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Assessment of Knowledge and Awareness of Different Mandibular Anaesthesia Techniques in Dental Students of Udaipur, India

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Abstract:

- ***Background:***

Dentists and dental students frequently employ local anesthesia for a variety of dental surgical procedures. In dentistry, mandibular anesthesia techniques are frequently employed to sedate the lower jaw in preparation for restorative or surgical treatments. Inferior alveolar nerve block, Gow Gates, Vazirani-Akinosi, mental, and incisive nerve block are some of the mandibular anesthesia procedures. Learning a new technique is challenging, but unlearning an old skill to practice a new one is much more challenging. The purpose of this study is to evaluate the awareness and knowledge of IANB and Gow-Gates mandibular anesthesia techniques, as well as to ascertain the learning curve for these techniques, specifically among dentistry students.

- ***Aim:***

To evaluate dental student's awareness and understanding of various mandibular anesthesia techniques, including IANB and Gow Gates, and to ascertain how quickly they pick up these techniques.

- ***Setting And Design:***

From October 2022 to September 2024, 140 dental students at Darshan Dental College and Hospital in Udaipur, Rajasthan, India, participated in this descriptive longitudinal study.

- ***Methodology:***

The study was performed by evaluating all the details on a pre-approved and pre-validated visual analogue scale (VAS) observing and grading students on a scale from 0 to 5 (easy to most difficult). A pretested 5-item, 1-page questionnaire was graded by the common blinded observer. Data on demographics, difficulties learning various mandibular anesthesia techniques, failures to achieve anesthesia, and the favored mandibular anesthesia technique among dental students were collected. Chi–square test was used for statistical analysis.

- ***Result and Conclusion:***

140 pupils in all were observed. Female students made up 65% of the student body (n = 92). The IANB mandibular anesthetic approach was favored by 80% (n = 112) of the students over the Gow Gates technique. The Gow Gates

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mandibular anesthetic technique has a longer learning curve, as evidenced by the fact that 67% (n = 95) of students required correction during administration. The knowledge and practice for Gow Gates mandibular anesthesia technique is steeper in spite of being more efficient technique when compared with the learning curve and efficiency of IANB mandibular anesthesia technique.

Keywords: *(Mandibular Anesthesia Techniques, IANB, Gow Gates, Knowledge, Dental Students).*

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I. INTRODUCTION

Patients frequently associate dentistry with pain, particularly those who have had numerous extractions, have periodontal disease that necessitates surgery, or have symptomatic teeth that require endodontic therapy [1]. As a result, pain control becomes a crucial topic when doing different dental procedures.

The term "local anesthesia" refers to the lack of feeling in a specific region of the body caused by either an inhibition of the peripheral nerves' conduction process or a depression of excitement in nerve terminals [1]. The most popular way to reduce pain in dental practice is to utilize chemical agents that are reversible local anesthetics [2]. By applying a local anesthetic near to the main trunk, the nerve block technique secures regional anesthesia by blocking afferent signals from traveling centrally past that point [3].

In dentistry, mandibular anesthesia techniques are frequently employed to sedate the lower jaw in preparation for restorative or surgical treatments. The conventional inferior alveolar, Vazirani-Akinosi, and Gow Gates techniques are among the methods that can be used to anesthetize the inferior alveolar nerve. The conventional inferior alveolar approach is the most often used method for obtaining local anesthesia for mandibular surgical procedures [4].

William Halsted and Richard J. Hall (1884) first described the traditional inferior alveolar nerve block procedure. Although it makes use of intraoral landmarks, this method has been shown to have lower success rates. Gow Gates used both intraoral and extraoral markers to develop a novel method of mandibular anesthesia in 1973. The condyle's neck is the target site, and this method has been shown to have higher success rates [4].

For both of these methods to be successfully used, precise anatomical knowledge, manual dexterity, and clinical expertise are necessary. The purpose of this study is to evaluate dentistry students in Udaipur, Rajasthan, regarding their understanding and awareness of various mandibular anesthesia procedures, specifically IANB and Gow Gates. The outcome could assist teachers in determining the difficulties pupils encounter when learning these techniques. By identifying areas where conventional teaching methods may be lacking, student progress assessments can serve as a foundation for implementing better pedagogical strategies, such as digital learning aids or simulation training. While the Gow-Gates approach offers larger nerve coverage but necessitates more in-depth anatomical expertise, the IANB is more popular but has a higher failure rate because of anatomical variances [5]. It is possible to determine whether method is more useful for pupils at various educational stages by examining the learning curves for both.

II. MATERIALS AND METHODS

- *Study Design, Study Population, Study Area and Study Duration:*

A Descriptive Longitudinal study was conducted among 140 undergraduate final year dental students in Darshan dental college and hospital, Udaipur, Rajasthan, India from Oct 2022 to Sept 2024. A pretested 5 item, 1-page questionnaire was graded by a single blinded observer using visual analogue scale [6].

- *Inclusion Criteria:*

Students were included who attended regular rotatory 1 month posting in the department of oral and maxillofacial surgery and attended theory lectures on various mandibular anaesthesia techniques by the same observer.

- *Exclusion Criteria:*

Subjects were excluded if they were absentees or have not attended the theory lectures on various mandibular anaesthesia techniques.

III. OFFICIAL PERMISSION AND ETHICAL CLEARANCE

Ethical clearance was obtained by ethical committee of the institution. Only willing participants were included in the study after obtaining a written consent.

Official permission was obtained from the Principal of the Institution and Head of the Department of Oral and maxillofacial surgery.

The data collected were analysed with SPSS software version 26 (SPSS Inc., Chicago, Illinois, USA). Demographic and questionnaire response data were subjected to descriptive analysis, cross tab analysis, and Chi-square tests with a significance criterion of p=0.05.

IV. RESULTS

There were 140 participants in all, 48 of whom were male (34%) and 92 of whom were female (65%). Additionally, the results indicated that 20% (n=28) of the

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students favoured Gow Gates, whereas 80% (n=112) of the students picked IANB. Of the participants who were part of the study, 32% (n=45) said they needed to be corrected while using the IANB approach, and 67.8% (n=95) said they needed to be corrected when using the Gow Gates technique.

Table 1 Distribution of Study Population by Academic Year and Gender.

Academic year	**Males**		**Females**	
	n	%	n	%
4th year (2022-23)	20	28.5	50	71.4
4th year (2023-24)	28	40	42	60
TOTAL	48	34.2	92	65.7

Table 2 Table Showing Preference of IANB Mandibular Nerve Block by Students with Understanding of the Landmark.

Academic Year	**IANB**	
	n	%
4th Year (2022-23)	50	71.4
4th Year (2023-24)	62	88.5
TOTAL	112	80

Table 3 Table Showing Preference of Gow Gates Mandibular Nerve Block by Students with Understanding of the Landmark.

Academic Year	**Gow Gates**	
	n	%
4th Year (2022-23)	20	28.5
4th Year (2023-24)	8	11.4
TOTAL	28	20

Table 4 Summary of Responses by Academic Level to the Question “How Often Did They Experienced IANB Failure?” Among Students.

Response	**4th Year (22-23)**	**4th Year (23-24)**
Very often	06	07
Often	10	08
Sometimes	05	08
Rarely	25	28
Never	24	19
Total responses(n)	70	70

Table 5 Summary of Responses by Academic Level to the Question “How Often Did They Experienced Gow Gates Failure?” Among Students.

Response	**4th Year (22-23)**	**4th Year (23-24)**
Very often	25	28
Often	20	18
Sometimes	10	10
Rarely	08	07
Never	07	07
Total responses	70	70

Table 6 Summary of Responses Indicating “How Often Were They Corrected While Administrating Different Mandibular Anesthesia Techniques?”

Academic Year	**IANB**		**Gow gates**		**Total**	
	Male	Female	Male	Female	IANB	Gow Gates
4th Year (22-23)	10	14	08	27	24	35
4th Year (23-24)	06	15	12	48	21	60
n					45	95
%					32%	67.8%

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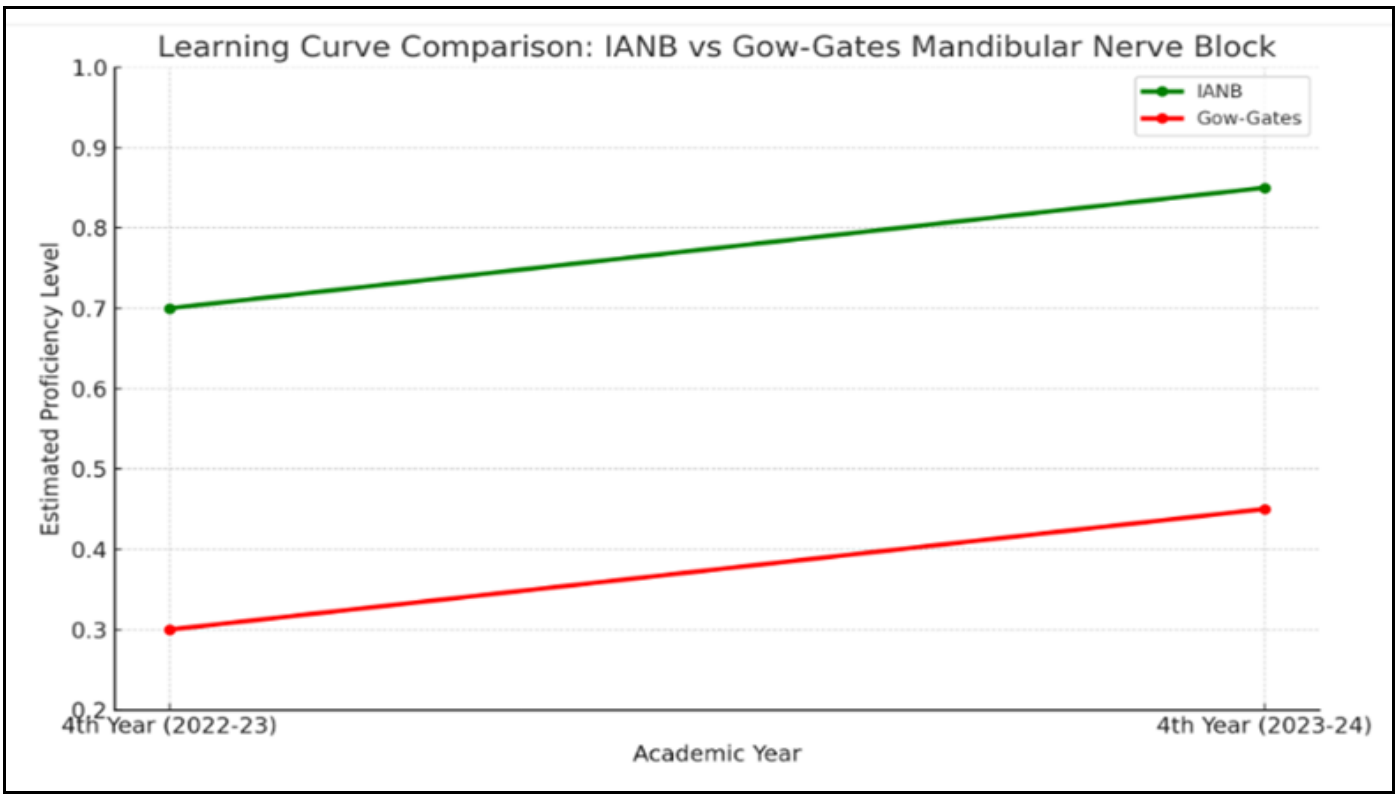

Fig 1 Learning Curve Comparison
(IANB vs Gow-Gates Mandibular Nerve Block)

➢ *Figure Labels: Learning Curve Interpretation*

The steeper learning curve for Gow-Gates can be visualized as:

- X-Axis: Academic exposure/time (e.g., moving from 4th Year 2022-23 to 2023-24)
- Y-Axis: Mastery/Proficiency Level
- Curve for IANB: Rises quickly with few errors → high preference, low failure.
- Curve for Gow-Gates: Rises slowly, with more frequent corrections and failures → low preference.

V. DISCUSSION

The current study assessed dental practitioners' learning curves for two mandibular anesthetic techniques: Gow Gates and inferior alveolar nerve block (IANB). The results highlight how difficult it can be to learn new therapeutic approaches, especially when doing so necessitates unlearning long-standing habits.

The findings show that the participants strongly preferred the IANB approach. The extensive teaching and application of IANB in dental school and clinical practice may be the reason for this preference [7]. Since IANB is frequently the first procedure dental students learn, it forms a fundamental part of their skill set. Most practitioners use it by default because of its perceived ease of use and familiarity.

The Gow Gates mandibular anesthesia technique is still underutilized even though it is a more effective method with wider anesthesia coverage. According to the study, this might be because of its more difficult learning curve. Dental professionals' reluctance to include Gow Gates into their regular practice is probably influenced by the challenge of unlearning the IANB approach. Practitioners used to the relatively simple IANB technique may be intimidated by Gow Gates' requirement for a more thorough understanding of mandibular anatomy and precise needle placement.

The Gow Gates technique's higher learning curve highlights the need for improved training methods. Advanced simulation tools and practical workshops could be useful additions to dental curricula to introduce students to this method early on [8]. To promote its use, Gow Gates' benefits—such as lower failure rates and wider nerve block coverage—should also be emphasized [4,5].

It's interesting to note that women made up the majority of study participants. The demographic dispersion emphasizes the significance of creating inclusive training programs that cater to the various needs of practitioners, even if no particular relationship between gender and technique choice was investigated.

This study is hampered by its dependence on self-reported data, which may induce bias, even though it offers insightful information. In order to give a more impartial analysis of the learning curves for both strategies, future research could include skill tests or observational methods. Furthermore, investigating how training approaches affect Gow Gates adoption may aid in the development of solutions to close the gap between perceived difficulty and actual application.

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VI. CONCLUSION

Because of its steep learning curve and the challenge of unlearning the popular IANB technique, the Gow Gates technique is underutilized despite its greater efficiency. Gow Gates may be more widely used in dentistry if training programs are improved and the clinical benefits are highlighted.

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