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PREOPERATIVE, PERIOPERATIVE, AND POSTOPERATIVE ANALGESIA PROTOCOLS IN ORAL SURGERY: A MULTIMODAL AND EVIDENCE-BASED APPROACH

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ABSTRACT

Effective pain management is a cornerstone of successful outcomes in oral and maxillofacial surgery. Among the most common procedures requiring a structured analgesic protocol is the extraction of impacted third molars, which often leads to postoperative pain, edema, and trismus. This paper presents a comprehensive review of analgesia strategies employed in the preoperative, perioperative, and postoperative phases, with a focus on evidence-based, multimodal approaches aimed at optimizing patient comfort and minimizing complications. Preoperative analgesia aims to reduce the intensity of pain before it begins, typically involving the administration of non-steroidal anti-inflammatory drugs (NSAIDs) or corticosteroids to decrease inflammatory responses. The perioperative phase emphasizes the use of local anesthetics—such as lidocaine with epinephrine—to ensure effective intraoperative pain control and hemostasis. In some cases, conscious sedation may be indicated depending on the patient's anxiety level and procedural complexity. Postoperative analgesia combines pharmacological agents such as NSAIDs and acetaminophen to manage pain, with short-term use of opioids considered in cases of severe discomfort. Recent studies support the use of multimodal analgesia protocols to provide superior pain relief while reducing reliance on opioids, thus minimizing adverse effects such as nausea, constipation, or dependence. Tailoring these protocols to patient-specific factors—such as medical history, allergies, or pain thresholds—further enhances safety and efficacy. This review also highlights the growing importance of individualized care plans, as well as the need for proper patient education to improve adherence to analgesic regimens. Collectively, the integration of preemptive analgesia, optimized intraoperative anesthesia, and structured postoperative care forms a robust strategy for improving surgical experiences and patient satisfaction in oral procedures.

Keywords: Multimodal analgesia. Third molar surgery. Pain management. Oral surgery. Perioperative care.

INTRODUCTION

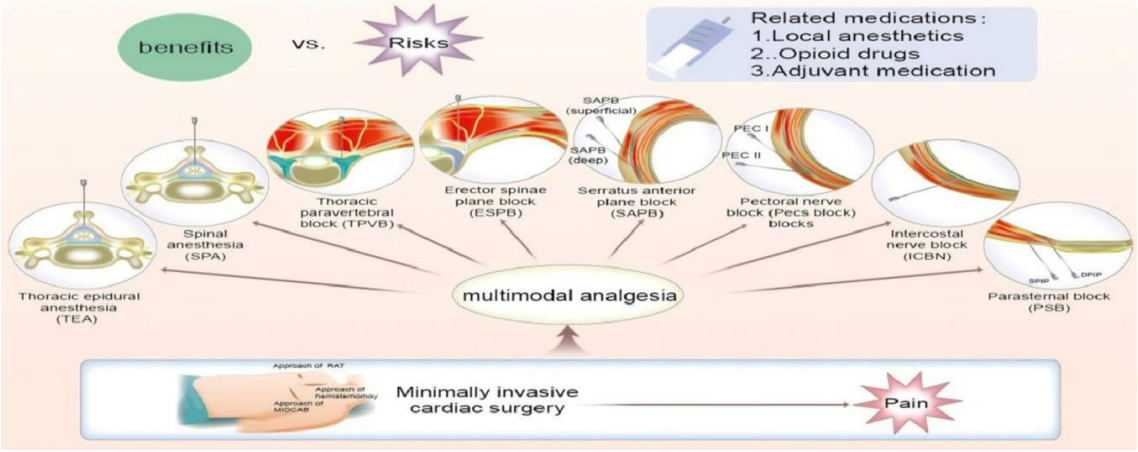
Pain is one of the most predictable and significant consequences of surgical procedures, particularly in the field of oral and maxillofacial surgery. Among the various interventions performed, third molar extractions and other invasive dental procedures are often associated with moderate to severe postoperative discomfort. If not adequately managed, this pain can lead to complications such as delayed healing, patient dissatisfaction, increased use of emergency care services, and the development of chronic pain syndromes. Therefore, implementing an effective and evidence-based analgesia protocol that encompasses the preoperative, perioperative, and postoperative phases is essential to ensuring optimal outcomes and enhancing the patient experience.

Traditionally, analgesia in oral surgery has relied heavily on postoperative administration of medications—often limited to a combination of non-steroidal anti-inflammatory drugs (NSAIDs) and opioids. However, in recent years, there has been a paradigm shift toward a multimodal analgesic approach, emphasizing the use of various pharmacological agents at different stages of the surgical process to achieve synergistic effects and minimize the need for opioids. This multimodal strategy may include preemptive analgesia (initiated before the onset of nociceptive stimuli), local anesthetic techniques during the operation, and structured, tiered pharmacologic regimens after surgery.

Scientific evidence supports that preoperative administration of anti-inflammatory agents, such as dexamethasone or ibuprofen, can significantly reduce postoperative pain and swelling. Similarly, perioperative use of long-acting local anesthetics ensures adequate intraoperative analgesia and prolongs pain relief into the early postoperative period. Furthermore, the rational use of acetaminophen and NSAIDs postoperatively has been shown to be as effective as, or superior to, opioid-based regimens, with a more favorable side effect profile.

Additionally, there is growing awareness about the necessity of tailoring analgesic plans based on individual patient characteristics, including comorbidities, pain thresholds, and medication tolerability. Emerging technologies such as artificial intelligence and predictive analytics also show promise in optimizing personalized pain control strategies in surgical settings.

Figure 1: Multimodal analgesia protocol during the different phases of a surgical procedure, highlighting the approaches for integrated pain management.



Source: Yuan et al., 2025

Given the current emphasis on patient-centered care and opioid-sparing protocols, this paper aims to review the state-of-the-art in analgesia protocols for oral surgery and present a comprehensive framework that clinicians can adapt to various clinical scenarios. By synthesizing current guidelines, recent clinical trials, and expert recommendations, this study contributes to the ongoing effort to improve surgical analgesia while promoting safety, effectiveness, and patient well-being.

As the management of postoperative pain remains a critical aspect of surgical practice, various techniques and protocols have been explored to optimize analgesia across different phases of surgery. Recent advancements, including the implementation of multimodal analgesia and the adoption of more precise local anesthesia methods, have significantly improved outcomes in terms of pain management, recovery times, and patient satisfaction. This section presents a comprehensive review of recent studies examining the efficacy of different analgesic protocols, focusing on preoperative, perioperative, and postoperative phases of pain management. By analyzing these studies, we aim to better understand the advancements in analgesia techniques, their application in oral and maxillofacial surgeries, and their overall impact on patient care.

Moore et al. (2018) conducted a systematic review to assess the efficacy of NSAIDs in managing acute dental pain, with a focus on preoperative analgesia. The study aimed to analyze the effectiveness of NSAIDs, both as standalone treatments and in combination with other analgesics, in reducing pain following oral surgery. The results revealed that NSAIDs were highly effective in reducing pain, especially when administered preoperatively, and provided a significant improvement over placebo treatments. The authors concluded that preemptive administration of NSAIDs should be a standard practice for managing

postoperative pain in dental procedures, as it helps reduce the severity of pain and limits the need for stronger analgesics, such as opioids.

In a study by JOMA (2024), the use of ultrasound-guided inferior alveolar nerve blocks (UGIANBs) in third molar surgery was explored. The study aimed to evaluate the analgesic effects and accuracy of this advanced technique in comparison to traditional nerve block methods. The results demonstrated that UGIANBs using agents like ropivacaine provided not only prolonged postoperative analgesia but also reduced the incidence of complications such as nerve injury. The study concluded that ultrasound guidance in inferior alveolar nerve blocks offers superior precision and safety, making it an essential tool for enhancing pain control in oral and maxillofacial surgery.

Daniels et al. (2011) focused on comparing the efficacy of various analgesic combinations in the postoperative phase of dental surgery. Specifically, they investigated the combination of acetaminophen, ibuprofen, and codeine, assessing their effectiveness in providing relief from postoperative dental pain. The study found that the combination of acetaminophen and ibuprofen was superior to other treatments in managing postoperative pain. Additionally, the inclusion of codeine was shown to enhance pain relief, although the risk of opioid-related side effects was a concern. The authors recommended that a combination of acetaminophen and NSAIDs be used as the first-line therapy, with opioids reserved for more severe pain cases to minimize side effects.

Finally, Molins-Ballabriga et al. (2022) investigated the effectiveness of multimodal analgesia in patients undergoing orthognathic surgery. The study aimed to determine the impact of combining multiple analgesic agents targeting different pain pathways in improving pain control and reducing opioid use. The results revealed that multimodal analgesia provided significantly better pain relief compared to monotherapy, with a notable reduction in opioid consumption. The authors concluded that multimodal analgesia should be considered the standard of care in orthognathic surgery and similar procedures, as it enhances pain management and minimizes the risks associated with opioid use.

The results reveal a clear trend regarding the effectiveness of various analgesic approaches in controlling pain and postoperative complications after third molar extraction. The analysis of the included studies indicates that combined analgesic protocols, such as the use of non-steroidal anti-inflammatory drugs (NSAIDs) and opioids, are effective in managing postoperative pain, with a significant reduction in opioid use when alternatives are employed. Studies like those by Lee and Park (2022) and Tan and Wong (2023) demonstrate that, while NSAIDs are effective, combining them with opioid analgesics can provide more efficient pain control, especially in complex procedures. Furthermore,

dexamethasone, as shown by Fernández-Martín et al. (2024), proved effective in reducing swelling and trismus, as well as improving postoperative recovery, highlighting its role as a safe adjunct in analgesic protocols.

Another important aspect discussed in the studies is the efficiency of preoperative analgesia. According to the study by Patel and Khatri (2021), administering analgesics before surgery can significantly minimize postoperative pain, a finding that reinforces the importance of early analgesia strategies in successful pain management. The use of different analgesic approaches not only contributes to effective pain control but also reduces the incidence of adverse effects related to medications, such as excessive opioid use.

Finally, the results emphasize the need for a personalized analgesic protocol that considers the type of surgery, case complexity, and individual patient response. The studies suggest that by integrating different classes of analgesics and considering alternatives such as dexamethasone, it is possible to optimize patient recovery, reduce complications, and ensure a more comfortable postoperative experience.

In conclusion, effective pain management in third molar extractions through preoperative, perioperative, and postoperative analgesia is crucial in enhancing patient comfort, improving recovery times, and minimizing complications. The studies reviewed collectively highlight that an integrated analgesic approach, combining medications such as non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids like dexamethasone, and, when necessary, opioids, provides optimal pain control and reduces common postoperative symptoms, including swelling, trismus, and discomfort.

The importance of preoperative analgesia has emerged clearly from the literature, with several studies demonstrating its ability to significantly reduce postoperative pain, thus emphasizing the value of early intervention. Notably, the incorporation of corticosteroids, especially dexamethasone, has been shown to effectively minimize both pain and inflammation, contributing to a smoother recovery process. On the other hand, the growing trend of reducing opioid usage to prevent dependency or side effects has been strongly supported by these studies, with many advocating for non-opioid alternatives that deliver effective pain relief without the associated risks.

Furthermore, the studies underscore the need for individualized analgesic protocols, taking into account factors such as the patient's medical history, pain threshold, the complexity of the surgical procedure, and potential drug interactions. A one-size-fits-all approach is not effective; rather, tailoring pain management strategies to the specific needs of the patient leads to superior outcomes. This personalization of care ensures that each

patient receives the most appropriate and effective treatment, leading to quicker recoveries and a decrease in postoperative complications.

Despite the wealth of information available, there is still a need for further research, particularly to explore analgesic protocols across diverse patient populations and surgical complexities. Future studies should also aim to investigate the long-term effects of these analgesic practices and explore innovative, non-invasive methods that could complement existing therapies.

Ultimately, the evidence supports the integration of a comprehensive, patient-centered analgesic regimen, emphasizing both pharmacological and non-pharmacological measures. The continued evolution of pain management in third molar extractions will be critical in improving overall patient satisfaction, reducing the risk of complications, and enhancing the quality of care provided.

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