



Local Anesthesia and Sedation for Patients With PTSD

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Local Anesthesia and Sedation for Patients With PTSD

Effective Date: 6/1/2018 Expiration Date: 6/1/2021

Learning Objectives: After reading this article, the individual will learn: (1) the importance of local anesthesia and the proper level of sedation when treating patients with post-traumatic stress disorder (PTSD), and (2) the local anesthesia and sedation protocols used to treat 3 patients with different causes of PTSD. **Subject Code:** 340.

About the Authors



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Disclosures: Dr. Flores reports no disclosures.

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Post-traumatic stress disorder (PTSD) is a condition of disordered stress responses associated with an experience perceived as so atrocious that it causes a mental, physical, or combined hyperdisturbance. It is a common reason patients seek anesthesia services for dentistry.^{1,2}

The following case reports show an anecdotal link, supported by literature, between acceptable dental experiences and the level of sedation currently performed in most dental offices. This article proposes that patients who suffer from PTSD have the best sedation outcomes when placed under minimal or deep sedation. Moderate sedation—which is a level most dentists are likely to achieve, whether purposely or unintentionally—is more apt to elicit PTSD experiences compared to light or deep sedation.³ When comparing light and deep sedation, the literature supports light sedation as more effective for PTSD patients.^{4,5}

Profound local anesthesia should be achieved prior to beginning any procedure. Likewise, a failing intravenous (IV) sedation may be due to a lack of profound local anesthesia, and it should be considered prior to administering more of the IV drug. Even though medications, education, and techniques for IV sedation have expanded in dentistry, appropriate local anesthesia remains the ideal treatment for pain elimination.⁵

To maintain consistency with the ADA's current revisions on anesthesia levels, this article will classify anesthesia as minimal, moderate, or deep sedation/general anesthesia.⁶ It will focus on sedation, not general anesthesia, since sedation is the anesthesia level most dental offices utilize.

CASE PRESENTATIONS

Case 1

A call was received from an obstetrician (OB). She had a 26-year-old female patient who was being seen for an intrauterine device (IUD) replacement under “light IV sedation.” The initial IUD, placed with a paracervical block only, was painful, and she requested IV sedation for replacement.

An IV drip was started in the right antecubital (AC) vein, with no supplemental oxygen (O₂) and with blood pressure and pulse oximetry monitoring. An initial dose of 2 mg midazolam and 50 mcg fentanyl was administered. The patient's blood pressure was 132/87. Oxygen saturation was 97%. She expressed discomfort during block administration, so an additional dose of 2 mg midazolam and 50 mcg fentanyl was administered. The block was administered, but, upon IUD placement, the patient started to kick and jerk. An additional dose of 2 mg midazolam and 50 mcg fentanyl was given, at which point the patient stopped twisting. Her blood pressure was 128/75. Oxygen saturation was 95%. IUD insertion was successful, but immediately after insertion, the oxygen saturation dropped to 92% and respirations slowed.

A sternal rub was given. The patient began to awaken and

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scream loudly for everyone to “get away.” The sternal rub was discontinued, and the doctor tried verbally calming the patient. The patient began to lapse back into hypopnea and O₂ desaturation. A sternal rub was again given, and the patient opened her eyes and “screamed at the top of her lungs.” The doctor stated that the scream was “the most intense, blood-curdling scream” she had ever heard, “like someone was killing her,” and that she was screaming about her uncle. The doctor reported, “It freaked the room out.” Unfamiliar with administering reversal agents, the obstetric team chose to allow the sedatives to metabolize. The re-sedating/sternal rub loop continued for approximately 10 minutes until the patient passed into a lighter level of anesthesia. After the patient recovered, it was revealed that she had audio and visual hallucinations about previous sexual abuse.

During the IUD pre-sedation consult, she voiced that she was seen in the author’s dental ambulatory surgical center (ASC) 2 years prior for extractions under IV sedation. Anesthesia records indicated that she denied any PTSD history during the dental anesthesia consult. On the day of the dental surgery, a 22-g IV was inserted in the right AC vein. Prior to transport to the operating room (OR), 2 mg midazolam was administered. An EKG, a pulse oximeter, a blood pressure cuff, a nasal cannula with 3L O₂ flow, protective goggles, protective arm restraints, and a precordial stethoscope were placed on the patient. While the attending dental surgeon and resident scrubbed, 2 mg midazolam, 25 mcg fentanyl, 20 mg ketamine, and 10 mg propofol were bolused, and propofol was started via infusion pump at 50 mcg/kg/min. Immediately prior to local anesthesia administration, 2 mg midazolam, 25 mcg fentanyl, 10 mg ketamine, and 10 mg propofol were bolused, and propofol infusion was increased to 75 mcg/kg/min. Respirations via precordial were 14 to 16 breaths/min.

The patient showed no signs of stimulation to multiple intra-oral injections and required a chin lift to keep the airway patent. Light snoring was noted, with periodic obstruction heard via precordial. As the resident moved to inject the other half of the mouth, an additional 2 mg midazolam and 25 mcg fentanyl dose was given to maintain a deep sedation level. The patient did not respond to surgical stimulus, and no more boluses were given during extractions of teeth Nos. 1, 16, and 17. Precordial respirations were 12 to 14 minutes, and propofol infusion was decreased to 50 mcg/kg/min after extraction of tooth No. 1. After extraction of tooth No. 16, breathing was quiet and controlled at 14 to 16 breaths/min, and propofol infusion decreased to 40 mcg/kg/min. As the resident began the extraction of tooth No. 32, an additional dose of 2 mg midazolam and 25 mcg fentanyl was given. Propofol infusion was discontinued as surgical site No. 17 was sutured. The total drug administration was 10 mg midazolam, 100 mcg fentanyl, 30 mg ketamine, and 240 mg propofol over a 90-minute case.

Table 1. Questions to Ask Patients With a History of Post-Traumatic Stress Disorder (PTSD)

- May I ask the reason for your PTSD diagnosis?
- Are there any specific sounds, lights, feelings, or situations that trigger your PTSD?
- For this procedure, you will be placed in a reclined position with males, females, or both around you or looking down at you. Will this trigger a PTSD episode?
- For this procedure, you will be administered sedative drugs that may trigger a PTSD episode. What are some calming measures you use?
- Would you be more comfortable with all female/male dentists or staff?
- Do you feel you need to be more or less asleep for PTSD control?

The patient recovered well and never expressed signs of PTSD.

Discussion

No PTSD history was disclosed prior to dental IV anesthesia. This author’s practice is to keep ketamine out of sedations for patients with a history of traumatic stress, but current literature supports that ketamine actually causes fewer traumatic reactions and PTSD symptoms during IV sedation, perhaps due to its dissociative action.⁷ This patient denied any PTSD history, but a characteristic of PTSD can be a repression of memories so awful or misunderstood by immature comprehensive processes that they are pushed far into the subconscious.^{8,9} Patients can also be fully aware of the abuse but cannot physically bring themselves to speak of it.⁸ PTSD from sexual abuse at an early age is not uncommon, with 30% of children falling victim to abuse.⁹ Other factors, such as mild disabilities or foster care, increase sexual abuse likelihood fourfold.¹⁰ Benzodiazepines, barbiturates, and other similar sedatives can increase the possibility of past recall that presents during sedation, though the accuracy of the recall is uncertain.¹¹

Dentists should also be aware that oral and vaginal mucosa share the same ectodermal origin and early innervation during fetal development.¹² Due to this fact, oral stimulation, especially under sedation, can be misinterpreted and confused with vaginal stimulation in a principle psychologists call the Mouth-Vagina

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Equation.¹³ It refers to vaginal contractions that can occur when infants are undergoing oral stimulation, such as suckling or nursing.¹⁴

The differing experiences of the same patient in Case 1 illustrate 2 important considerations. First, deeper sedation levels (as used in the dental procedure) may be more beneficial to PTSD patients in preventing PTSD dissociative episodes.¹⁵ Second, it is possible that the paracervical block in the OB suite may not have achieved adequate local anesthesia. The choice to administer more IV medications instead of re-administering more local anesthesia may have caused the patient to slip into a moderate sedation level. After our discussion, the OB doctor stated that a question about PTSD and abuse will be added to her practice's pre-sedation consult.

Case 2

A 38-year-old male, weighing 110 kg, was seen for extractions of teeth Nos. 14, 19, and 20. The patient requested IV sedation due to anxiety. The airway exam revealed an obese neck, limited cervical range of motion, Class IV Mallampati, and that he was a 0.5 packs per day smoker (Figure 1).

During the pre-sedation consult, the patient stated his last dental extractions were done in prison. Questions regarding PTSD were asked. The patient said he was diagnosed with PTSD due to gang and prison experiences. Previous gang activity led him to be stabbed and shot, collapsing his left lung. He also stated, "I don't like when people stand around me." After a discussion of triggers, current anxiety, procedure length, and the dental OR environment, the decision was made to place him under minimal sedation. Deep sedation was not recommended due to airway factors. He reported that he was able to keep his anxiety under self-control as long he was "awake." Sedation planning included the patient maintaining an aware state to help increase self-control of his behavior.

An IV was placed in the right AC vein, and 2 mg midazolam was administered prior to transport to the OR. Monitoring and protective procedures were repeated as in Case 1. While the dental surgeons scrubbed, 2 mg midazolam and 25 mcg fentanyl were bolused. Prior to local administration, a dose of 1 mg midazolam and 25 mcg fentanyl was given. The patient was appropriately responsive to verbal commands at the start of intraoral injections by the resident. During injections, his blood pressure increased from 138/92 to 152/110 and his heart rate increased from 87 to 120 bpm. Precordial respiration monitoring increased from 16 to 22 breaths/min. The patient was in discomfort, so an additional dose of 1 mg midazolam and 25 mcg fentanyl was given.



Figure 1. For the patient in Case 2, the decision was made to administer minimal sedation instead of deep sedation due to airway factors.

The patient tolerated the remaining local injections, but upon extraction pressure to tooth No. 14, he started to struggle. An additional dose of 2 mg midazolam and 25 mcg fentanyl was given. His blood pressure decreased to 142/97, and his heart rate decreased to 110 bpm. Respirations were deep and steady at 18 breaths/min. The patient tolerated the extraction of tooth No. 14 well. As the extraction of tooth No. 19 began, the patient again started to struggle, wail, and break through the protective restraints. The patient was instructed to keep his arms down and stop moving his head, but he was no longer responding normally to verbal commands. The suggestion was made that the attending dental surgeon complete the case. The patient began to make random vocalizations and purposefully move away from surgical stimulus.

The attending dental surgeon placed additional local injections, and the patient calmed. The attending dentist performed the remaining extractions with little aggravation of the patient. Slight snoring was heard through the precordial. After the last extraction, the resident took over suturing, and the patient began to respond normally to verbal commands. In the recovery area, he was asked about any hallucinations during the case. The patient stated he was back in prison, fighting, and felt hands holding him down.

Discussion

During the pre-sedation visit, the patient was visibly nervous: gripping the arms of the chair, constantly looking over his shoulder

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at the door, and sitting on the edge of the chair with constant shifting motions. This behavior looked excessively anxious, so he was asked about PTSD. In the general population, females have a higher prevalence of PTSD than males (3.4% of females, 0.3% of males), but in prison populations, PTSD in men increases to 9.5% to 21%.¹⁶ Other studies suggest this number is higher, but given the secrecy and hierarchal system assault brings, many male prisoners do not report.¹⁶

In this case, the patient slipped into moderate anesthesia after additional midazolam and fentanyl. However, the anesthesia provider had to rely on the local anesthesia placement of the resident. With an obtunded patient, it is difficult to tell if a patient is reacting to pressure or pain, but additional IV sedatives may not have been needed as this patient became more uncooperative. This is evident when the patient relaxed once the attending dentist re-administered local anesthetic. Under any form of sedation, the senses are modified, but under increasing levels of sedation, misinterpretation of pressure for pain becomes probable.¹⁷ Additional explanations for his negative behavior could be that he was processing the sensation as pressure but was unable to understand how to respond correctly. The local anesthesia placed by the resident may not have been effective or may have been misplaced.

Case 3

A 42-year-old male, weighing 90 kg, was seen for the extraction of teeth Nos. 10, 11, 12, and 13. The patient requested IV sedation due to anxiety, PTSD, and a hyperactive gag reflex. An airway exam revealed an obese neck, limited cervical range of motion, Class IV Mallampati, and status as a former smoker and ethanol abuser. The patient explained that he had a previous left knee surgery in which he “came out of anesthesia swinging.” The patient had infrequent dental care, only seeking care in emergency situations.

During the pre-sedation consult, the patient was forthcoming with his PTSD diagnosis and stated it was due to combat in the military. He was referred to a dental specialist for extractions, but he stated he does not know why “the guy stopped working on me.” The patient’s understanding of the specialist visit was that, at some point after 2 extractions were completed, he became uncontrollable and the procedure was aborted. The patient was then referred to the author’s university dental ASC. He said that prior to the induction of anesthesia at the specialist’s office, he told the doctor that he needs to be “more on the awake side” to cope with dentistry. The patient believes the specialist “did not listen.” After a discussion of trigger events, current anxiety, procedure length, and OR environment, the decision was made to place him under minimal sedation. Deep sedation was not recommended due to airway factors. Again, self-awareness was utilized as a means to control his behavior during the procedure.

The patient’s preoperative vital signs were a blood pressure of 120/76, a heart rate of 57, a temperature of 36.4°C, and a respiratory rate of 18 breaths/min. A 22-g IV was placed in the right AC vein, and 2 mg midazolam was administered prior to transport to the OR. The same monitoring and safety procedures were repeated as in Cases 1 and 2; 10 mg propofol and 25 mcg fentanyl were bolused, with another 1 mg midazolam and 25 mcg fentanyl given via local injections.

The patient was appropriately responsive to verbal commands for intraoral injections, with blood pressure remaining steady at 118/72, heart rate at 58 to 62 bpm, and precordial respirations at 16 breaths/min. He displayed no signs of discomfort and remained normally responsive to both verbal and tactile stimulation. After the first 2 extractions, an additional 1 mg midazolam and 10 mg propofol were given. The patient continued at a minimal level of sedation. Supplemental local injections were given, and an additional 25 mcg fentanyl was administered. The patient tolerated the remaining 2 extractions and suture placement well.

Discussion

In this case, it is evident that good local anesthesia was obtained given the fact that under light sedation, the patient remained comfortable throughout the extractions. This patient was also aware of his PTSD triggers, especially when it comes to dental care. One of his triggers was whizzing noises, since they remind him of bullets whizzing in the air. His increased ability to cope with PTSD may owe to its military origin. Since the Persian Gulf War, the military has been proactive in awareness and treatment of its members, especially those who have seen active combat. The military uses a reliable and valid PTSD checklist as a measure and guide to begin PTSD treatments.¹⁸ In rare occasions, increased benzodiazepine administration can cause paradoxical violence.¹⁹ This patient’s PTSD awareness and previous sedation experience in the dental setting were helpful in establishing a baseline sedation target to achieve. His anesthesia level never varied too far, if at all, from minimal, so his self-control was helpful in improving his dental sedation experience.

MANAGEMENT OF PTSD PATIENTS

When it is discovered that a patient has a PTSD history, the patient is assessed with certain questions (Table 1). Depending on patient feedback and provider assessment, reasonable accommodations should be made to increase patient comfort and sedation success.

CONCLUSION

Minimal, moderate, or deep sedative treatment can be achieved via nitrous oxide (N₂O), enteral, combination N₂O/enteral, or IV

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routes. The success of sedation is heavily contingent upon profound local anesthesia. Without it, even the most practiced sedation dental practitioner will have difficulty achieving patient cooperation. Uncooperative surgical behavior is further compounded in patients with previous traumatic experiences.

Sedation preparedness is started at the sedation-evaluation visit. Pre-medications to achieve minimal sedation may lose effectiveness during longer or more invasive treatments.² Local anesthesia with concurrent IV sedation is a safe, effective practice, but, as seen in the cases presented, PTSD and other traumatic events should be considered.³ Current literature and the cases presented here suggest that minimal or deep sedation may be the preferred level for PTSD patients.

As demonstrated in Case 1, the dentist needs to look for unspoken PTSD signs of sexual abuse. This may be in patients who admit to strange dreams or hallucinations, especially when lying recumbent with a dentist standing over them or when the mouth is probed. Patients may only half finish sentences when the PTSD question is asked, have overly strong reactions to questioning, or have visceral reactions to bright lights being shined in their faces.⁸

As demonstrated in Case 2, providers may want to look for exaggerated signs of paranoia, depression, intimidation behaviors, or extreme stress responses.²⁰ This author has had a former prisoner approach and state, “I have no problem going back to prison for my dentistry,” when he was denied the anesthesia level he wanted due to safety concerns in the outpatient setting. This is an example of an exaggerated intimidation response.

In Case 3, this patient was uncommon in his coping ability for PTSD, but providers should look for patients who are less self-disclosing and keep history answers abruptly short, particularly when asked about previous bad experiences. A 2009 study showed that combat veterans, male and female, express “PTSD symptom clusters,” which include issue or question avoidance, communication that appears emotionless or impaired, major depression, drug/alcohol misuse, and divorce, resulting in profound effects on relationships with others.²¹ A dental provider considering sedation should assess the possibility of PTSD, especially when the patient’s military service is known.

Mental health pre-anesthesia questions are important to gain a complete view of anesthesia needs. Understanding the associations between current mental conditions and the dentistry needed gives providers a direction to guide the sedation course. Remembering to reassess for profound local anesthesia prior to re-administration of sedative medications will allow a margin of safety for the dentist. ♦

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POST EXAMINATION QUESTIONS

1. **Patients who suffer from post-traumatic stress disorder (PTSD) have the best sedation outcomes when placed under:**
 - a. Minimal sedation.
 - b. Deep sedation.
 - c. Moderate sedation.
 - d. Either a or b.
2. **Which of the following is the ideal treatment for pain elimination?**
 - a. Light sedation.
 - b. Moderate sedation.
 - c. Deep sedation.
 - d. Appropriate local anesthesia.
3. **Moderate sedation is more apt to elicit PTSD experiences compared to light or deep sedation. When comparing light and deep sedation, the literature supports light sedation as more effective for PTSD patients.**
 - a. The first statement is true; the second is false.
 - b. The first statement is false; the second is true.
 - c. Both statements are true.
 - d. Both statements are false.
4. **Moderate sedation is a level of sedation most dentists are likely to achieve, whether purposely or unintentionally.**
 - a. True.
 - b. False.
5. **PTSD from sexual abuse at an early age is not uncommon, with _____ of children falling victim to abuse.**
 - a. 10%.
 - b. 20%.
 - c. 30%.
 - d. 40%.
6. **In the general population, females have a higher prevalence of PTSD than males. In prison populations, PTSD in males increases to 9.5% to 21%.**
 - a. The first statement is true; the second is false.
 - b. The first statement is false; the second is true.
 - c. Both statements are true.
 - d. Both statements are false.
7. **Unspoken PTSD signs of sexual abuse include:**
 - a. A patient who only half finishes sentences when a PTSD question is asked.
 - b. A patient who has strong reactions to questioning.
 - c. A patient who has visceral reactions to bright lights being shined in his or her face.
 - d. All of the above.

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- 8. In rare occasions, increased benzodiazepine administration can cause paradoxical violence in PTSD patients.**
- a. True.
 - b. False.
- 9. In Case 2, the patient slipped into moderate anesthesia after additional doses of midazolam and fentanyl. When local anesthetic was re-administered, the patient relaxed.**
- a. The first statement is true; the second is false.
 - b. The first statement is false; the second is true.
 - c. Both statements are true.
 - d. Both statements are false.
- 10. Nitrous oxide (N₂O), enteral, combination N₂O/enteral, or intravenous routes can be used to achieve:**
- a. Minimal sedation.
 - b. Moderate sedation.
 - c. Deep sedation.
 - d. All of the above.



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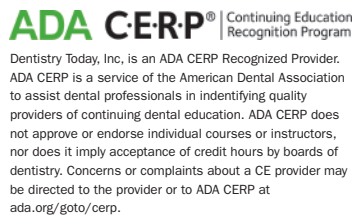
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