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## Technical Note

# Extraoral mandibular nerve block with peripheral nerve stimulator for temporomandibular surgery



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## ABSTRACT

**Introduction:** Adequate postoperative pain relief after gap arthroplasty is usually managed by intravenous opioids and NSAIDs with their inherent side effects. Mandibular nerve block provides good quality and long lasting analgesia. Use of peripheral nerve stimulator aids the block in cases with distorted anatomy. **Methods:** We describe the use of peripheral nerve stimulator for extra-oral mandibular nerve block in patients undergoing temporomandibular surgery.

**Results:** Since the peripheral nerve stimulator provides an objective identification of the nerve, the success is close to 100%. Pain relief is excellent with reduction in intraoperative and postoperative consumption of opioids and NSAIDs. Postoperative pain relief lasts for at least 8 h and reduces subsequent requirement of analgesics.

**Conclusion:** Peripheral nerve stimulator is a sure, safe and easy option available for mandibular nerve block in patients undergoing temporo-mandibular surgery especially with distorted anatomy.

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## 1. Introduction

Postoperative pain associated with surgery over the temporo-mandibular region can result in inadequate mouth opening and hinders active physiotherapy leading to poor results. Adequate postoperative pain relief is usually managed by intravenous opioids and NSAIDs with their inherent side effects [1]. Extra-oral mandibular nerve block provides good quality and long lasting analgesia. It may be a technically difficult block to perform in patients with distorted anatomy such as temporomandibular joint ankylosis or dislocation. Mandibular nerve being a mixed nerve, can be easily identified objectively with the use of peripheral nerve stimulator in cases with distorted anatomy.

We report the technique of extra-oral mandibular nerve block with the aid of a peripheral nerve stimulator in patients with distorted anatomy.

\* Asian AOMS: Asian Association of Oral and Maxillofacial Surgeons; ASOMP: Asian Society of Oral and Maxillofacial Pathology; JSOP: Japanese Society of Oral Pathology; JSOMS: Japanese Society of Oral and Maxillofacial Surgeons; JSOM: Japanese Society of Oral Medicine; JAMI: Japanese Academy of Maxillofacial Implants.

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## 2. Technique

Patient posted for surgeries on the temporomandibular joint usually have a reduced mouth opening either due to pain or distorted anatomy. This makes the airway challenging for the anaesthesiologist. The mandibular nerve block can be administered preoperatively, intraoperatively or postoperatively with the aid of the peripheral nerve stimulator.

In an awake patient, the head is turned to the contralateral side and a skin wheal is raised with lignocaine 2% just below the zygomatic arch between the mandibular notch formed by the conoid anteriorly and the coronoid process of the mandible posteriorly (Fig. 1).

A 22G 10 cm insulated bevelled needle (Stimuplex A, B Braun) is attached to the peripheral nerve stimulator (Stimuplex DIG, B Braun, Germany; Fig. 2). The alligator clamp is attached to an ECG electrode placed on the face as neutral. The nerve stimulator is switched on, a frequency of 2 Hz and an initial current of 1.2 mA is set by rotating the knob. The needle is inserted perpendicularly extra-orally to hit the lateral pterygoid plate (Fig. 3a). The pterygoid plate is reached at a depth of 3–5 cm from the skin. The needle is then withdrawn and redirected postero-superiorly at an angle of 45°–60° towards the upper end of pinna (Fig. 3b) till the desired motor response from the temporalis/masseter muscles resulting in a jaw jerk is achieved. After achieving the jaw jerk, current is gradually reduced to 0.6 mA maintaining the muscle

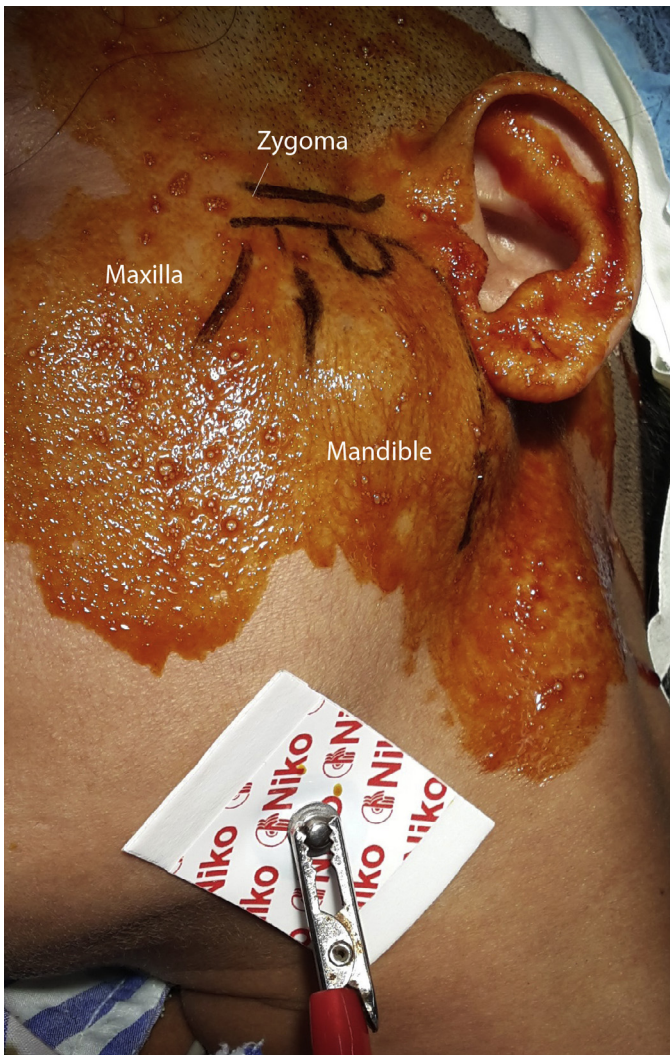


Fig. 1. Surface anatomy for the mandibular block.

contraction resulting in visible jaw jerk [2]. After negative aspiration, 0.15–0.2 ml/kg of 0.25% bupivacaine with 1 µg/kg fentanyl is injected. The same procedure is repeated on the other side for bilateral surgery.

If the anatomy is distorted to obliterate the mandibular notch, block can be administered once the surgery has been performed. Although the technique remains the same as above, the patient should not be under the effect of neuromuscular blockers. In such a case, the dose of neuromuscular blocker is withheld just before the release of ankyloses. Once ankyloses is released, and the patient is breathing spontaneously, block is administered. No further rocuronium or fentanyl is usually required intraoperatively. Residual neuromuscular block is reversed at the end of surgery and trachea extubated.

In children and uncooperative patients, the block can be administered after general anaesthesia. The anaesthesia can be propofol or inhalation (sevoflurane) based, maintaining spontaneous respiration. A 5 cm bevelled needle should be used in children. Trachea can then be intubated either under fibre optic guidance or direct laryngoscopy facilitated by neuromuscular blockade.

### 3. Results

No opioids are usually required after the block. Postoperative period remains uneventful and patients remain pain free for

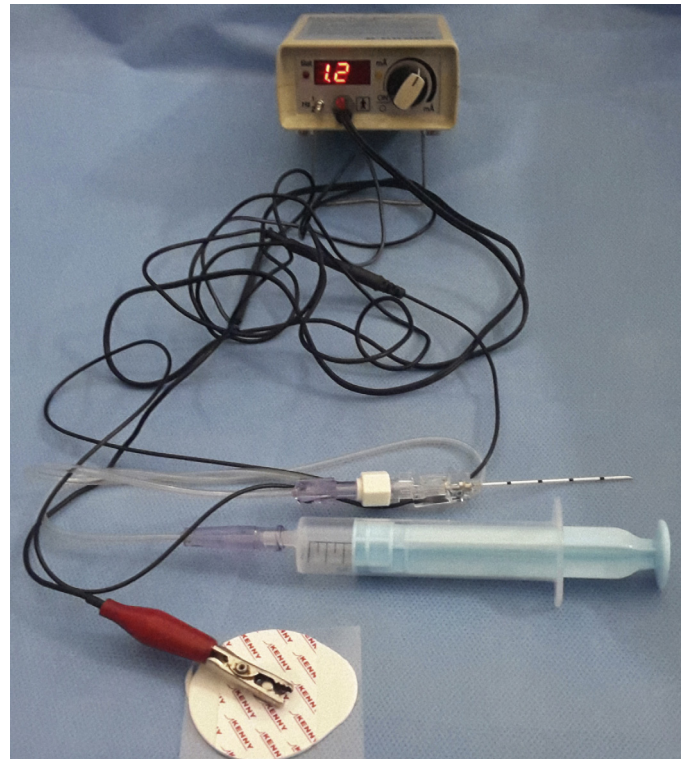


Fig. 2. Peripheral nerve stimulator.

approximately 8 h as assessed by Visual Analogue Scale/FACES Pain Scale – Revised (score  $\leq 2$ ) [3]. For the next 24 h, the pain usually remains  $\leq 4$  and can be managed with oral paracetamol 10 mg/kg three times a day. Side effects include paresis of the facial nerve which is usually transient and resolves within 24 h.

### 4. Discussion

Mandibular nerve block is often performed for therapeutic and anaesthetic purposes for surgery involving the mandibular region. Advantages of a nerve block include excellent pain relief and avoidance of the side effects associated with the use of intravenous analgesics [4].

Anatomically, there are very few nerves that need to be blocked: the auriculotemporal and the greater auricular nerve supply the skin and the soft tissue around the temporomandibular joint. The joint itself is supplied by the auriculotemporal nerve and some fibres from the masseteric branch of the mandibular nerve. All these nerves can be blocked by a single injection of the mandibular nerve trunk via the extra-oral approach (Fig. 4).

Intra-oral [5] and closed mouth techniques like that of Vazirani-Akinosi [6] commonly employed by the dental surgeons block only the inferior alveolar nerve and the lingual nerve. While these are adequate for dental procedures and those on the mandible, the temporomandibular joint is spared.

The nerve is identified with the help of a peripheral nerve stimulator and a visible jaw jerk. A peripheral nerve stimulator (PNS) generates an electric current and transmits it via an insulated needle with an exposed tip. This ensures the current to be delivered in very close proximity to targeted nerves. The intensity (mA) and frequency (Hz) of the current being applied can be controlled. A higher initial current allows for earlier identification of the nerve's location. As the needle tip approaches the nerve, the current is then decreased, allowing it to be placed in close proximity of the target nerve. Constant stimulation of the nerve between 0.6 and 0.4 mA

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