ROLE OF COMBINING LONG BUCCAL NERVE BLOCK WITH INFERIOR ALVEOLAR NERVE BLOCK TO IMPROVE SUCCESS OF LOCAL ANESTHESIA FOR EXTRACTION OF MANDIBULAR TEETH

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ABSTRACT

Objective:

The aim of this study is to ascertain the role of combining long buccal nerve block with inferior alveolar nerve block in achieving local anesthesia for extraction of mandibular teeth.

Materials and Methods:

The study took place at two teaching hospitals simultaneously (Fatima Jinnah Dental College Hospital, Jinnah Medical and Dental College Hospital Karachi), from January 2011 to June 2011. A total of 300 patients were randomly assigned to 3 groups of 100 patients each. Lidocaine 2% with 1:100,000 epinephrine was used for all injections.

Group 1: patients received an IAN block using 1 cartridge of L/A + 1 cartridge as Buccal infiltration.

Group 2: patients received an IAN block using 2 cartridges of L/A + 1 cartridge as Buccal Infiltration.

Group 3: patients received 1 cartridge as an IAN block and 1 cartridge as a long buccal nerve block.

A visual analogue scale (VAS) was used to rate pain immediately post-operativewhilesubjective discomfort experienced during the surgical procedure (rated as yes/no). Data was also collected for patients who would require extra cartridge of IAN block to achieve complete anesthesia. Data was analyzed using SPSS 14.0.

Results:

The success rates for groups 1 to 3 were 25.20%, 27.27% and 75.54% respectively. Group 3 had significantly better anesthesia compared with group 1 and group 2 ($P < 0.05$).

Conclusion:

Combining an IAN block and a long buccal nerve block provided more effective anesthesia in mandibular extraction.

Keywords:

Local Anesthesia, Molar Extraction, Lidocaine, VAS

INTRODUCTION

The most frequently used injection technique for achieving local anesthesia for extraction of mandibular posterior teeth including impacted third molars isinferior alveolar nerve block (IANB).However, the IANB does not always result in successful anesthesia.[1-17] Failure rates of 7 to 75% have been reported in different studies [1-17]. In this regard it would be beneficial to improve the success rate of the IANB.Meechan et al [18] have shown that buccal or buccal plus lingual infiltrations of 1.8 ml of 2% lidocaine with 1:100,000 epinephrine were effective. Kanaa et al [19] also used a cartridge of 2% lidocaine with 1:100,000 epinephrine for buccal infiltration anesthesia of the mandibular first molar. The lidocaine solution had a 39% success rate [16]. The low success rate with the lidocaine solution would not allow profound anesthesia for most clinical

procedures. There is some anesthetic effect of the lidocaine solution for buccal and lingual infiltrations, so adding a buccal or lingual infiltration to an inferior alveolar nerve block would result in a greater incidence of regional anesthesia.

The choice of anesthetic solution should be based on three main clinical considerations: anesthetic potency, latency (time to onset of anesthesia), and duration of the anesthetic effect [20]. Other important considerations are the pharmacokinetics (absorption, distribution and excretion) and toxicity of the drug. Lidocaine, synthesized by Löfgren in 1943, was the first amide anesthetic prepared for local application, and the only marketed representative of this drug group with topical action. Its potency is presently regarded as the standard for comparison with other local anesthetics [21]. The latency of lidocaine varies from 2-3 minutes, with an approximate duration of anesthetic effect for 2% solutions with epinephrine 1:100,000 as vasoconstrictor of 85 minutes at pulp level, and 190 minutes in soft tissues[22]. Lidocaine is the local anesthetic most widely used for pain control, since its pharmacokinetic characteristics and low toxicity compared with other ester-type anesthetics make it safe for use in dental practice[20-24].

This study was designed to improve the success of inferior alveolar nerve block by combining it with long buccal nerve block, in this manner a longer and more effective anesthesia can be achieved for extraction of mandibular posterior teeth.

MATERIALS AND METHODS

The study took place at two teaching hospitals simultaneously (Fatima Jinnah Dental College Hospital, Jinnah Medical and Dental College Hospital Karachi), from January 2011 to June 2011. Cross sectional comparative design was adopted. A convenience sample of 300 adults was taken with inclusion criteria of age 15 - 45 yrs., a positive indication for extraction of mandibular posterior teeth including dental caries, periodontal disease and impactions. Exclusion criteria were extremes of age, ASA II to ASAV patients (Chart 1.), pregnancy and lactation. Patients were randomly assigned to one of three parallel groups, initially in 1:1:1 ratio, to receive either one of three anesthetic regimens.

Group 1: patients received an IAN block using 1 cartridge of L/A + 1 cartridge as Buccal infiltration.

Group 2: patients received an IAN block using 2 cartridges of L/A + 1 cartridge as Buccal Infiltration.

Group 3: patients received 1 cartridge as an IAN block and 1 cartridge as a long buccal nerve block.

Informed consent was taken from all patients. Local anesthesia was given (2% Lidocaine with 1:100,000 epinephrine) by inferior alveolar nerve block (IANB) and local infiltration or long buccal nerve block (LBNB) technique. No more than 5 cartridges were given to any patient.

In IANB standard technique was employed; the nerve was approached from the apposite side of the mouth by angling the syringe from between the premolars of the opposite side, after piercing the mucosa and buccinator muscles between the palato-glossal and palato-pharyngeal folds until hitting the bone (ascending ramus). The syringe was retracted few millimeters and brought parallel to the ramus (anteroposteriorly) in close approximation to the mandibular foramen injecting anesthetic solution after careful aspiration.

Success for the anesthesia was measured on the basis of a subjective feeling of pain-free extraction. Success rate was calculated by dividing number of individuals who remain pain free after the extraction by the total number of individuals in the group.

Pain during the procedure was measured on a scale of 1 -to- 10 (VAS), each patient was asked to grade his/her pain from 1 to 10 with score of 1 measuring no pain and score of 10 measuring extreme pain (Chart 2).

Data was also collected for patients who would require extra cartridge of IAN block to achieve complete anesthesia in Group 1 and Group 2 patients.

Proportions of patients were compared between anesthesia groups and success rates with the Pearson chi squared test (adjusted for the stratification variable including age-groups and gender), and independent sample t-test with mean VAS scores. Data was analyzed using SPSS 14.0.

RESULTS

Mean Age of the sample of 27.82 +/- 5.81. Mean VAS Score (immediate post operative) was calculated as 4.2 +/- 2.5 for all groups combined.

The overall success rates for groups 1 to 3 were 25.20%, 27.27% and 75.54% respectively. Group 3 had significantly better anesthesia (mean VAS 2.29 +/- 1.92) compared with group 1 (mean

TABLE 1.
SUCCESS RATES AND MEAN VAS SCORES

Institute	Groups	Parameters	Success Rates[α]	Significance	Mean VAS	SD
JMDC	Anesthesia Groups	Group 1[β]	28.01		6.93	3.3
		Group 2[γ]	22.92	<0.05	4.86	1.5
		Group 3[δ]	77.08		2.46	2.2
	Gender	Male	38.04	>0.05	5.1	3.4
		Female	47.3		4.4	2.7
	Age Groups	15 - 25 yrs.	62.95		3.31	2.8
		25 - 35 yrs.	31.2	<0.05	5.63	2.9
		35 - 45 yrs.	33.86		5.31	3.2
FJDC	Anesthesia Groups	Group 1[β]	22.38		7.81	1.7
		Group 2[γ]	31.63	<0.05	4.32	1.5
		Group 3[δ]	74		2.12	1.6
	Gender	Male	45.23	>0.05	4.84	1.6
		Female	40.11		4.66	1.6
	Age Groups	15 - 25 yrs.	59.73		4.75	1.6
		25 - 35 yrs.	29.91	<0.05	3.81	1.6
		35 - 45 yrs.	38.37		5.69	1.5
OVERALL (Combined)	Anesthesia Groups	Group 1[β]	25.2		7.37	2.98
		Group 2[γ]	27.27	<0.05	4.59	1.85
		Group 3[δ]	75.54		2.29	1.92
	Gender	Male	41.64	>0.05	4.97	2.86
		Female	43.71		4.53	2.71
	Age Groups	15 - 25 yrs.	61.34		4.03	2.2
		25 - 35 yrs.	30.56	<0.05	4.72	2.25
		35 - 45 yrs.	36.12		5.5	2.34
	Total	Overall	42.67		4.75	2.5

[α] Success Rate: estimated on the basis of discomfort as indicated by the patient before and during the procedure. All cases with no discomfort were taken as successful.

[β] Group 1: patients received an IAN block using 1 cartridge of L/A + 1 cartridge as Buccal infiltration.

[γ] Group 2: patients received an IAN block using 2 cartridges of L/A + 1 cartridge as Buccal Infiltration.

[δ] Group 3: patients received 1 cartridge as an IAN block and 1 cartridge as a long buccal nerve block.

CHART 1: MEAN VAS SCORES

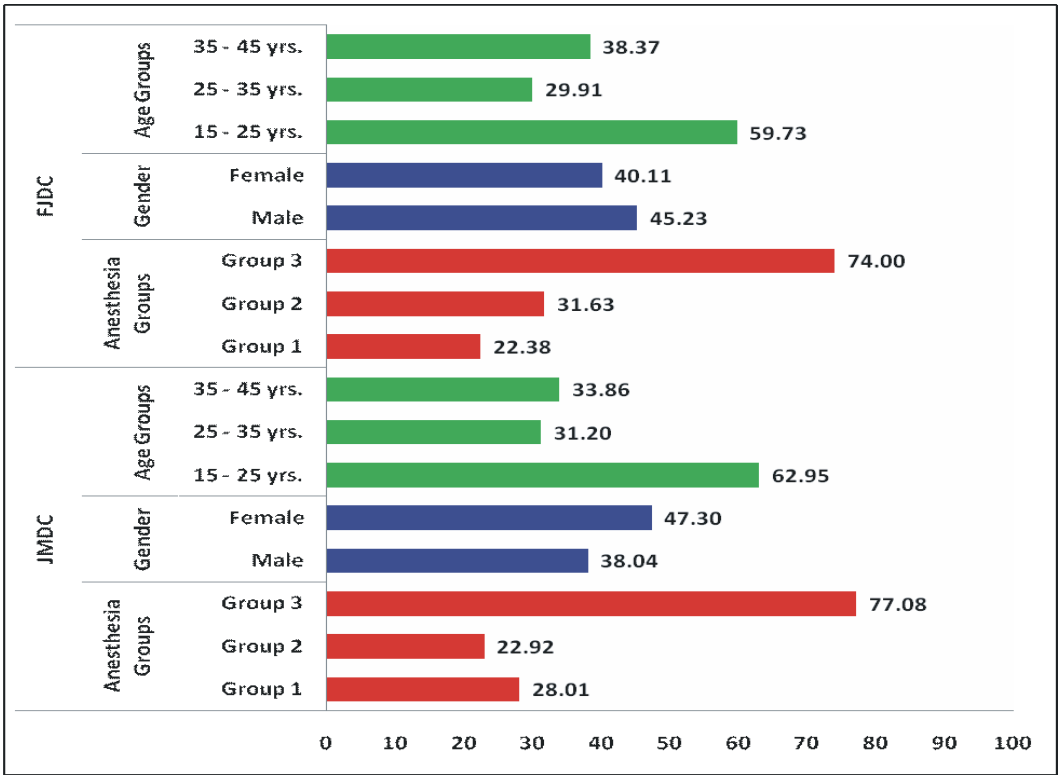


CHART 2: SUCCESS RATES

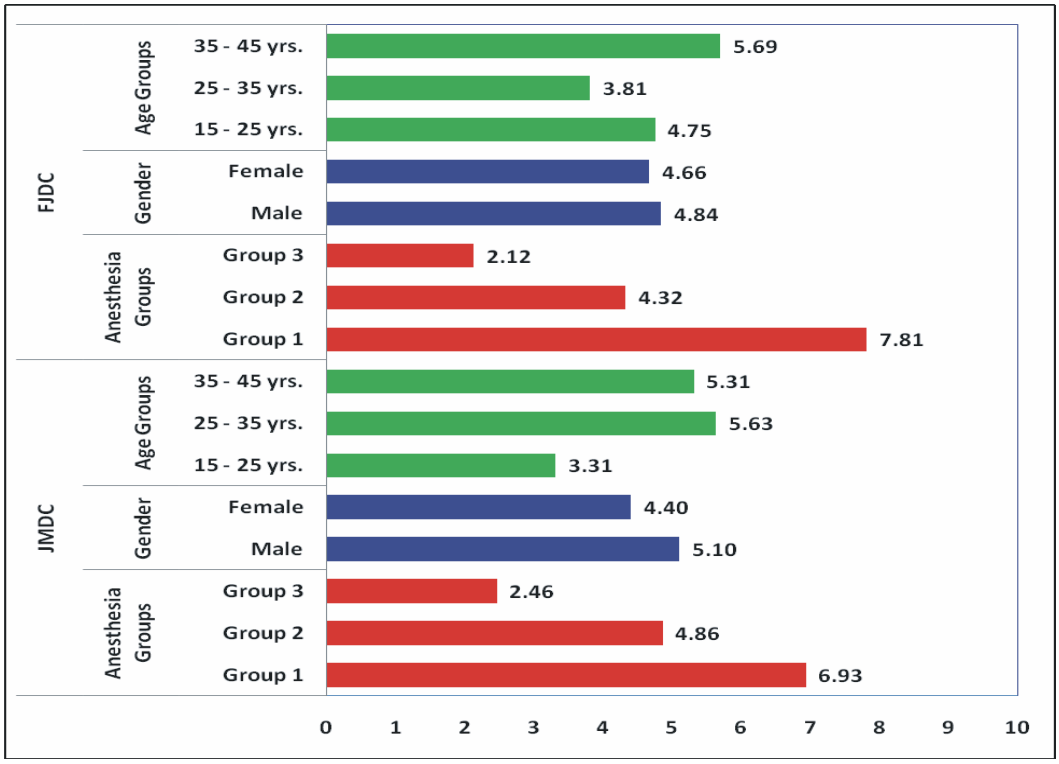
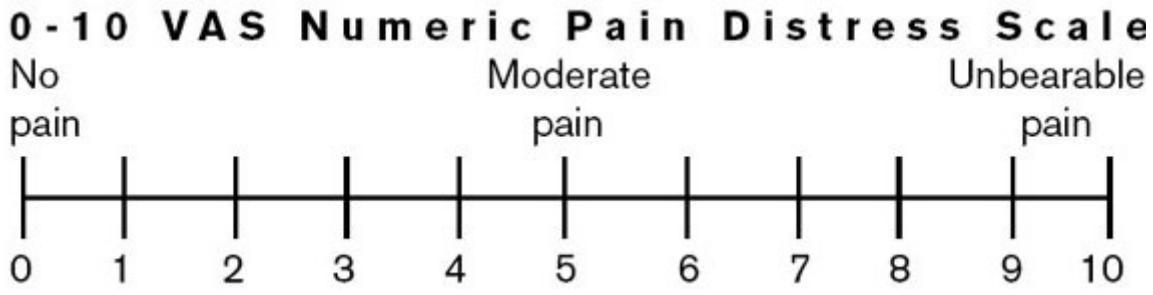


CHART 1.

ASA Classification		Examples:
ASA I	A normal healthy patient	Healthy; no smoking, no or very minimal drinking.
ASA II	A patient with mild systemic disease	Smoker; more than minimal drinking; pregnancy; obesity; well controlled diabetes, well controlled hypertension; mild lung disease.
ASA III	A patient with severe systemic disease, not incapacitating	Diabetes, poorly controlled hypertension; distant history of MI, CVA, TIA, cardiac stent; COPD, ESRD; dialysis; active hepatitis; implanted pacemaker; ejection fraction below 40%; congenital metabolic abnormalities.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Recent history of MI, CVA, TIA, cardiac stent; Ongoing cardiac ischemia or severe valve dysfunction; implanted ICD; ejection fraction below 25%.
ASA V	A moribund patient who is not expected to survive without the operation	Ruptured abdominal or thoracic aneurism; intracranial bleed with mass effect; ischemic bowel in the face of significant cardiac pathology..
ASA VI	A patient who has already been declared brain-dead and whose organs are being removed for transplant.	
The addition of an 'E' indicates emergency surgery.		

CHART 2



VAS 7.37+/-2.98) and group 2 (mean VAS 4.59 +/-1.85).Overall Success rates for Age Groups 1 to 3 were 61.34%, 30.56% and 36.12% respectively.Overall success rates for male was 41.64% and for females 43.71%.(Table 1).

Stratification was also done on the basis of institutes (FJDC and JMDC). The success rates were comparable in age-groups and anesthesia groups but there was a marked difference in gender showing greater success (47.3%) in females at JMDC as compared to female patients (40.11%) at FJDC. However mean VAS scores failed to show a remarkable difference between the institutes.

DISCUSSION

Pain control through inferior alveolar nerve block (IANB)is one of the most widely used local anesthetic techniques in oral surgery.IANB does not always result in successful anesthesia.Failure rates of 7 to 75% have been reported in different studies.[1-17].

The study was designed to improve the efficacy of inferior alveolar nerve block by combining it with long buccal nerve block in achieving a longer and more effective anesthesia for extraction of mandibular posterior teeth.

Our study has shown that the success rates for anesthesia in groups 1 to 3 were 25.20%, 27.27% and 75.54%. Group 3 having combined IANB and long buccal nerve block had significantly better anesthesia (mean VAS 2.29 +/- 1.92) compared to other groups. Group 1 using one cartridge for IANB and one cartridge ofbuccal infiltration (mean VAS 7.37+/-2.98) had a significantly greater mean VAS score as compared to other two groups. The difference is not reflected in success rates as discomfort felt by the patient during extraction depends on other factors also including operator's confidence and swift removal/delivery of tooth.

Mean VAS Score (immediate post operative) were calculated as 4.0 +/- 2.58 for all groups combined.The mean age of the sample of 27.82 +/-5.81.

The study demonstrated that anesthesia was slightly more successful in the younger age group with the overall Success rates for Age Groups 1 to 3 were 61.34%, 30.56% and 36.12% respectively.

This study has clearly demonstrated that combining long buccal nerve block with inferior alveolar nerve block has a better success rate as compared to using buccal infiltration along with inferior alveolar nerve block.

CONCLUSION

Combining an IAN block and a long buccal nerve block provided more effective anesthesia in extraction of mandibular teeth.

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