RESEARCH PAPER

Does PSA Block Is Sufficient For Extraction Of Maxillary Posterior Teeth Having Apical Periodontitis?: a prospective study

Type of study: Prospective study

Running title: Effect of PSA block for extraction of maxillary posterior teeth with apical periodontitis

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ABSTRACT

Background: Achieving adequate anaesthesia during extraction of maxillary posterior teeth with apical periodontitis can be challenging due to inflammatory changes in periapical tissues. The Posterior Superior Alveolar (PSA) nerve block is commonly used; however, its effectiveness as a sole anaesthetic technique in such cases remains uncertain.

Aim: To evaluate the adequacy of PSA nerve block as a stand-alone anaesthetic technique for the extraction of maxillary posterior teeth with apical periodontitis.

Materials and Methods: This prospective study included 20 patients aged between 40 and 70 years presenting with maxillary posterior teeth diagnosed with apical periodontitis. All patients received a PSA nerve block prior to extraction. Pain levels were assessed using a pain scale. Patients who reported pain scores between 3 and 10 received supplemental infiltration anaesthesia, after which pain was reassessed. The need for additional anaesthesia and pain relief outcomes were recorded and analysed.

Results: Out of 20 patients, only 3 patients (15%) achieved adequate anaesthesia with the PSA block alone. The remaining 17 patients (85%) required supplemental infiltration anaesthesia to achieve complete pain relief. A marked reduction in pain scores was observed following infiltration anaesthesia compared to PSA block alone.

Conclusion: The PSA nerve block alone is often insufficient for achieving profound anaesthesia in maxillary posterior teeth with apical periodontitis. Supplemental infiltration anaesthesia is frequently required and should be considered a routine adjunct to ensure effective pain control and improved patient comfort during extraction procedures.

Keywords: PSA nerve block, apical periodontitis, maxillary posterior teeth, infiltration anaesthesia, tooth extraction, pain management.

How to cite this article: Fathima J N, Saravanan. DOES PSA BLOCK IS SUFFICIENT FOR EXTRACTION OF MAXILLARY POSTERIOR TEETH HAVING APICAL PERIODONTITIS?: A PROSPECTIVE STUDY. Int J Drug Deliv Technol. 2026;16(15s): 810-813. DOI: 10.25258/ijddt.16.15s.91

INTRODUCTION

Extraction of maxillary posterior teeth affected by apical periodontitis represents a common dental procedure, often required to alleviate pain, resolve infection, and restore oral health. Among the key considerations in performing these extractions is the choice of anaesthesia technique, which not only ensures patient comfort but also facilitates the extraction process by achieving profound anaesthesia. One frequently employed method is the Posterior Superior Alveolar Nerve (PSA) block, a regional anaesthetic technique designed to anaesthetise the posterior maxilla, including the maxillary molars.(1)(2,3)

Apical periodontitis, characterised by inflammatory and infectious changes in the periapical tissues of a tooth, presents a significant clinical challenge in dental practice(4). The successful extraction of teeth with apical periodontitis not only requires effective pain management but also necessitates thorough anaesthesia to minimise patient discomfort during the procedure. Traditionally, PSA block anaesthesia has been utilised to achieve anaesthesia in the posterior maxilla for various dental procedures, including extractions.However, the anatomical complexity of the maxillary molars, along with variations in nerve innervation, may result in incomplete anaesthesia or the need for supplementary injections.(1,5,6)

Does psa block is sufficient for extraction of maxillary posterior teeth having apical periodontitis?:a prospective study

This prospective study seeks to investigate the adequacy of the PSA block technique as a stand-alone method for achieving profound anaesthesia during the extraction of maxillary posterior teeth with apical periodontitis. Our study aims to assess both the clinical outcomes and patient-reported experiences, including pain levels and satisfaction, following extractions performed with PSA block anaesthesia.(2)(7)(8)

Through rigorous data collection and analysis, we aim to contribute critical insights into the effectiveness and limitations of PSA block anaesthesia in managing pain and discomfort during tooth extractions complicated by apical periodontitis. Our findings have the potential to inform clinical practice by providing evidence-based guidance on the choice of anaesthesia technique for these specific extractions.

MATERIALS AND METHODS

Study Design and Setting

This study was designed as a prospective clinical study conducted in the Department of Oral and Maxillofacial Surgery at Saveetha Dental College and Hospitals.

Study Population

A total of 20 patients aged between 40 and 70 years who presented with maxillary posterior teeth diagnosed with apical periodontitis and indicated for extraction were included in the study.

Inclusion Criteria

- Patients with maxillary posterior teeth (premolars and molars) diagnosed with apical periodontitis
- Patients requiring extraction of the affected tooth
- Patients willing to participate and provide informed consent

Exclusion Criteria

- Patients with systemic conditions such as diabetes mellitus and hypertension
- Patients with known allergy to local anaesthetic agents
- Patients on analgesics or antibiotics prior to the procedure
- Pregnant or lactating women

Anaesthetic Procedure

All patients received a Posterior Superior Alveolar (PSA) nerve block using a standard technique with local anaesthetic solution. A waiting period of a few minutes was allowed to achieve anaesthesia.

Pain Assessment

Pain was assessed using a numerical pain rating scale (0–10), where:

- 0 = No pain
- 1–3 = Mild pain
- 4–6 = Moderate pain
- 7–10 = Severe pain

Pain scores were recorded after administration of the PSA block and prior to extraction.

Supplemental Anaesthesia

Patients who reported a pain score between 3 and 10 after PSA block were administered supplemental infiltration anaesthesia in the periapical region of the affected tooth. Pain was reassessed before proceeding with extraction.

Outcome Measures

The primary outcome measured was the adequacy of PSA nerve block, determined by:

- Ability to perform extraction without additional anaesthesia
- Requirement of supplemental infiltration anaesthesia

Secondary outcomes included:

- Pain scores following PSA block
- Pain scores after supplemental infiltration

Data Collection and Analysis

All data were recorded in a structured format and tabulated. The results were expressed as frequency and percentage. Graphical representations, including pie charts and bar graphs, were used to illustrate the distribution of anaesthetic effectiveness and the need for supplemental anaesthesia.

RESULTS:

Anaesthesia Technique	Number (n=20)	Percentage (%)
PSA Block only	3	15%
PSA+Infiltration	17	85%
Total	20	100%

Table 1: Distribution of Anaesthetic Effectiveness

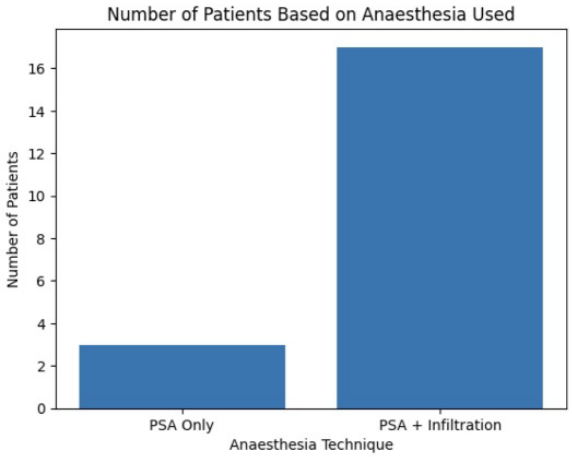

Figure 1: Bar graph showing distribution of patients based on anaesthetic technique used.

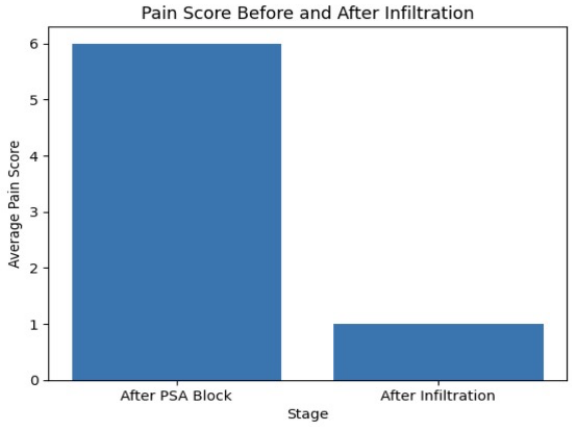

Figure 2 : Bar graph comparing pain scores after PSA block and after supplemental infiltration.

A total of 20 patients with maxillary posterior teeth diagnosed with apical periodontitis were included in this prospective study. Among the participants, 3 patients (15%) achieved adequate anaesthesia with the Posterior Superior Alveolar (PSA) nerve block alone, allowing the extraction procedure to be completed without any additional anaesthetic intervention. However, the majority of patients, 17 patients (85%), experienced inadequate anaesthesia following the PSA block and required supplemental infiltration anaesthesia to achieve complete pain relief.

The distribution of anaesthetic effectiveness is presented in Table 1, which shows that only a small proportion of patients could be managed with PSA block alone, while most required additional infiltration. This trend is further illustrated in Figure 1, where the number of patients requiring supplemental anaesthesia is significantly higher compared to those managed with PSA block alone.

Pain assessment following the administration of PSA block revealed that most patients reported moderate to severe pain, indicating incomplete anaesthesia. Following the administration of supplemental infiltration anaesthesia, a marked reduction in pain levels was observed in all patients, enabling painless extraction. The comparison of pain scores before and after infiltration, as depicted in Figure 2, demonstrates a substantial decrease in pain following the use of supplemental anaesthesia.

Overall, the success rate of PSA block as a sole anaesthetic technique was 15%, whereas 85% of cases required additional infiltration anaesthesia. The final success rate after the use of supplemental infiltration was 100%, as all extractions were completed without pain.

Statistical analysis using the chi-square test demonstrated that the requirement for supplemental infiltration anaesthesia was significantly higher compared to the use of PSA block alone ($p < 0.05$). These findings indicate that PSA nerve block alone is insufficient in the majority of cases involving apical periodontitis, and the use of supplemental infiltration anaesthesia is essential to achieve effective pain control during extraction of maxillary posterior teeth.

DISCUSSION:

The aim of this prospective study was to assess the adequacy of the posterior superior alveolar (PSA) nerve block as a sole anesthetic technique for the extraction of maxillary posterior teeth with apical periodontitis. Our findings have provided valuable insights into the clinical requirements for patients in this specific category.(9)

Our study, in alignment with previous literature, demonstrates that the PSA block alone can be effective in achieving pulpal anesthesia for most patients undergoing maxillary posterior tooth extraction. However, it is important to emphasize that a significant subset of patients with apical periodontitis may require supplemental infiltration anesthesia to ensure complete pain control.(9,10)(9–11)

We observed considerable variability in patient responses to the PSA block in our study. While some patients achieved satisfactory anesthesia solely through the PSA block, others reported discomfort or pain during the procedure, necessitating additional measures. This variability highlights the complex nature of apical periodontitis cases, where inflammation and infection may compromise the effectiveness of nerve blocks. (9–12)

Our findings strongly suggest that supplemental infiltration anesthesia should be considered as a standard practice in cases involving maxillary posterior teeth with apical periodontitis. Infiltration

anesthesia, particularly in the periapical region of the affected tooth, can provide localized anesthesia that complements the broader numbing achieved by the PSA block. This approach minimizes discomfort and ensures patient comfort during the extraction procedure.

Providing adequate pain control is a cornerstone of patient-centered dental care. For patients with apical periodontitis, who often experience acute and chronic pain, it is imperative that clinicians adopt a comprehensive approach to anesthesia. By combining the PSA block with infiltration when needed, practitioners can optimize patient comfort, enhance treatment outcomes, and reduce patient anxiety associated with the procedure.

Clinicians should approach each case individually, taking into consideration factors such as the extent of apical periodontitis, patient pain thresholds, and anatomical variations. A thorough assessment of the patient's condition and a clear understanding of the limitations of the PSA block are essential in making informed decisions regarding anesthesia techniques.

Conclusion:

In conclusion, our prospective study underscores the importance of recognizing the potential limitations of the PSA block in cases involving maxillary posterior teeth with apical periodontitis. While the PSA block can be effective for many patients, supplementary infiltration anesthesia should be readily available and considered a valuable adjunct to ensure comprehensive pain control and enhance the overall patient experience. The judicious use of both techniques reflects a patient-centered approach to dental care in this specific patient population

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