in adults](#)".)

SUMMARY AND RECOMMENDATIONS

- **Definitions**
 - **Acute procedural anxiety** – Acute procedural anxiety is an excessive fear of medical, dental, or surgical procedures that results in acute distress or interference with completing necessary procedures. (See '[Introduction and Terminology](#)' above.)

- **Specific phobia of clinical procedures** – Some specific phobias are conceptualized as a subset of the manifestations of acute procedural anxiety. These are diagnosed when the patient's fears are specific to the procedure or its immediate effects. (See ['Introduction and Terminology'](#) above.)
- **Planning treatment** – We use shared decision-making in formulating the treatment plan. We review the impact of the anxiety or procedure phobia on the patient's quality of life and daily functioning and whether the anxiety is causing avoidance of a needed procedure. (See ['Planning treatment'](#) above and ['To treat or not to treat'](#) above.)
- **Treating co-occurring anxiety disorders** – We prioritize the treatment of co-occurring anxiety disorders such as generalized anxiety disorder or panic disorder. Presenting symptoms may be due to co-occurring disorders which, if treated, may improve the presenting symptoms and overall quality of life. (See ['Addressing co-occurring anxiety disorders'](#) above.)
- **Choosing treatment modality** – Medication and brief cognitive-behavioral therapy (CBT) are both effective treatments for acute procedural anxiety and treatment of specific phobias of clinical procedures and can be used as first-line treatment. We typically choose between these interventions on the basis of patient preference; however, specific factors affect our treatment selection include (see ['Choosing initial treatment modality'](#) above):
 - **Pharmacologic management** is favored as the initial treatment in the following circumstances:
 - Patient preference
 - Clinical need is emergent or one-time rather than recurring
 - Patient's anxiety is too severe to tolerate psychotherapy
 - Psychotherapy is unavailable or was ineffective
 - **Psychosocial intervention** is favored as the initial treatment in the following circumstances:
 - Patient preference
 - Patient is unable to tolerate the medications or has medical contraindications
 - The patient requires a procedure on a repeated basis
- **Benzodiazepine as first-line medication** – For most patients receiving medication for procedural anxiety, we suggest first-line treatment with a benzodiazepine (eg, [midazolam](#)

or [lorazepam](#)), rather than other medications ([table 1](#)) (**Grade 2C**). (See '[Benzodiazepines as first-line medication](#)' above.)

- **Melatonin as alternative medication** – For patients who do not tolerate benzodiazepines, who have a substance use disorder or cognitive impairment that precludes their use, or in individuals in which they have been ineffective, we suggest treatment with sublingual melatonin rather than benzodiazepines (**Grade 2C**). (See '[Melatonin as alternative to benzodiazepine](#)' above.)
- **Psychosocial intervention** – We suggest first-line treatment with either brief CBT or brief supportive therapy rather than other psychosocial interventions (eg, supplemental education, music therapy, spiritual training) for individuals receiving psychosocial treatment of acute procedure anxiety (**Grade 2C**). (See '[Psychosocial management](#)' above.)
- **Specific phobia of clinical procedure** – Specific phobias may include fears that are specific to a clinical procedure. The most commonly seen specific phobias of clinical procedures include dental phobia, MRI claustrophobia, and blood-injection-injury phobia (see '[Specific phobia of clinical procedures](#)' above). In vivo exposure is highly recommended in such instances, in addition to the psychosocial intervention(s) described above.

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Topic 16851 Version 27.0

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