

# Best Practices for Management of Pain, Swelling, Nausea, and Vomiting in Dentoalveolar Surgery

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## KEYWORDS

• Pain • Wisdom teeth • Nausea • Vomiting • Swelling • Outpatient

## KEY POINTS

- Develop techniques to customize the outpatient experience and minimize these potential side effects.
- Review current therapies to minimize swelling, pain, and postoperative nausea and vomiting.
- Staying abreast of the current surgical and pharmacologic and even homeopathic methods of treating our patients' needs will ensure a safe outcome and good experience for our patients.

## BEST PRACTICES FOR CONTROLLING PAIN, SWELLING, NAUSEA, AND VOMITING FROM DENTOALVEOLAR SURGERY

Currently, therapy for the management of patient comfort after third molar surgery should be directed toward procedure-specific pharmacologic techniques that will minimize the inflammatory and noxious stimulus to the soft and hard tissues of patients. The buzzword today is all about preemptive methods to minimize the untoward effects of the surgery and anesthesia.

Although good surgical technique is a given, all surgery creates injury to the soft and hard tissues when it is related to the removal of impacted teeth. Multiple biochemical cascades are activated on the first incision in the mucosa. End fibers of afferent neurons send signals created by the noxious stimulus to both the cerebral cortex and limbic system. The clotting cascade is also activated, bringing in not only the necessary clotting factors but also the next

level of factors related to mounting an inflammatory response.

The inflammatory response to injury is the key to the development of pain and eventually swelling after any surgery. The inflammatory chemicals released from injury to tissue include prostaglandins, leukotrienes, bradykinin, and platelet-activating factors, to name a few. These chemicals, in turn, cause several chain reactions leading to vascular dilation and increased permeability, causing edema through interstitial fluid accumulation and increased tissue pressure.

The emotional response to pain and the actual surgical event can upregulate the response to the painful stimulus as well as the inflammatory stimulus that creates nausea, possibly leading to vomiting via the vagal pathways, our fight-or-flight mechanism.

Patient-specific factors to consider are their general health, including the possibility of a patient in chronic pain already on pain medications, drug

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abusers, immune compromise, and multiple allergies to medications. These patient issues are often difficult to manage well. Any patient that must take daily medication for any condition will need to be assessed for possible interactions between medications you would like to use, the surgical procedure needing to be done, and the risks of taking them off any medications they are using for their other health issues if indicated by the nature of the procedure.

Thus, there are multiple pathways that pharmacologic intervention can obtund, block, redirect, upregulate, or downregulate signals to improve the patients' physiologic experience as well as emotional experience postoperatively. Preventive measures should be considered in this light to decrease the pain, nausea, vomiting, and swelling associated with third molar surgery.

### **SURGICAL TECHNIQUE FROM OPENING TO CLOSING**

The more difficult the surgery, the more likely the patient will experience pain, swelling and trismus after the surgical removal of third molars. Overall this impacts on the patient experience and quality of life for several days after the event. The grade of extraction thus correlates positively with the trauma created to remove a third molar. Parant grade I tooth is equivalent to a simple forceps removal, whereas grade IV will require bone cutting and flap reflection.<sup>1</sup> Understanding this relationship should guide the practitioner to provide appropriate surgical techniques to minimize trauma as much as possible. It also allows the surgeon to formulate a pharmacologic action plan for minimizing pain, swelling, and trismus after surgery.

If a tooth is impacted and requires removal, the thought of flap design and type of closure will play a role in minimizing pain, swelling, and trismus. Borgonovo and colleagues<sup>2</sup> recently evaluated the use of 3 different types of flaps in third molar surgery on postoperative discomfort. They described the use of an envelope flap, a triangular flap, or a trapezoidal flap. An envelope flap was the least traumatic with dissection; the trapezoidal flap required the most dissection, periosteal stripping, and perhaps manipulation or injury of the masseter muscle. An envelope flap led to the least amount of pain, trismus, and swelling.

Closure of the flaps created to remove third molars has also been evaluated in regard to preventing pain, swelling, and trismus.<sup>3</sup> Closure either primarily or secondarily did not seem to impact pain or facial swelling according to the reviews in these papers. However, secondary closure has been found to create less trismus. The use of

primary closure versus a wound dressing was also assessed.<sup>4</sup> They found the use of a whitehead varnish dressing was more effective than primary closure to reduce swelling and trismus. Pain control was not changed with either method in this study. Logically the conclusion relates back to the initial issues described of tissue dissection and pain. The more dissection of either soft tissue or bone you do, the more it will create inflammation and, thus, increase pain.

### **PAIN CONTROL**

As stated previously, the best method to control postoperative pain will be to minimize the soft and hard tissue trauma from surgery. However, this unfortunately cannot always be avoided in the removal of third molars. Pain control, thus, begins with good surgical technique. The rest is up to the medications we choose to use for our patients to interfere with the propagation of pain and the perception of pain. Of course, during the removal of third molars the surgeon will use a local anesthetic to achieve pain control for the short-term. Local anesthetics block the afferent neural stimuli from the surgery by blocking the low voltage-gated sodium channels on the cell membranes and, thus, interfere with the afferent signal propagation. Blocking of the afferent neural stimuli by the local anesthesia will reduce the hyperalgesia and allodynia associated with surgery. Block injections or infiltration of local anesthesia, long-acting or short-acting drugs, and postoperative use of extended-release local anesthetics should be considered. The block injections will last longer than the infiltration of medications regardless of the type of local used. The need for rescue injections, which further traumatize soft tissues and create more inflammation, should be reduced.

Many different types of local anesthetics are available for use in third molar surgery. Of interest is the speed of onset of the medication and how long it will last when it comes to postoperative pain management. Lidocaine is the standard that all other medications are compared. Recent studies of local anesthesia comparing the efficiency of lidocaine with articaine and bupivacaine have been published.<sup>5-8</sup> In all the onset of action of these drugs is not as much an issue in relation to postoperative pain as the duration of action. Bupivacaine should be the local anesthetic of choice when it comes to achieving long-acting postoperative anesthesia. Its duration of action has been reported to be as long as 10 hours. This duration is important because the initial onset of the maximum severity of postoperative pain peaks within the first several hours after surgery. This

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