Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 10, pp.39868-39871, October, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

INFERIOR ALVEOLAR NERVE BLOCK VS GOW-GATES INJECTION TECHNIQUE-A COMPARISON OF THE EFFICACY BETWEEN DIFFERENT AGE GROUPS

***Karthikeyan Maruthamuthu**

Department of Oral & Maxillofacial Surgery, Adhiparasakthi Dental College & Hospital

ARTICLE INFO

Article History:
Received 10th July, 2016
Received in revised form
22nd August, 2016
Accepted 28th September, 2016
Published online 30th October, 2016

Key words:

Inferior alveolar nerve block,
Gow Gates, Neurosensory testing.

ABSTRACT

Several studies have been undertaken thus far which compares the techniques of Inferior alveolar nerve block and Gow Gates mandibular block but a final conclusion on their efficacy is still controversial. This study, having been performed with standardized, accurate criteria, compared both the techniques between different age groups of patients. Thirty patients of age group 15-65 years were divided into group A (15 members) for Gow Gates technique and group B (15 members) for Inferior alveolar nerve block technique. Results were evaluated based on neurosensory testing once every 5, 10 and 15 minutes after anesthetising the tooth. In conclusion, experienced surgical skills are required for the success of the classical Gow-Gates technique. Inferior alveolar nerve block showed promising results in this study.

Citation: Karthikeyan Maruthamuthu, 2016. "Inferior alveolar nerve block vs gow-gates injection technique-a comparison of the efficacy between different age groups", *International Journal of Current Research*, 8, (10), 39868-39871.

INTRODUCTION

In dentistry, pain management is of prime importance for the reduction of fear and anxiety in patients associated with dental procedures (Mario Alberto Isiordio-Espinoza *et al*., 2012). Thus Deep anaesthesia is very important particularly in dental surgery (Abbas Haghighat *et al*., 2015) and is achieved mostly by local anaesthesia. Local anaesthesia has been defined as a loss of sensation in a circumscribed area of the body caused by a depression of excitation in nerve endings or an inhibition of the conduction process in peripheral nerves. Mantle bundles are the first to be reached by the local anaesthetic agent in high concentrations and get completely blocked shortly after the injection (Stanley F. Malamed 6th edition). Pain control through truncal block of inferior alveolar nerve is the widely employed loco-regional anaesthetic technique which affords safety and comfort for both the surgeon and the patient (Mario Alberto Isiordio-Espinoza *et al*., 2012). The operator (choice of anaesthetic technique) and the patient (anatomical, pathological, and psychological aspects) determine the success & failure rates. According to, Lopez *et al.* if symptoms of anaesthesia are not identified after a prudent period of 10-15 minutes following the anaesthetic procedure, then it is considered a failure (Abbas Haghighat *et al*., 2015).

****Corresponding author: Karthikeyan Maruthamuthu,***
Department of Oral & Maxillofacial Surgery, Adhiparasakthi Dental College & Hospital

The IANB is the most frequently employed mandibular injection technique but failure rates are reported among 44% to 81% of cases (Marta Montserrat-Bosch *et al*., 2014). This classic technique was originally developed by Fischer and later modified by many authors (AurasaWaikakul *et al*., 1991). In the year 1973, a journal published the first account of a new approach to mandibular anaesthesia which has since become known as the Gow Gates technique developed by Gow Gates who used extraoral landmarks for mandibular anaesthesia (Stanley F. Malamed, 1981). In a 2014 review, Khalil discussed an alternative technique for overcoming conventional IANB failure (MaryamAlHindi *et al*., 2016). Failure may also be due to patient fear, systemic and local complications of intraoral infection, biologic diversity in being responsive to drugs, anatomical variations, infections and inflammation, dense bones, bifid mandibular nerve, incorrect method of injection (Abbas Haghighat *et al*., 2015). An advantage of Gow Gates is that the interpterygoid fascia limits medial diffusion of the anaesthetic solution which flows anteriorly and inferiorly into the mandibular canal. The auriculotemporal, mylohyoid, and buccal nerves are also blocked with a single dose. Higher injecting point avoids initiation of an inflammatory process in the mandibular ramus area (Adriana Shinagawa *et al*., 2009). This technique has theoretical attraction but objective evidence of efficacy is minimal (Stanley F. Malamed, 1981). The attempt of this study is to evaluate the effectiveness of this procedure in a small number of clinical trials.

MATERIALS AND METHODS

ETHICS-The study was approved by Institutional Review Board (IRB/IEC Reference No:2016-UG-BrIII-KAR-01/APDCH) of Adhiparasakthi Dental Collage and Hospital. An informed consent was signed by patients under study. Thirty patients who came to the Outpatient department of Oral and Maxillofacial Surgery of Adhiparasakthi Dental Collage and Hospital were selected randomly. The samples were divided into Group (A) 15 for Gow Gates and Group (B)15 for IANB. Inclusion criteria includes patients between 15 to 65 years, mandibular third molar firm, completely erupted and therapeutically extracted tooth for orthodontic reasons were also included. Exclusion criteria includes medically compromised patients, uncooperative patients, patients with history of allergy to drugs, periodontal and pterygoid plexus positioned near deposition point, dependence on extra oral landmarks (VivekAggarval*et al*., 2010)and compromised teeth. The materials employed for the study were 26 gauge unilock syringes, 2%lignocane with 1:200000 epinephrine, cotton applicator tip, cotton rolls and a timer. The study operators were Post Graduate students of OMFS department of Adhiparasakthi Dental College and Hospital. The selected tooth was anesthetized at the correct landmark i.e.insertion of needle near the mandibular foramen for IANB and for Gow Gates the target site is the neck of the condyle. Before administration of anaesthesia intra orally, a TEST DOSE was given. The timer was turned on as soon as the local anaesthetic was administered.

Fig 1.a shows a patient receiving Inferior Alveolar Nerve Block and Fig 2.a and 3.a shows patients receiving Gow Gates injection technique. The time of onset of anaesthesia, which is defined as the first sensation of numbness or tingling in the anaesthetized region, calculated from the point of retrieval of needle after the injection (Vinay Mohan Kashyap*et al*., 2011) was duly noted. Duration of procedure and post op duration of anaesthesia was also recorded.Pain experienced during injection was described by the patient on a four-point Verbal Analogue Scale (VAS) during injection of the solution and not on the needle-prick itself (Vinay Mohan Kashyap*et al*., 2011). Verbal analogue scale (VAS) shows reading as 0 - no pain, 1-Mild and bearable pain, 2-Moderate pain, 3-Unbearable, severe pain (Abbas Haghighat*et al*., 2015). Transient facial paralysis or Re-injection was also noted at the time of procedure and during the procedure.According to Toyt 0-1 shows injection success, 2-3 shows injection failure. Onset of anaesthesia was noted for each technique. Lip numbness was checked once in every 5, 10 and 15 minutes by all the three techniques mentioned below

1) Needle prick method – With the patients eyes closed, a 26 gauge needle is pricked on the LA injected side and control side. The technique is considered a success if the patients feels numbness and cannot identify the anaesthetized side. (Fig. 1.c, 2.c, 3.c shows patient undergoing pinprick test

Table 1. Grades of anaesthesia of both techniques by fischers exact test P-value

Grades of Anaesthesia	Injection Technique					
	Gow Gates		IANB		Total	
	N	%	N	%	N	%
Grade-A	2	13.3	14	93.3	16	53.3
Grade-B	0	.0	1	6.7	1	3.3
Grade-C	13	86.7	0	.0	13	43.3
Total	15	100.0	15	100.0	30	100.0

Chi-Square Test	Value	P-Value
Fisher's Exact Test	25.305	<0.001

N- Normality values

Table 2. Result values of mann whitney test for onset, duration, post op duration of anaesthesiamann-whitney test result values

Variable	Injection technique	N	Mean Rank	Z-value	P-value
Onset of Anaesthesia (secs)	Gow-gates	15	20.00	4.0417	<0.001
	IANB	15	9.00		
Duration of anaesthesia (secs)	Gow-gates	15	17.93	1.516	0.129
	IANB	15	13.7		

Table 3. Test cotton wool, pin prick, mechanoceptive test

TESTS	CHI SQUARE TEST	P VALUE
COTTON WOOL TEST		
5 mins	Fischer exact test	0.999
10 mins	Fischer exact test	0.330
15 mins	Pearson chi-square test	0.256
PINPRICK TEST		
5 mins	Pearson chi-square test	0.999
10 mins	Pearson chi-square test	0.025
15 mins	Pearson chi-square test	0.713
MECHANOCEPTIVE TEST		
5 mins	Fischer exact test	0.999
10 mins	Pearson chi-square test	0.065
15 mins	Pearson chi-square test	0.121

2) Cotton roll method – A Cotton roll is slowly swiped over the experimental and control side. The technique is considered a failure if the patient identifies the spot. (Fig. 1.b, 2.b, 3.b shows patients undergoing cotton roll test)
3) Mechanoceptive test - A cotton tip applicator is placed randomly at both the experimental and control side and results were calculated by the same response as mentioned in the above two techniques. (Fig. 1.d, 2.d, 3.d shows patients undergoing mechanoceptive test)

RESULTS

The samples taken into the study were 15 patients for Gow-gates and 15 patients for IANB with p value (0.394) and a mean for Gow-Gates 27(SD±11.27) and IANB 29.27(SD±12.09) and no significant difference exists between these two groups in terms of age. Onset of anaesthesia shows highly significant value of (<0.001) with a mean of 209.73(SD±57.491) and 110.27(SD±39.56) for Gow Gates and IANB respectively which shows IANB to be better efficient than Gow gates technique. There is no significant difference in the duration of anaesthesia between Gow Gates and IANB (p=0.129) with a mean of 173.87(SD±95.52) and 122.67 (SD±74.83) respectively. Post op duration of anaesthesia is highly significant (<0.001) between Gow Gates with a mean of 127.3(SD±19.11) and IANB with a mean of 61.13(SD±14.76). Grade of anaesthesia shows highly significant (<0.001) values that IANB is better than GOW-GATES. VAS shows p value of 0.201 which shows that both techniques have an equal number of responders in all categories of VAS.In this study, none of the patients show Transient facial paralysis in both the groups.In comparison to Gow Gates, IANB requires less reinjection which is highly insignificant (<0.001)

DISCUSSION

Lower third molar removal has been considered as a good model in pain related clinical trials which requires profound pulpal soft tissue & periodontal ligament anaesthesia. The only problem is the observation of bleeding spot at the injection site, which nesseciates blinding of the surgeons (Marta Montserrat-Bosch *et al*., 2014). Some authors found the Gow- Gates technique to be more susceptible to mistakes when approximating the target area at the condylar neck by extra oral landmarks (Adriana Shinagawa *et al*., 2009). Since there is variability in the interpretation of pain along with a lack of objective parameters for clinical evaluation, a standard method is needed for objective assessment of local anaesthetic injection. Bjorn was the first investigator to employ electric pulp tester (Tzu-Ni Lai *et al*., 2006). One study shows EPT as not always an accurate method of determining pulpal anaesthesia (AmitJena and GovindShashirekha, 2013). But in this study we employed VISUAL ANALOG SCALE to assess pain during injection. The variation in the results is also due to objective assessment of pain which is one of the factors. The IANB success rate by Cohen *et al*., Kennedy *et al*., Matthews *et al*., Reisman *et al*., Claffey *et al*., Nusstein *et al*., Bigby *et al*. and Lindemann *et al*. have suggested that success rate is not adequate for performing endodontic treatment on posteriors teeth (AmitJena and GovindShashirekha, 2013). This study favours the standard Inferior alveolar nerve block to be more efficient than the Gow- Gates technique.Cohen's group found that 23 out of 61(38%) subjects required supplemental anaesthesia as IANB failed to provide adequate anaesthesia. The reported IANB success rate was 62% (AmitJena and Govind Shashirekha, 2013). In our study, out of 15 patients13 patients required re-injection in Gow – Gates and only 1 patient out of 15 patients required re-injection with the Inferior alveolar nerve block. In a study of 4,275 cases, Malamed observed decreased incidence of trismus with Gow Gates relative to conventional IANB (MaryamAlHindi *et al*., 2014) but this study shows that no patients reported with trismus or facial paralysis in both techniques.Sisk reported no significant difference in effectiveness among these two techniques. Some authors found Gow Gates to be significantly less effective than the conventional one (AurasaWaikakul and Jirapun Punwutikorn, 1991). Montagnese *et al*. (1984) who compared Gow Gates and standard block techniques in 40 patients noted no statistically significant differences between the two techniques (Berezowski *et al*., 1988). This study shows (group B) the Inferior alveolar nerve block to be more effective when compared to (group A) Gow Gates both statistically and in group analysis. One such study showed that 96% of the highest frequency of anaesthesia was acquired by the Inferior dental anaesthesia whereas Gow gates showed 90%. PINPRICK testing was found reliable for assessing anaesthesia achieved (Todorovic *et al*., 1986). This study also included the pinprick test which showed in both techniques that after 15 minutes, 30% of patient's showed response. The cotton wool test was found to be superior in Gow Gates in 5 minutes, Inferior alveolar nerve block in 10 minutes, and Gow Gates in 15 minutes. In aspects of the Mechanoceptive test, in 5minutes, 3 patients show response in Gow Gate whereas it is 2 patients in Inferior alveolar nerve block. In 10 minutes 4 patients in Gow Gates and 9 patients in Inferior alveolar nerve block shows response. In 15 minutes 8 patients in Gow Gates and 12 patients in Inferior alveolar nerve block responds positively (i.e. anaesthesia lasts for these patients)

Conclusion

This study shows IANB to be more efficient than Gow-Gates in terms of onset of anaesthesia and in grades of anaesthesia with fewer need for re-injection in IANB. As many techniques have been described in the literature for IANB, most dentists continue to use conventional block approach (MaryamAlHindi *et al*., 2014). The prevailing curriculum on anaesthetic injection technique should be widened as it also relies on other techniques which is applicable only for theory basis. The advantages, disadvantages and complete knowledge of all the injection techniques should at least be introduced to the future dentist to widen the implementation of various techniques in their regular routine practice.

REFERENCES

Abbas Haghighat, Zahra Jafari, D. AriushHasheminia, Mohammad-HasanSamandari *et al*. 2015. Comparison of success rate and onset time of two different anaesthesia techniques. *Med oral patol oral Cir Bucal*., Jul 1; 20(4):e459-63.

Adriana Shinagawa, Veronica K.L.Chin, SaidR.Rabbani, AntonioC.Campos. 2009. A Novel Approach to Intraoral Mandibular Nerve Anesthesia: Changing Reference Planes in the Gow-Gates Block Technique's Oral MaxillofacSurg., 67:2609-2616

Aggarwal V, Singla M, MiglaniS, KohliS, Irfan M. 2015. A prospective, randomized single-blind evaluation of effect of

injection speed on anaesthetic efficacy of inferior alveolar nerve block in patients with symptomatic irreversible pulpitis. *Med Oral Patol Oral Cir Bucal*., 20(4):e459-463.

AmitJena, GovindShashirekha. 2013. Effect of preoperative medication on the efficacy of inferior alveolar nerve block in patients with irreversible pulpitis: A Placebo-controlled clinical study. *J Conserv Dent*., 16 (2):171-4.

AurasaWaikakul, JirapunPunwutikorn. 1991. A Comparative Study of the Extra-Intraoral Landmark Technique and the Direct Technique for Inferior Alveolar Nerve Block. *J Oral Maxillofac Surg*., 49:804-808.

Berezowski, B.M., J.F.Lownie, P.E.Cleaton-Jones. 1988. A comparison of two methods of inferior alveolar nerve block. *J.Dent*., 16:96-98.

Mario Alberto Isiordio-Espinoza, MarianaOrozeo-Solis, Franciso Javier Tobias-Azua, Elsa Patricia Mendez-Gutierrez. 2012. Subcutaneous tramadol increases the anaesthetic efficacy of mepivacaine with epinephrine in inferior alveolar nerve block. *British Journal of Oral and Maxillofacial Surgery*, 50:157-160.

Marta Montserrat-Bosch, Ruifigueiredo, Pedro Nogueria-Magalhaes, JosepArnabat-Dominguez *et al*. 2014. Efficacy and complication associated with a modified inferior alveolar nerve block technique. Randomized, triple-blind clinical trial. *Med Oral Patol Oral Cir Bucal*., 19 (4): e391-7.

MaryamAlHindi, BayanRashed, NouraAlOtabi. 2016. Failure rate of inferior alveolar nerve block among dental students and interns. *Saudi Med J*., 37 (1):84-9.

Stanley F. Malamed. 1981. The Gow-Gates mandibular block. *Oral Surgery Oral Medicine Oral Pathology*, 51:463-67

Stanley F. Malamed.The Handbook of local Anesthesia.6th edition.pg 2.

TodorovicL., Z. Stajcic, V.Petrovic. 1986. Mandibular versus inferior dental anesthesia: clinical assessment of 3 different techniques. *Int. J. Oral Maxillofac*. *Surg*., 15:733-738.

Tzu-Ni Lai, Chun-Pin Lin, Sang-HengKok, Puo-Jen Yng *et al*. 2006. Evaluation of mandibular block using a standardized method. *OralSurg Oral Med Oral Pathol Oral Radiol Endod*., 102:462-68.

Vinay Mohan Kashyap, Rjendra Desai, Praveen B.Reddy, SureshMenon, 2011. Effect of alkalinisation of lignocaine for intraoral nerve block on pain during injection, and speed of onset of anaesthesia.*British Journal of Oral and Maxillofacial Surgery*, 49:e72-e75.

VivekAggarval, MDS, and DebipadaKabi, MDS. 2010. Comparitive evaluation of anaesthetic efficacy of Gow-Gates mandibular conduction anaesthesia, Vazirani-Akinosi technique, buccal-plus-lingual infiltrations, and conventional inferior alveolar nerve anaesthesia in patients with irreversible pulpitis. *Oral Med Oral Pathol Oral Radiol Endod*., 109:303-308.

****