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Research Article

Efficacy of Superficial Cervical Plexus Block as an adjunct to Inferior Alveolar Nerve Block in Selective Maxillofacial Surgical Procedures: A Prospective Clinical Study

Sonam Mukati[1]*, Ajay Kumar Pillai[2], Neha Jain[3]

[1]Postgraduate Resident, Department of Oral & Maxillofacial Surgery, People's Dental Academy, Bhopal, India.

[2]Professor, Head, Department of Oral & Maxillofacial Surgery, People's Dental Academy, Bhopal, India.

[3]Professor, Department of Oral & Maxillofacial Surgery, People's Dental Academy, Bhopal, India.

***Corresponding Author:** Dr. Sonam Mukati, Postgraduate Resident, Department of Oral & Maxillofacial Surgery, People's Dental Academy, Bhopal, India.

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Abstract

Background: Achieving profound anesthesia in surgical procedures involving the mandibular angle region remains challenging due to overlapping sensory innervation from both the inferior alveolar nerve and branches of superficial cervical plexus. This study evaluates the effectiveness of superficial cervical plexus block (SCPB) as an adjunct to the inferior alveolar nerve block (IANB) in selective cases involving the angle of mandible.

Methodology: A prospective clinical study was conducted on patients undergoing minor maxillofacial surgical procedures in mandibular angle region. Intraoperative pain scores, onset of anesthesia, need for supplemental anesthesia, operator satisfaction, and postoperative analgesia were assessed.

Results: A total of 10 patients were included in the study. Patients in the superficial cervical plexus block demonstrated improved intraoperative analgesia, lower intraoperative pain scores and reduced requirement for supplemental anesthetic injections. The onset of anesthesia was clinically faster, and the duration of postoperative analgesia was longer, no major complications or adverse effects were recorded during the study period.

Conclusions: Superficial cervical plexus block appears to provide sufficient anesthesia and increased patient comfort in surgeries involving the mandibular angle. SCPB may be considered as an effective and safe alternative for improved perioperative pain control.

Keywords: *Superficial Cervical Plexus Block; Inferior Alveolar Nerve Block; Mandibular Angle Surgery; Maxillofacial Anesthesia.*

Introduction

Pain control is a fundamental aspect of maxillofacial surgery, directly influencing patient comfort, surgical efficiency, and postoperative recovery. The mandibular angle, ramus, and posterior body constitute regions where profound anesthesia is often difficult to achieve using conventional techniques. While the inferior alveolar nerve block (IANB) remains the primary technique for mandibular anesthesia, several patients continue to report discomfort during surgical procedures in the mandibular angle region. [1,2]

This limitation is attributed to the complex sensory innervation of the area. The superficial branches of the cervical plexus—including the great auricular, transverse cervical, and lesser occipital nerves—contribute to the cutaneous innervation of the skin and fascia overlying the mandibular angle. Due to this anatomical overlap, IANB alone may fail to provide complete analgesia.

The superficial cervical plexus block (SCPB) has recently gained attention as a potentially superior adjunct technique for achieving comprehensive anesthesia in the mandibular angle region. The block is simple, safe, and capable of anaesthetizing the cervical plexus branches before they reach their cutaneous targets.

This study aims to evaluate the effectiveness, patient comfort, and clinical outcomes of SCPB when used along with IANB in selective maxillofacial surgical procedures. [3-10]

Materials and Methods

The study design was a prospective clinical study conducted in the Department of Oral and Maxillofacial Surgery at People's Dental Academy, Bhopal, over a duration of 3 months. A total of 10 participants, aged 18 to 60 years, were included in the study. The inclusion criteria encompassed patients who were indicated for minor surgical procedures in the mandibular angle and posterior mandibular region, classified as ASA I or II, and were capable of providing informed consent. Those who are medically and mentally compromised were excluded.

For anesthesia techniques, both the inferior alveolar nerve block (IANB) and the superficial cervical plexus block (SCPB) were administered. The SCPB was performed at the midpoint of the posterior border of the sternocleidomastoid muscle, utilizing 5–7 mL of 2% lignocaine with adrenaline at a dilution of 1:100,000. Various outcome measures were assessed, including the onset of anesthesia, intraoperative pain scores using a Visual Analog Scale (VAS), the need for supplemental anesthesia, operator satisfaction scores, the duration of postoperative analgesia, and any complications that may have arisen during the study period.

Anatomy of the Superficial Cervical Plexus

The cervical plexus is formed by the anterior rami of the first four cervical spinal nerves (C1–C4). It is located in the neck, lying deep to the sternocleidomastoid muscle and superficial to the prevertebral fascia. The plexus gives rise to both motor and sensory branches; the superficial cervical plexus consists mainly of cutaneous sensory nerves supplying the skin of the neck, lower face, and mandibular angle region. [1]

The superficial branches of the cervical plexus emerge at the posterior border of the sternocleidomastoid muscle at a point known as Erb's point, situated approximately at the midpoint of the muscle. After emerging, these nerves pierce the deep cervical fascia and course superficially to innervate their respective cutaneous territories. [2]

The principal superficial branches include the great auricular nerve, transverse cervical nerve, lesser occipital nerve, and supraclavicular nerves.

The great auricular nerve (C2–C3) ascends vertically across the sternocleidomastoid muscle toward the parotid gland and mandibular angle. It supplies sensation to the skin over the angle of the mandible, parotid region, mastoid area, and the lower part of the auricle. This nerve is particularly relevant in maxillofacial surgery, as it contributes significantly to pain sensation during surgical manipulation of the mandibular angle. [3]

The transverse cervical nerve (C2–C3) runs horizontally across the sternocleidomastoid muscle and supplies the skin of the anterior cervical region. It may also contribute to sensory innervation of the submandibular and lower facial regions, which are frequently involved during posterior mandibular surgical procedures. [4]

The lesser occipital nerve (C2) ascends along the posterior border of the sternocleidomastoid muscle toward the postauricular region and lateral scalp, supplying sensation to the upper lateral neck and postauricular skin. Although its contribution to mandibular surgery is indirect, it may be involved during extensive surgical retraction. [5]

The supraclavicular nerves (C3–C4) descend to supply the lower neck and upper chest wall; their involvement is limited in maxillofacial procedures but may be encountered during wider surgical exposure. [2]

Clinical Significance in Maxillofacial Surgery

The mandibular angle region exhibits overlapping sensory innervation from both the mandibular division of the trigeminal nerve and the superficial cervical plexus. While the inferior alveolar nerve block effectively anesthetizes the mandibular teeth and deep periosteal structures, it does not consistently block the cutaneous innervation supplied by the cervical plexus, particularly the great auricular nerve. [5]

As a result, patients may experience pain or discomfort during skin incision, periosteal elevation, and soft tissue retraction despite adequate inferior alveolar nerve block. The superficial cervical plexus block targets these cutaneous branches at their point of emergence, thereby providing more comprehensive anesthesia of the mandibular angle region and improving intraoperative comfort. [6]

Technique of Superficial Cervical Plexus Block

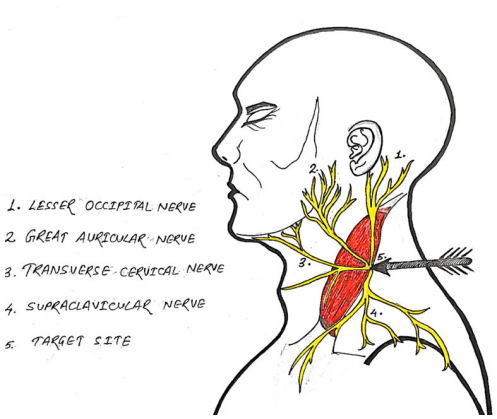
The superficial cervical plexus block was administered using the landmark-based technique. The patient was positioned in a supine position with the head slightly turned to the contralateral side to expose the lateral aspect of the neck. Strict aseptic precautions were maintained throughout the procedure.

The sternocleidomastoid muscle (SCM) was identified, and the midpoint of its posterior border, corresponding to Erb's point, was marked. This point lies approximately at the level of the C4 vertebra and represents the site where the superficial branches of the cervical plexus emerge. [3]

After skin preparation, a 22–25 gauge needle was inserted subcutaneously at the marked point. Care was taken to avoid deep needle penetration to prevent inadvertent blockade of the deep cervical plexus. Following negative aspiration, 5–7 mL of local anaesthetic solution 2% lignocaine with adrenaline was injected in a fan-shaped manner along the posterior border of the sternocleidomastoid muscle. [6]

The local anaesthetic was deposited in the superficial plane to block the cutaneous branches of the cervical plexus, including the great auricular, transverse cervical, and lesser occipital nerves. Adequate time was allowed for onset of anaesthesia before commencement of the surgical procedure. Sensory blockade was confirmed using a pin-prick or cold sensation test over the mandibular angle and lateral neck region. [4]

Throughout the procedure, patients were monitored for vital signs and any signs of complications such as intravascular injection, hematoma formation, or respiratory discomfort. No deep cervical plexus involvement was intended or performed. [7]



Results

A total of ten patients were included in the present study. Among them, six (60%) were male and four (40%) were female. The majority of patients belonged to the 31–50 years age group (50%), followed by 20–30 years (30%) and 51–70 years (20%). Six patients (60%) were from rural areas, while four (40%) were from urban areas.

Regarding the surgical procedures performed, mandibular angle fracture management was the most common procedure, accounting for 50% cases. This was followed by incision and drainage for submandibular space infection in 30% patients and surgical removal of impacted third molars in 20% patients.

The anesthetic efficacy assessment showed a mean onset time of 6.2 ± 1.1 minutes and a mean duration of anesthesia of 178 ± 22 minutes. Successful anesthesia was achieved in nine patients (90%), while one patient (10%) experienced a failed nerve block.

Postoperative pain assessment revealed low mean Visual Analog Scale (VAS) scores, with a mean intraoperative VAS score of 1.4 ± 0.6 and a mean postoperative VAS score of 1.8 ± 0.7. The mean time to first analgesic requirement was 6.5 ± 1.2 hours. No intraoperative or postoperative complications were observed in any of the patients.

Table 1. Demographic Characteristics of the Study Participants (n = 10).

Variable	Category	n	%
Gender	Male	6	60.0
	Female	4	40.0
Age group (years)	20–30	3	30.0
	31–50	5	50.0
	51–70	2	20.0
Residence	Rural	6	60.0
	Urban	4	40.0

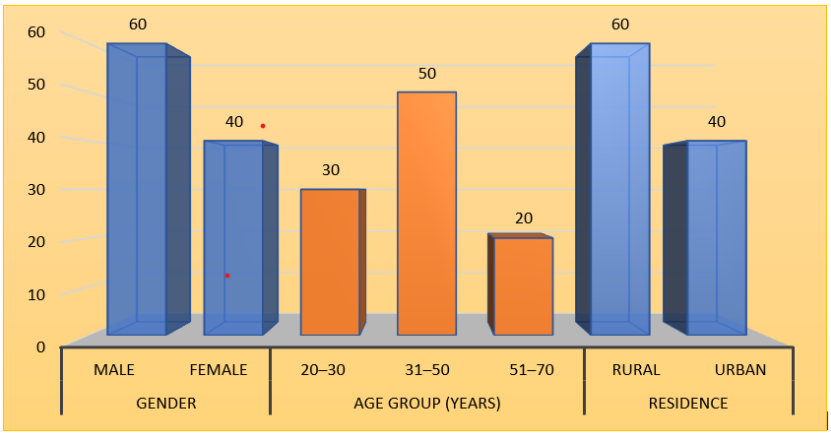


Figure 1. Demographic Characteristics of the Study Participants (n = 10)

Table 1 presents the demographic distribution of the study participants. Among the ten subjects included in the study, males constituted the majority with 60%, while females accounted for 40% of the sample. The most common age group was 31–50 years, comprising half of the participants, followed by the 20–30 years age group (30%) and 51–70 years age group (20%). A higher proportion of participants belonged to rural areas (60%) compared to urban areas (40%). Overall, the demographic profile indicates a predominance of middle-aged male patients from rural backgrounds.

Table 2. Distribution of Surgical Procedures Performed (n = 10)

Surgical Procedure	n	%
Mandibular fracture	5	50.0
Submandibular space infection	3	30.0
Impacted mandibular third molar	2	20.0

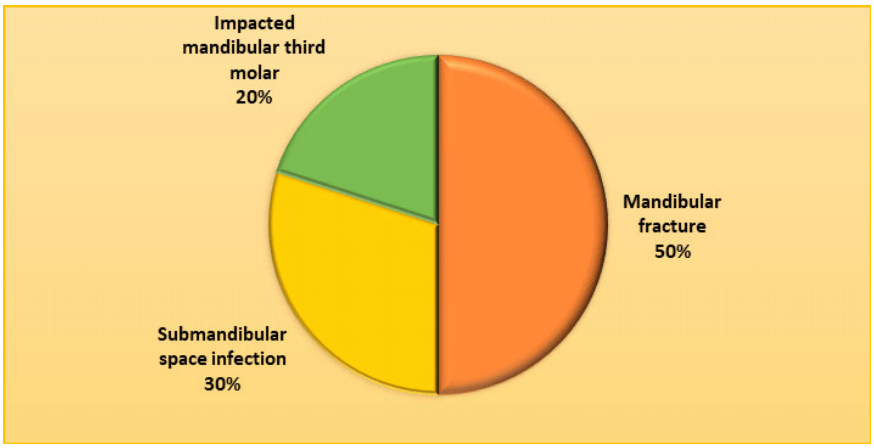


Figure 2. Distribution of Surgical Procedures Performed (n = 10)

Table 2 depicts the distribution of surgical procedures performed under the study protocol. Mandibular fracture management was the most frequently performed procedure, accounting for 50% of the cases. This was followed by submandibular space infection surgeries, which constituted 30% of the sample. Impacted mandibular third molar surgeries formed the remaining 20% of cases. The findings indicate that the anesthetic technique was applied across a varied spectrum of maxillofacial surgical procedures, with a higher representation of trauma-related cases.

Table 3. Anesthetic Efficacy Parameters.

Parameter	Observation Mean±SD/%
Mean onset time (minutes)	6.2 ± 1.1
Mean duration of anesthesia (minutes)	178 ± 22
Supplemental local anesthesia required	2 (20%)
Successful anesthesia	9 (90%)
Failed block	1 (10%)

Table 3 summarizes the anesthetic efficacy outcomes observed in the study. The mean onset time of anesthesia was 6.2 ± 1.1 minutes, indicating a relatively rapid establishment of anesthetic effect. The mean duration of anesthesia was 178 ± 22 minutes, suggesting adequate anesthetic coverage for the duration of the surgical procedures. Supplemental local anesthesia was required in 20% of cases, while successful anesthesia was achieved in 90% of patients. A failed block was observed in one case (10%). Overall, the anesthetic technique demonstrated a high success rate with satisfactory onset and duration characteristics.

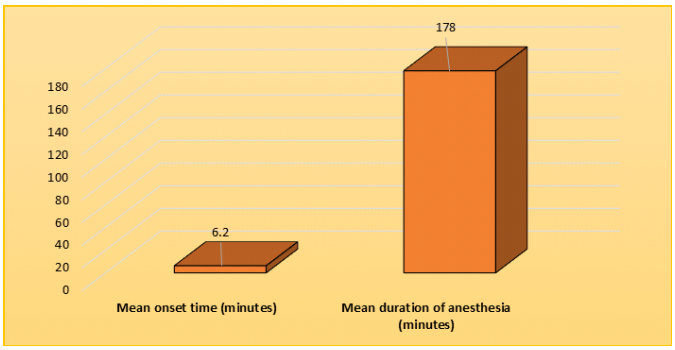


Figure 3 (a). Mean onset time and mean duration of anesthesia (minutes).

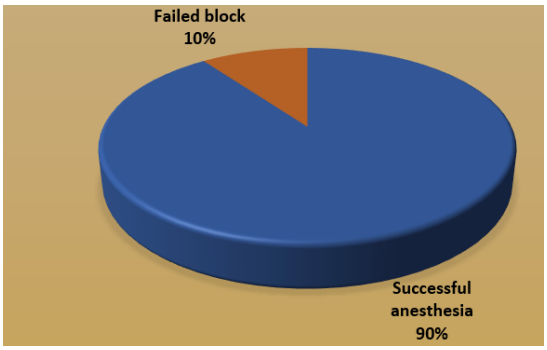


Figure 3(b). Success Rate of the Anesthetic Technique.

Table 4. Postoperative Pain and Recovery Assessment.

Parameter	Observation (Mean±SD)
Mean intraoperative VAS score	1.4 ± 0.6
Mean postoperative VAS score	1.8 ± 0.7
Time to first rescue analgesic (hours)	6.5 ± 1.2
Postoperative complications (%)	Nil

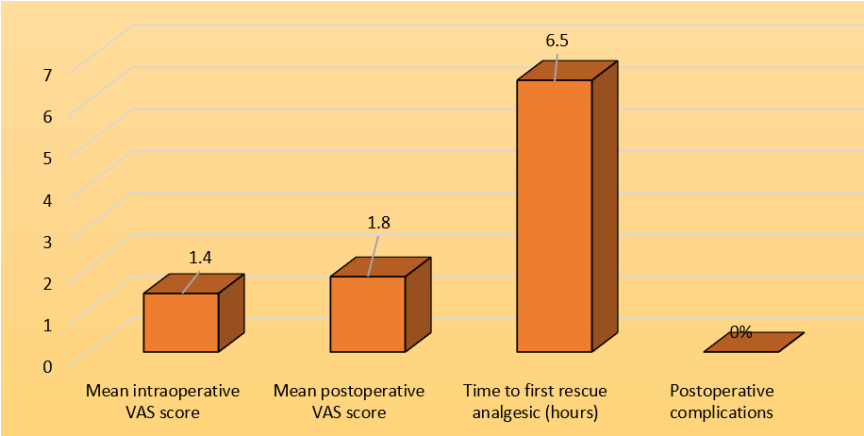


Figure 4. Postoperative Pain and Recovery Assessment.

Table 4 outlines the postoperative pain and recovery parameters. The mean intraoperative Visual Analog Scale (VAS) score was low at 1.4 ± 0.6, indicating minimal pain during the surgical procedures. The mean postoperative VAS score was slightly higher at 1.8 ± 0.7 but remained within the mild pain range. The mean time to first rescue analgesic was 6.5 ± 1.2 hours, reflecting prolonged postoperative analgesia. No postoperative complications were reported in any of the cases. These findings suggest effective pain control and favorable postoperative outcomes following the anesthetic technique.

Statistical analysis

Statistical analysis was carried out using IBM SPSS Statistics for Windows, Version 30.0 (IBM Corp., Armonk, NY, USA). Data were analyzed primarily using descriptive statistics, with categorical variables expressed as frequencies and percentages and continuous variables as mean ± standard deviation. A p-value < 0.05 was considered statistically significant.

Discussion

Effective pain control is critical in maxillofacial surgical procedures, particularly in the mandibular angle region where innervation is complex and overlapping. While IANB provides profound pulpal anesthesia, it often fails to adequately anesthetize the overlying soft tissues. [1,2] The present study demonstrated that the addition of SCPB to IANB significantly improved intraoperative analgesia and reduced the need for supplemental anesthetic infiltration.

The improved analgesic effect can be attributed to blockade of the cutaneous branches of the cervical plexus (C2–C4), particularly the great auricular and transverse cervical nerves, which supply the skin overlying the mandibular angle and submandibular region. [3,4] These findings are consistent with those reported by Saripalli et al., who demonstrated improved patient comfort and reduced intraoperative pain when SCPB was used as an adjunct to IANB in mandibular surgeries. [8]

Kanthan et al. published his study where he reported prolonged postoperative analgesia and reduced requirements for rescue analgesics with the use of superficial cervical plexus block in maxillofacial surgical procedures. [9] The prolonged postoperative analgesia observed in the present study supports these findings and may be attributed to the wider sensory coverage achieved with SCPB compared to localized infiltration techniques.

Pandit et al. demonstrated predictable spread of local anesthetic along the posterior border of the sternocleidomastoid muscle following SCPB, resulting in effective cutaneous anesthesia. [4] This may explain the lower intraoperative VAS scores observed in the SCPB group.

An additional advantage of SCPB is the provision of a uniform anesthetic field without significant tissue distortion, facilitating better surgical access. [6] No major complications were encountered in the present study, which is in agreement with previous reports describing SCPB as a safe and minimally invasive technique when performed in the superficial plane. [7,9]

The limitations of the present study include the small sample size and the use of a landmark-based technique without ultrasound guidance. Future studies using ultrasound-guided SCPB and larger sample sizes may further validate these findings and improve the safety and efficacy of the technique. [10]

Conclusion

To concluded that superficial cervical plexus block, when used as an adjunct to inferior alveolar nerve block, provides superior intraoperative analgesia and improved patient comfort compared to local anesthetic infiltration in selective maxillofacial surgical procedures involving the mandibular angle region. SCPB also reduces the need for supplemental anesthesia and offers prolonged postoperative analgesia without increasing complication rates. Therefore, superficial cervical plexus block can be considered a safe and effective alternative to local infiltration in appropriately selected cases of maxillofacial surgery.

Conflict of Interest

The authors declare that they have no conflict of interest.

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References

1. Standring S, editor. Gray's Anatomy: The Anatomical Basis of Clinical Practice. 41st ed. London: Elsevier; 2016.
2. Moore KL, Dalley AF, Agur AMR. Clinically Oriented Anatomy. 8th ed. Philadelphia: Wolters Kluwer; 2018.
3. Tubbs RS, Salter EG, Wellons JC 3rd, Blount JP, Oakes WJ. Superficial landmarks for the spinal accessory nerve within the posterior cervical triangle. J Neurosurg Spine. 2005 Nov;3(5):375-8. doi: 10.3171/spi.2005.3.5.0375. PMID: 16302632.
4. Pandit JJ, Dutta D, Morris JF. Spread of injectate with superficial cervical plexus block in humans: an anatomical study. Br J Anaesth. 2003 Nov;91(5):733-5. doi: 10.1093/bja/aeg250. PMID: 14570798.
5. Kende P, Wadewale M, Mathai P, Landge J, Desai H, Nimma V. Role of Superficial Cervical Plexus Nerve Block as an Adjuvant to Local Anesthesia in the Maxillofacial Surgical Practice. J Oral Maxillofac Surg. 2021 Nov;79(11):2247-2256. doi: 10.1016/j.joms.2021.05.005. Epub 2021 May 15. PMID: 34153248.
6. Kanthan RK. The use of superficial cervical plexus block in oral and maxillofacial surgical practice as an alternative to general anesthesia in selective cases. Ann Maxillofac Surg. 2016 Jan-Jun;6(1):4-8. doi: 10.4103/2231-0746.186120. PMID: 27563598; PMCID: PMC4979341.
7. Stoneham MD, Prys-Roberts C. Cervical plexus blockade: indications and techniques. Br J Anaesth. 1995;75(4):433–436.
8. Jarvis MS, Sundara Rajan R, Roberts AM. The cervical plexus. BJA Educ. 2023 Feb;23(2):46-51. doi: 10.1016/j.bjae.2022.11.008. Epub 2022 Dec 28. PMID: 36686890; PMCID: PMC9845551.
9. Tran DQ, Dugani S, Finlayson RJ. A randomized comparison between ultrasound-guided and landmark-based superficial cervical plexus block. Reg Anesth Pain Med. 2010 Nov-Dec;35(6):539-43. doi: 10.1097/AAP.0b013e3181faa11c. PMID: 20975470.
10. Kim JS, Ko JS, Bang S, Kim H, Lee SY. Cervical plexus block. Korean J Anesthesiol. 2018 Aug;71(4):274-288. doi: 10.4097/kja.d.18.00143. Epub 2018 Jul 4. PMID: 29969890; PMCID: PMC6078883.