

Evaluation Of Anesthetic Success Of Halstead Method Versus Gow-Gates Method In Mandibular Procedures

Author

Abstract

Aim: This study aimed to evaluate the inferior alveolar nerve block, that is, the Halstead technique, Gow Gates technique for mandibular anesthesia.

Methodology: This prospective, double-blinded, in-vivo study was conducted amongst 20 patients, requiring mandibular anesthesia. These patients were divided into two groups. Parameters assessed were time required for appearance of subjective and objective symptoms and signs, positive aspiration, need for supplementary anesthesia, and ease of administration.

Results: The mean time for the appearance of subjective symptoms was significantly shorter with the Halstead technique (58.30 seconds) compared with the Gow-Gates method (163.10 seconds). Similarly, the onset of objective signs occurred earlier in the Halstead group (132.10 seconds) than in the Gow-Gates group (289.70 seconds). Halstead technique had statistically significant ($P < 0.05$) faster objective signs than Gow gates technique. Supplementary block if required was noted for both techniques.

Conclusion: Halstead technique produced a significantly faster onset of mandibular anesthesia compared to the Gow-Gates method.

Keywords: Mandibular anesthesia, Inferior alveolar nerve block, Halstead technique, Gow-Gates technique

Date of Submission: 06-04-2026

Date of Acceptance: 16-04-2026

I. Introduction:

The inferior alveolar nerve block is the most frequently employed injection technique in dental practice. When administered with proper care, it is regarded as a simple and reliable procedure. [1] The technique involves needle insertion in the region surrounding the mandibular foramen to deposit the local anesthetic solution adjacent to the nerve before it enters the inferior alveolar canal. This block provides analgesia to the lower lip, gingiva, and mandibular teeth up to the midline.[2]

The literature reports a failure rate of approximately 15–20% for the inferior alveolar nerve block. These failures have been attributed to factors such as patient anxiety, anatomical variations, and technical errors during administration. To address these limitations, several modified techniques have been introduced and documented in the literature.[3] These techniques differ in needle angulation, the depth of insertion and the diffusion pattern of the local anesthetic solution. Consequently, the ease of administration and effectiveness of anesthesia vary among these methods.[4]

The Halstead technique is classified as an indirect approach, in which the needle is introduced from the contralateral lower premolar region. Another indirect method, the Gow-Gates technique, is regarded as highly effective and involves advancing the needle parallel to an imaginary line drawn between the intertragic notch and the corner of the mouth. The needle is advanced until bony contact is made with the neck of the condyle, which typically occurs at an average depth of approximately 25 mm. In this technique, the target area is located at the level of the sigmoid notch, positioned well above the mandibular foramen.[5]

II. Method:

This study was carried out with sample size of 20 patients in the department of oral and Maxillofacial Surgery, Peoples Dental Academy, Bhopal. Patients presenting with need of minor oral surgical procedure requiring anesthesia were selected and assessed.

this study comprised 20 patients who reported for the minor oral surgical procedure involving hemi-mandible. The patients were randomly assigned into two groups– Group I received Halstead nerve block and Group II were administered Gow-gates nerve block. Positive aspiration, meantime for the onset of anesthesia, and pain during the surgical procedure were compared. Patients who were medically compromised, and diagnosed with space infections were excluded from the study.

The patients were randomly allocated in two groups using chit system. Strict infection-control measures were maintained for every procedure. Topical anesthesia preceded all injections, which were administered by a single operator to ensure consistency. A volume of 1.8 ml was used for Halstead blocks and 3

ml for Gow-Gates blocks. All injections were delivered with a 3 ml syringe and 26.5-gauge needle, following the anatomical guidelines of each technique.

Group I - Mandibular Anesthesia using Halstead technique.

Group II -Mandibular Anesthesia using Gow-gates technique

Techniques

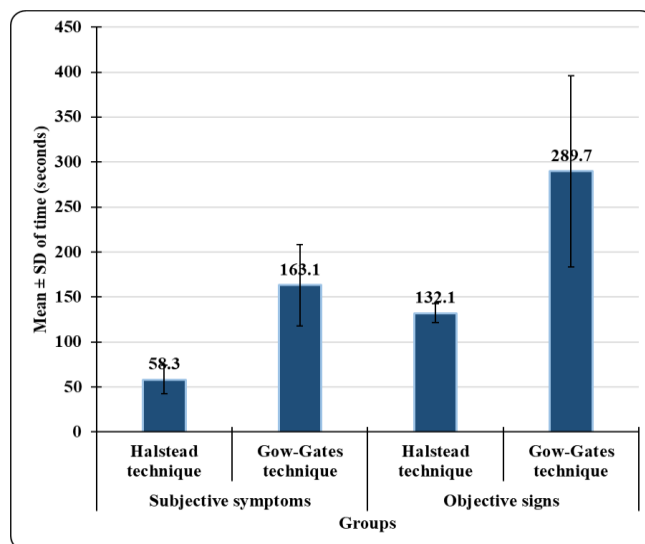
The Gow-Gates technique involves deposition of local anesthetic near the head of the mandibular condyle with the mouth wide open, directing the needle from the contralateral canine toward the mesio-palatal cusp of the ipsilateral maxillary second molar until bony contact with the condylar neck is achieved at approximately 25 mm, followed by aspiration and deposition of up to 1.8 mL of anesthetic solution.

The Halstead technique delivers local anesthetic in the pterygomandibular space adjacent to the inferior alveolar nerve before it enters the mandibular foramen, using the coronoid notch, pterygomandibular raphe, and occlusal plane as landmarks, with the injection administered 6–10 mm above the occlusal plane and bony contact achieved at a depth of 20–25 mm prior to anesthetic deposition.

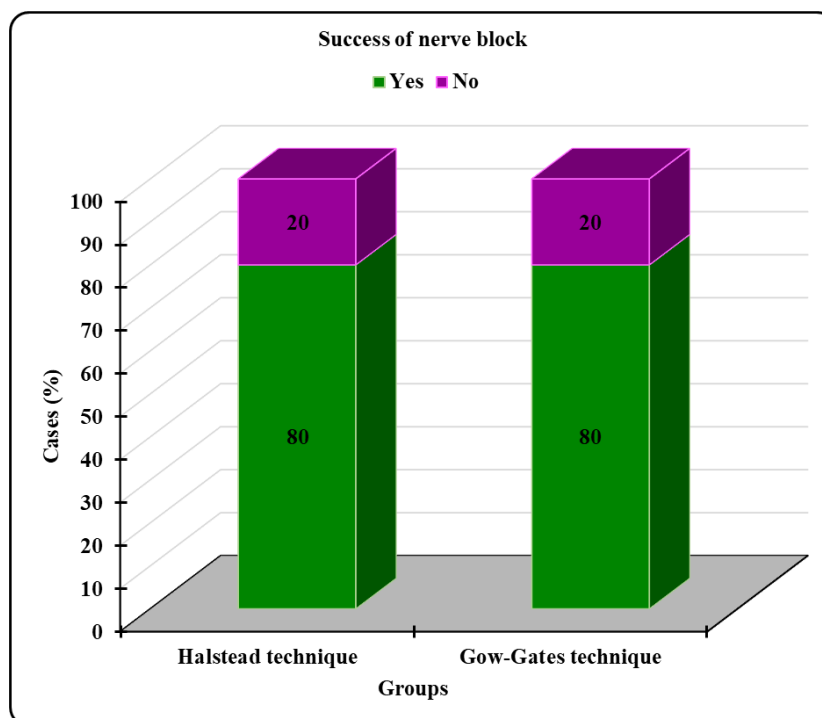
III. Result

The mean age of the study participants was 45.15 ± 18.13 years, with most subjects falling within the adult age group. Of the total 20 patients enrolled, 9 (45%) were male and 11 (55%) were female. All subjects were randomly allocated into two equal groups, with 10 patients each receiving mandibular anesthesia using the Halstead and Gow-Gates techniques. The time interval from injection to the onset of anaesthesia was recorded for both subjective symptoms and objective signs. The mean time for the appearance of subjective symptoms was significantly shorter with the Halstead technique (58.30 seconds) compared with the Gow-Gates method (163.10 seconds). Similarly, the onset of objective signs occurred earlier in the Halstead group (132.10 seconds) than in the Gow-Gates group (289.70 seconds). Statistical analysis using the Mann–Whitney U test revealed a very highly significant difference between the two techniques for both subjective and objective onset times ($P < 0.001$), demonstrating a faster onset of anaesthesia with the Halstead technique.

Pain during the procedure was assessed using the visual analogue scale (VAS). Both groups showed minimal pain scores, with mean values of 0.20 for the Halstead group and 0.10 for the Gow-Gates group, and the difference was not statistically significant ($P > 0.05$). Aspiration was positive in three patients who received the Halstead technique, whereas all patients in the Gow-Gates group showed negative aspiration. However, this difference was not statistically significant. The requirement for supplementary anaesthesia was similar in both groups, with two patients in each group requiring an additional block, while the remaining eight patients in each group achieved adequate anaesthesia without supplementation. The overall success rate of mandibular nerve block was 80% in both groups. Complications were minimal, with only one case of hematoma observed in the Halstead group and none in the Gow-Gates group. There was no statistically significant difference in complication rates between the two techniques. Overall, although both techniques demonstrated comparable success, comfort, and safety, the Halstead technique provided a significantly faster onset of mandibular anaesthesia than the Gow-Gates method.



Graph 1: Comparison of the time taken for the start of the subjective symptoms and objective signs of anaesthesia between study groups



Graph 2: Comparison of success of nerve block between study groups.

IV. Discussion

Surgical removal of an impacted mandibular 3rd molar is one of the most common minor oral surgical procedures performed in any Maxillofacial Surgeon. In this regard, the key to a successful intraoperative surgery requires perfect anaesthesia. To remove the impacted mandibular 3rd molar or to perform any surgical procedure in the mandible, there are multiple Local anaesthesia techniques that can be employed. To anesthetise Inferior alveolar nerve, it can be achieved by intraoral injection techniques or extra oral injection techniques. If we are considering intraoral technique, a number of different techniques can be employed like Halstead technique, Clark and Holmes, Sargenti technique, Gow- Gates technique

In our present study we comparing the efficacy of Gow Gates & Halstead Technique to anesthetize mandible for minor Surgical procedures.

In both the techniques the operating surgeon used 2% lignocaine 1:200000 epinephrine as Local anesthetic agent.and 1.8 ml for classic Halstead technique and a quantity of 3ml was used for Gow gates technique In our study of out 20 patient that agreed to be a part of study, 9 were male and 11 were females.

In the present study we compare the mean time for the appearance of subjective symptoms was significantly shorter with the Halstead technique (58.30 seconds) compared with the Gow-Gates method (163.10 seconds) which is in conjunction with a A study conducted by Thomas et The mean time taken for onset of anesthesia was 6.16 min in patients who received anesthesia using Gow gates as compared to 2.78 min in patients who received anesthesia using halstead technique.

Positive aspiration A study conducted by Awate et al yielded positive aspiration in 2.5% of the cases and 15% had positive aspiration in group which received gow gates which is in similarity with our study showing 30% positive aspiration in group 1 when compared to none in group 2

Both approaches offer quality anesthesia in the posterior mandibular area when meticulously followed. The percentage of unsuccessful anesthesia in the Gov Gates group could be attributed to thin experience of the operator. Postoperative comfort and patient satisfaction were greater in the other group.

As the Halstead technique has been On the other hand, the Gow Gates technique is sensitive, and the area of insertion is the condylar neck, which is narrow in dimension. Its mediolateral dimensions are narrow, so it is difficult to reach the area, and there is room for error. [12]

Certain patient-related factors such as a bulky buccal fat pad, mandibular flaring, which make it difficult to identify landmarks which is a crucial step for successful block or the presence of any other anatomical variations may influence the success of inferior alveolar nerve blocks. However, these variables have not been adequately explored in existing literature. Evaluation of alternative anesthetic approaches becomes especially important in situations where the conventional inferior alveolar nerve block fails. Future research should incorporate these anatomical and clinical parameters to assess the effectiveness of alternative mandibular anesthesia techniques. Such investigations would enhance the understanding of technique selection

and help reduce failure rates associated with mandibular nerve blocks, ultimately improving patient comfort and clinical outcomes.

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