Original Article - Evaluative Study

# The use of superficial cervical plexus block in oral and maxillofacial surgical practice as an alternative to general anesthesia in selective cases

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## ABSTRACT

**Aim:** (1) To assess the feasibility, safety, and effectiveness of superficial cervical plexus (SCP) block in oral and maxillofacial surgical (OMFS) practice as an alternative to general anesthesia in selective cases. (2) To assess any associated complication specifically related to the procedure. **Subjects and Methods:** The total number of patients was 10, out of which 6 were male and 4 were female patients. Six patients had incision and drainage of perimandibular space infections, two patients had Level Ib cervical lymph node biopsies, one patient had enucleation of cyst in the body of mandible, one patient had open reduction and internal fixation isolated angle fracture. Informed written consent was obtained from the patients after they had the procedure explained to them. Exclusion criteria included patient's refusal to undergo the procedure under regional anesthesia, allergy to local anesthetic, excessively anxious, and apprehensive patients, significant upper airway compromise warranting an endotracheal intubation to secure airway. All patients had the procedure done by the same operating surgeon. All patients had their surgical procedures under regional anesthesia (SCP block with supplemental nerve blocks) performed by the same surgeon with satisfactory anesthesia and analgesia without any complication. **Results:** SCP block with concomitant mandibular nerve and long buccal nerve block has a high success rate, low complication rate, and high patient acceptability as shown in the study. **Conclusion:** The notable anesthetic effect and adequate working time, summed with the low risk of accidents and complications, make this technique a good alternative for sensitive blockage of part of the cranial and cervical regions and have positive outcomes in selective OMFS cases.

**Keywords:** Incision and drainage, neck infections, odontogenic infections, perimandibular infections, regional anesthesia, superficial cervical plexus block

## INTRODUCTION

Pain management has been a critical component of maxillofacial surgical practice. The Peruvian natives Incas were the first to use cocaine to achieve local anesthesia (LA).[1] Dr. William Morton, a Massachusetts Dentist, was the first to use anesthesia for tooth extraction in 1846. Carl Kolle introduced cocaine as an LA for use in dentistry. Contemporary medicine uses general anesthesia (GA) as rather safe, useful, and simple way to achieve surgical anesthesia. The downside of GA is high economic cost,



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a number of highly trained personnel, morbidity, mortality, and high-cost equipment. The advantage of regional anesthesia includes stress-free anesthesia as it prevents high catecholamine release, lower rate of blood loss because of local vasoconstrictors and sympathetic blockade, easy to perform techniques, lower morbidity rates in appropriate dosages of LA.

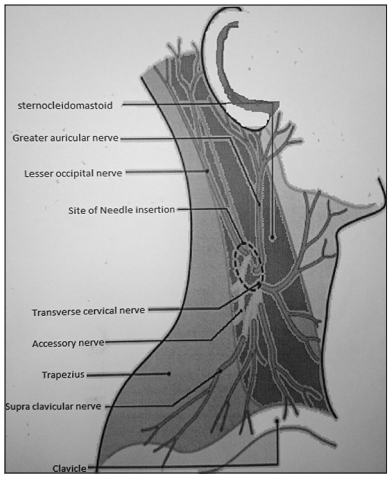


**Figure 1:** Superficial cervical plexus block relevant anatomy


**Figure 3:** (a and b) Left submandibular, sublingual and submental space infection


**Figure 5:** (a and b) Post-traumatic hematoma in spaces-submental, left submandibular, sublingual

The superficial cervical plexus (SCP) block is frequently used in a variety of disciplines such as in thyroidectomy, carotid endarterectomy, vocal cord surgeries, and cervicogenic painful syndromes.[2-4] Its application in oral and maxillofacial surgical (OMFS) has been in surgical drainage of an abscess in perimandibular region, excisions of superficial lesions, skin suturing in the corresponding dermatome.[5] Anatomic studies of the spread of injectate with SCP block in humans suggest that the LA crosses the deep cervical fascia and blocks the cervical nerves at their roots that is SCP innervates the skin of anterolateral neck.[6]

The aim of the study was:

- To assess the feasibility, safety, and effectiveness of SCP block in OMFS practice as an alternative to GA in selective cases


**Figure 2:** (a and b) Submental, left submandibular space infection


**Figure 4:** (a and b) Left buccal, submasseteric, and submandibular space infection

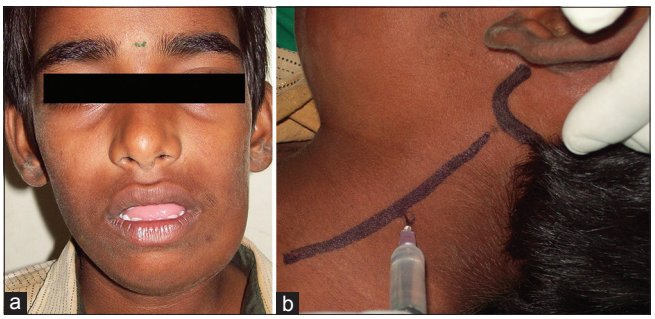


**Figure 6:** (a and b) Left submandibular, left sublingual and submental space infection

**Figure 7:** (a and b) Left submandibular, left sublingual and submental space infection

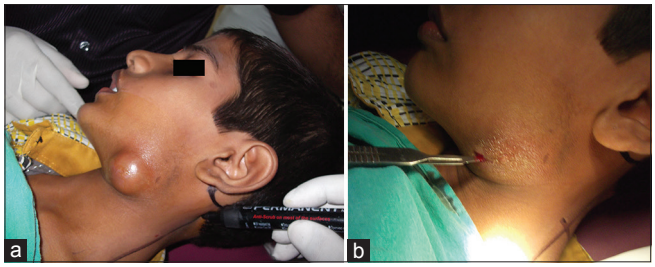

**Figure 9:** (a and b) Granulomatous lymphadenitis with caseous necrosis

- To assess any associated complication specifically related to the procedure.

## MATERIALS AND METHODS

The total number of patients was 10, out of which 6 were male and 4 female patients. The mean age was 28.1. Their case distribution is as follows:

- Incision and drainage of perimandibular space infections - 6
- Cervical lymph node biopsies - 2
- Cyst enucleation body of mandible - 1
- Open reduction and internal fixation isolated angle fracture - 1.

Informed written consent was obtained from the patients after they had the procedure explained to them. Exclusion criteria included patient's refusal to undergo the procedure under regional anesthesia, allergy to LA, excessively anxious and apprehensive patients, significant upper airway compromise warranting an endotracheal intubation to secure airway.

All patients had the procedure done by the same operating surgeon.

### Regional anatomy of superficial cervical plexus

The cervical plexus is formed by anterior divisions of the four upper cervical nerves situated on the anterior surface of the upper cervical vertebra; it rests on the levator anguli scapulae and scalenus medius muscle and covered by sternocleidomastoid. Emerging through the intervertebral foramen, the dorsal and ventral roots combine to form spinal nerve. The anterior rami of

**Figure 8:** (a and b) Granulomatous lymphadenitis with caseous necrosis

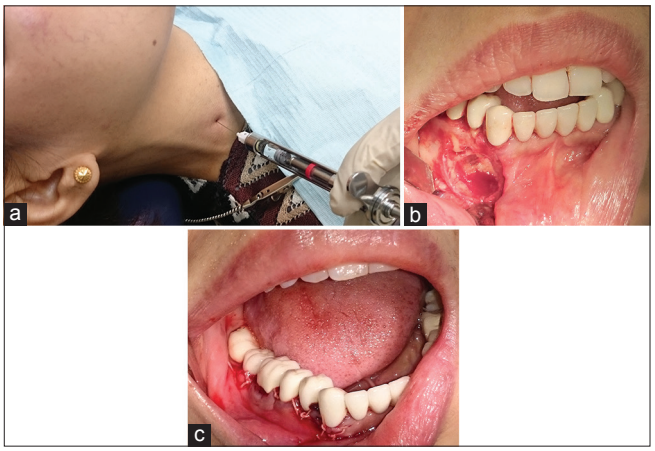

**Figure 10:** (a-c) Radicular cyst right body of mandible involving tooth #28, 29

C2 through C4 form the cervical plexus. C1 root is primarily a motor nerve and it is not blocked in this technique. The cutaneous branches of the plexus are greater occipital, greater auricular, transverse cervical, and supraclavicular nerves.

The branches of SCP emerge as four distinct nerves from the posterior border of sternocleidomastoid and supply innervations to superficial structures of the head, neck, and shoulders [Figure 1]. The deep branches of cervical plexus innervate the deep structures of neck including the muscles of anterior neck and diaphragm (phrenic nerve). The third and fourth cervical nerves typically send a branch to the spinal accessory nerve or directly into the deep surface of the trapezius to supply sensory fibers to the muscles.

### Landmark

- Mastoid process
- Chassaignac's tubercle of C6 vertebra - parallel to cricothyroid cartilage.

### Site of needle insertion

The site of needle insertion is at the midpoint of the line connecting the mastoid process with the Chassaignac's tubercle of C6 transverse process. This is the location of the branches of SCPs as they emerge behind the posterior of sternocleidomastoid muscle.

### Armamentarium

LA used in our technique was 2% lidocaine (1:100,000 adrenaline), LA cartridges, 20 ml syringe, 25 gauge needle, marking pen, and surface antiseptic/alcohol swipes.

### Procedure

SCP block is a field block requiring all the branches of the plexus to be bathed in LA solution. It thus relies on the LA volume to be effective.[7] The needle is inserted along the posterior border of sternocleidomastoid muscle and redirected 2–3 cm below and above the point of insertion. About 10–12 ml of LA solution was infiltrated along the border of muscle cephalad and caudal as mentioned. Depending on the anatomical location of the surgical site the patients were supplemented with long buccal nerve block and inferior alveolar nerve block accordingly.

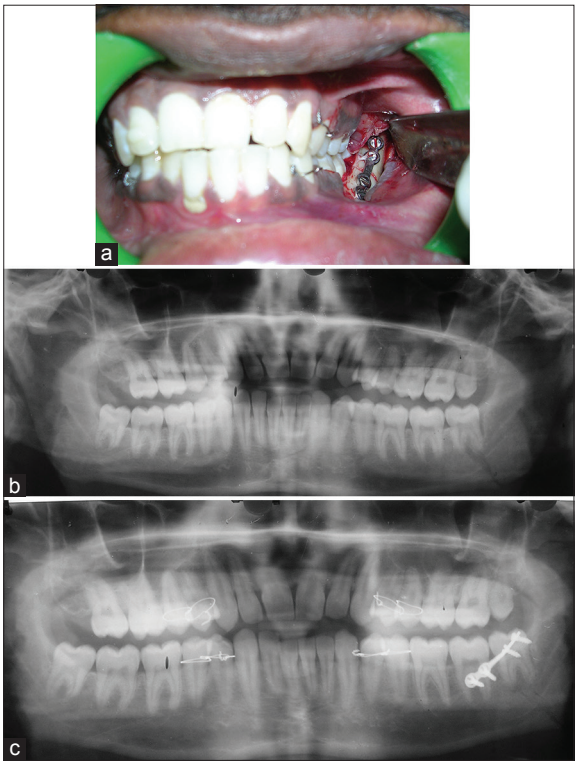


**Figure 11:** (a) Open reduction and internal fixation left angle fracture of mandible. (b) Preoperative X-ray left angle fracture. (c) Postoperative X-ray open reduction and internal fixation angle fracture left

## RESULTS

Of the total number of 10 patients, 6 were male and 4 were female. The number of patients who had incision and drainage of perimandibular facial space infections was 6.

Two patients had Level Ib cervical lymph node biopsy. One patient had cyst enucleation in the mandibular body region. One patient had open reduction internal fixation of isolated angle fracture through intraoral approach. All patients had SCP block supplemented by inferior alveolar nerve block and long buccal nerve block depending on the anatomical location of surgery to achieve surgical anesthesia. The case distribution is shown in Table 1.

All patients had their surgical procedures under regional anesthesia (SCP block with supplemental nerve blocks) performed by the same surgeon with satisfactory anesthesia and analgesia without any complication [Figures 2-11].

## DISCUSSION

LAs are frequently administered to perform incision and drainage of maxillofacial infections of odontogenic origin. Whenever the abscess involves the deeper facial spaces, GA is commonly used. The effective use of LAs can provide both patient comfort and safety to perform surgery in deeper planes of the neck and perimandibular region. SCP block takes care of the pain in skin incision and the necessary tissue dissection. By combining SCP block with our known techniques of nerve blocks such as the inferior alveolar and long buccal nerve blocks, a high level of safety and positive outcome was achieved. No adverse drug or technique incidents were recorded in our case series. Moreover, costs of the patient can be lowered. It is important to mention the limitations of this technique and the complications include infection, hematoma, phrenic nerve blockade, LA toxicity, nerve injury, and spinal anesthesia.[5]

**Table 1: Case Distribution**

| Patients | Age | Sex | Diagnosis | Procedure | Nerve block | Complications |
|---|---|---|---|---|---|---|
| 1. Figure 2a and b | 45 | Male | Submental, left submandibular space infection | I and D of involved spaces | SCP, inferior alveolar, long buccal | Nil |
| 2. Figure 3a and b | 18 | Male | Left submandibular, sublingual and submental space infection | I and D of involved spaces | SCP, inferior alveolar, long buccal | Nil |
| 3. Figure 4a and b | 70 | Female | Left buccal, submassetric, and submandibular space infection | I and D of involved spaces | SCP, inferior alveolar, long buccal | Nil |
| 4. Figure 5a and b | 38 | Male | Posttraumatic hematoma in spaces-submental left submandibular, sublingual | I and D of involved spaces | SCP, inferior alveolar, long buccal | Nil |
| 5. Figure 6a and b | 15 | Male | Left submandibular, left sublingual and submental space infection | I and D of involved spaces | SCP, inferior alveolar, long buccal | Nil |
| 6. Figure 7a and b | 14 | Female | Left submandibular, buccal, submassetric space infection | I and D of involved space | SCP, inferior alveolar, long buccal | Nil |
| 7. Figure 8a and b | 41 | Female | Granulomatous lymphadenitis with caseous necrosis | Left Level Ib node biopsy | SCP, inferior alveolar, long buccal | Nil |
| 8. Figure 9a and b | 18 | Male | Granulomatous lymphadenitis with caseous necrosis | Left Level Ib node biopsy | SCP, inferior alveolar, long buccal | Nil |
| 9. Figure 10a-c | 30 | Female | Radicular cyst right body of mandible involving tooth #28, 29 | Enucleation of cyst and curettage | SCP, inferior alveolar, long buccal | Nil |
| 10. Figure 11a-c | 30 | Male | Isolated favorable fracture - left angle of mandible | ORIF angle fracture | SCP, inferior alveolar, buccal | Nil |

SCP=Superficial cervical plexus; I=Incision; D=Drainage; ORIF=Open reduction internal fixation

## CONCLUSION

Finally, to conclude SCP block with concomitant mandibular nerve and/or long buccal nerve block has a high success rate, low complication rate, and high patient acceptability as shown in the study. The overall quality of operating condition as assessed by the surgeon was satisfactory. Careful patient selection is an important factor to exclude that are medically (significant respiratory disease, LA allergy) and temperamentally (highly stressed and anxious patients) unsuitable. Our study as with previous studies shows that the notable anesthetic effect and adequate working time, summed with the low risk of accidents and complications, make this technique a good alternative for sensitive blockage of part of the cranial and cervical regions. Regional blockage of superficial branches of the cervical plexus is an effective and safe procedure, and can be used in some procedures in the stomatological ambit.[8]

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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