

Assessment of Knowledge and Practice of Fresh Dental Graduates, Dental Surgeons and Specialists of Multan about Different LA Techniques for Mandibular Teeth: A cross-sectional survey

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ABSTRACT

Objective: To assess the knowledge about different mandibular nerve block techniques of fresh dental graduates, dental surgeons and specialists to attain mandibular nerve block for dental treatment in Multan.

Design of the Study: It was a cross-sectional survey.

Study Settings: This study was carried out at Department of Dentistry at Multan Medical & Dental College, Nishtar Institute of dentistry (Nishtar Medical University) and Bakhtawer Amin Dental College from August 2019 to August 2020.

Material and Methods: The study involved 220 respondents. The questionnaire was administered to fresh dental graduates (house officers) and dental surgeons in 3 dental colleges of Multan, and was collected on the same day. House officers who did not return the forms were reminded personally and contacted on the phone thrice over the following week.

Results of the Study: The frequency of respondents who could administer Gow-Gates without supervision was 20.9% (n=46). Participants from NID, Multan had the highest frequency (35.3%) with the lowest in BIMDC (16.6%) and MMDC (20.6%). The differences were non-significant (p=0.19). Significantly higher frequency of male respondents (10%, n=22) claimed they could administer Gow-Gates without supervision compared to female respondents (5.4%, n=12, p=0.012, Chi-Square). Training for Gow-Gates had been received by 12.7% (n=28) of the House Officers and dental surgeons. The Highest frequency of training was in NID, Multan (5.4%, n= 12, p= 0.016, chi-square).

Conclusion: The majority of the dental practitioners of Multan used IANB as their primary LA technique and intraligamental injections as a supplemental LA technique in their clinics to attain mandibular molars anesthesia for general dental procedures like fillings, root canals and extractions.

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

INTRODUCTION

The regular practice for attaining mandibular anesthesia for usual dental procedures is by the use of the Inferior Alveolar Nerve Block (IANB). However, failure rates are reported high for IANB, ranging from 31% to 41% in mandibular first and second molars, 42% in second premolars, 38% in first premolars, 46% in canines and up to 81% in lateral incisors¹. Gow-Gates (GG) has better success rate ranging from 91% to 95%¹. Gow-Gates is possibly used as a primary local anesthesia technique or as a supplemental technique after an unsuccessful attempt of Inferior alveolar nerve block²⁻⁴.

Gow-Gates mandibular nerve block gives sensory anesthesia to nearly the complete distribution of V3. The inferior alveolar, lingual, mylohyoid, mental, incisive, auriculotemporal, and buccal nerves are all blocked^{1, 7}. Considerable rewards of the Gow-Gates technique over IANB include its superior success rate, its lower rate of positive aspiration (approximately 2% vs. 10% to 15% with the IANB^{5, 8}) and the lack of troubles with extra sensory

innervation to the mandibular teeth. However, Gow-Gates is associated with longer waiting times of 5 or more minutes after administration of LA as compared to IANB which can be tested for anesthesia after 3-5 minutes¹.

While Gow-Gates is more effective^{1,5,6}, the majority dentists have not had a full grip on this procedure, probably due to insufficient guidance and practice, or an observation of increased pain linked with the injection and patient anxiety¹. But several randomized controlled clinical trials have established no major variation in pain on injection with the three techniques used to attain mandibular anesthesia: normal inferior alveolar nerve block, Gow-Gates mandibular block, and Vazirani Akinosi mandibular block^{11,12}.

METHODOLOGY

This cross sectional study and questionnaire based survey was conducted in November 2020. After taking Institutional Review Board (IRB), this study was conducted at MMDC, NMC and Bakhtawer am in dental college. The pilot study was done which led to modification of the data collection form. The questionnaire was administered to fresh dental graduates (house officers) and dental surgeons in 3 dental

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The questionnaire was modified and administered to general dental practitioners of Multan from November to December 2020, via pharmaceutical representatives paying visits to dental clinics. The short questionnaire was collected on same day, or one week later.

Data was analyzed using SPSS version 23. Frequencies and means were calculated for nominal and continuous univariate analysis. Chi-square, Mann Whitney U and Spearman's rho tests were used for bivariate analysis. A p-value of <0.05 was set as the level of statistical significance.

RESULTS

There were a total of 220 respondents in this study. Mean age was 24.28 S.D ± 3 with a maximum age of 57 and minimum of 22. There were 52 (23.6%) male respondents, 68 (30.9%) female respondents from 3 different colleges of Multan and 100 respondents from the community as general dental practitioners. Half (51.3%, n=111) of the participants claimed to know the technique for GG mandibular anesthesia. Mean self-perceived competence level for GG on a scale of 0-10 was 2.55, SD± 2.9 (median 2, mode 0). Respondants who knew how to administer Gow-Gates had a mean self-percieved competence level of 5.14 SD±2.8 (median 5) while those who did not know the technique had a mean competence level of 0.95 SD±1.7, (median 0, p < 0.0001, Man Whitney U test).

The frequency of respondants who could administer Gow-Gates without supervision was 20.9% (n=46). Participants from NID,Multan had the highest frequency (35.3%) with the lowest in BIMDC (16.6%) and MMDC (20.6%). The differences were non-significant (p=0.19). Significantly higher frequency of male respondants (10%, n=22) claimed they could administer Gow-Gates without supervision compared to female respondants (5.4%, n=12, p=0.012, Chi-Square). Training for Gow-Gates had been received by 12.7% (n=28) of the House Officers and dental surgeons. The Highest frequency of training was in NID,Multan (5.4%, n= 12, p= 0.016, chi-square).

There was a strong, highly significant positive correlation (rho=0.701, p=0.0001, Spearman's rho) between number of Gow-Gates injections administered and the mean competence level. A total of 100 general dental practitioners responded to the survey. Response rate was 59%. There were 55 (55%) male respondents and 45 (45%) female respondents, with 79 (79%) general dentists and 21 (21%) specialists. The year of graduation of respondents ranged from 1994-2016.

There were 66 valid responses for the choice of primary LA technique for mandibular anesthesia, as 53 respondents selected more than one primary technique. IANB was used by 95.4% (n=63/66) participants as a primary technique. Other techniques, mainly Vazirani Akinosi, intra-ligamental and infiltrations were used by 1 participant each (Table 1). Significantly more general dentists (97.9%) used IANB as primary LA technique compared to specialists (82.3%, p= 0.006). There were 79 valid responses for the question on supplemental LA, and

Intraligamental was the most frequently used technique (36.8%) followed by a repetition of IANB (24.2%) and infiltration (20%).

While comparing results between general dentists and specialists for supplemental LA technique, significant (p=0.045) differences existed in the choice of technique. Specialists used IANB and intraligamental more frequently, while general dentists used infiltration more frequently as a supplemental technique (Table 1).

Comparing training received by general dentists and specialists in LA techniques: Training had been received for IANB by 81% (n=81), for Gow-Gates by 20% (n=20), for Vazirani Akinosi by 11% (n=11), for intra-ligamental by 55% (n=55) and for infiltration by 65%. An apparent difference in Gow-Gates training between general dentists and specialists was found to be non-significant (p=0.195),

Table 1: training received according to designation.

LA technique	General dentists n=79	Specialists n=21	Total n=100
IANB	80.01% n=64	81% n=17	n=81
Gow-Gates	14.4% n=11	42.8% n=9	20% n=20
Vazirani Akinosi	7.5% n=6	23.8% n=4	11% n=11
Intraligamental	45.5% n=36	90.4% n=19	55% n=55
Infiltration	56.9% n=45	95.2% n=20	65% n=65

Chart 1

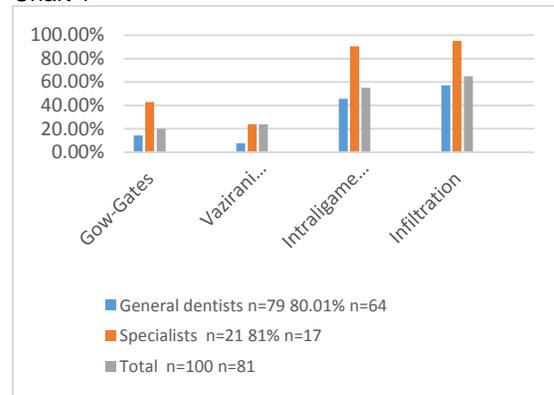
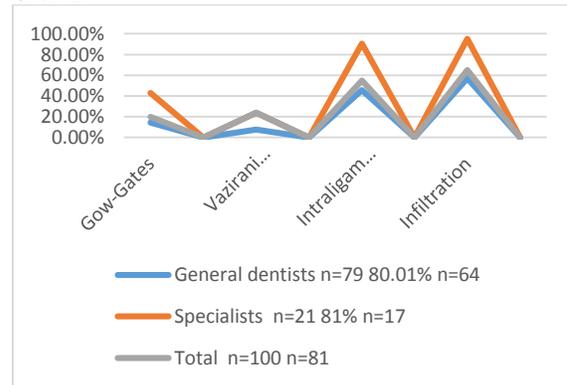


Chart 2



DISCUSSION

IANB has been the baseline procedure for mandibular LA and there is no surprise that it was the most preferential (97.4%) primary LA technique among respondents in this study. unluckily IANB has elevated failure rates (15% to 20%),¹ and requires additional dose occasionally¹. Superior success rates have been documented for Gow-Gates as a primary technique,²⁶ but no dentists in our study were using Gow-Gates as a baseline technique, even though some participants had received training for it (Table 1).

The incidence of positive aspiration in Gow-Gates is lesser than IANB, while a high dose (3ml) has been suggested by Malamed.¹⁻³ Clinicians should decide what is safer for their patients, and in cases of ineffectiveness of IANB, or when unintended intra-vascular LA administration may cause considerable medical harms, e.g. unstable angina or cardiac arrhythmias, Gow-Gates or a more superficial administration like Intraligamental injection may be indicated. The results showed that 51% of the fresh dental graduates had theoretical knowledge of Gow-Gates yet only 21% felt competent to administer it, this shows that meticulous practical training should be included in undergraduate dental curriculum for Gow-Gates and Vazirani Akinosi nerve block.

Vazirani Akinosi method, which is a closed mouth technique, is sometimes used as a primary technique in patients with limited mouth opening due to muscle trismus, infection, or the presence of tumor.¹ It may also be used as a secondary LA technique if the usual block anesthesia is unsuccessful.²⁴ Infiltration is very effective for mandibular anterior region where bone is more porous and permit LA to disperse in. The central core theory¹⁶ shows the high failure rates of IANB in the anterior region, and suggests the use of infiltration as a baseline technique for teeth in this area. Effectiveness of infiltration in this area is better, on the other hand 4% articaine may be more effective than 2% lidocaine as a primary or supplementary infiltration technique.²²

Intraligamental is a very useful supplemental LA technique, and was being used often for this reason by respondents. It can also be used as a primary technique for mandibular LA, though there are apprehensions about PDL injury when injecting large quantities of LA inside the PDL space for restorative purposes³⁰. Superior success rates for restorative procedures have been observed for intraligamental injections with contrast to the inferior alveolar nerve block, although intraligamental infiltration may require to be supplemented during procedures.²⁶ Intraligamental injections are also not easy procedures, and may require special armamentarium to administer efficiently while the same success rates (50% to 96%) have been established when evaluating different needles and tools for Intra-ligamentary injections.^{1,26}

The selection of additional LA technique should ideally be dependent upon the reason for failure of primary LA technique. Inaccurate technique is the most frequent reason for requiring repeat IANB. Where infection may be the cause for ineffectiveness of primary LA technique, it may be more useful to administer the supplemental LA more proximal (Gow-gates) or distal (e.g. intraligamental) to the site of infection. Parallelplan may be useful in cases of

anatomical variations, when both proximal (Gow-Gates) and distal (intraligamental) techniques may be useful.

CONCLUSION

The majority of the dental practitioners of Multan used IANB as their primary LA technique and intraligamental injections as a supplemental LA technique in their clinics to attain mandibular molars anesthesia for general dental procedures like fillings, root canals and extractions.

Recommendations: The requirement for training in alternative LA techniques like Gow Gates and Vazirani Akinosi is indicated. This training may be integrated in the undergraduate curriculum, and practiced during house job (internship) under supervision.

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