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Research Article

ANTERIOR MIDDLE SUPERIOR ALVEOLAR (AMSA) NERVE BLOCK VS INFRA ORBITAL NERVE BLOCK (IONB): THE VARYING DIFFERENCES AND EFFICIENCIES

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A B S T R A C T

The anterior middle superior alveolar (AMSA) nerve block injection is a relatively recent technique, which has been used for the anesthesia of the anterior maxillary teeth. This nerve block supposedly anaesthetises the anterior and middle superior alveolar nerves because of diffusion of the anesthetic solution via numerous nutrient channels on the palatal process of the maxillary bone. Thus AMSA block makes another palatal injection evitable and doesn't subject the patient to symptoms of numbness experienced in lateral part of nose, lower palpabrae and upper lip. We did a comparative study to analyze the efficacy of AMSA in comparison to IAON (Inferior alveolar nerve block).

INTRODUCTION

Conventionally, maxillary teeth have been anesthetized by administering an infiltration injection on the buccal or labial aspect of the target tooth.[1] The infraorbital, or intraosseous and intraligamentary injection have also been traditionally used for anesthesia of the maxillary teeth and soft tissues.[2,3]

The infra-orbital nerve is conventionally blocked at its exit from the infra-orbital foramen utilizing the percutaneous or intra-oral approaches. Intra-orally, the nerve can be blocked either via the central incisor approach or the premolar approach.[4]

The anterior middle superior alveolar (AMSA) nerve block injection is a relatively recent technique, which has been used for the anesthesia of the anterior maxillary teeth. This nerve block supposedly anaesthetises the anterior and middle superior alveolar nerves because of diffusion of the anesthetic solution via numerous nutrient channels on the palatal process of the maxillary bone.[3] Thus AMSA block makes another palatal injection evitable and doesn't subject the patient to symptoms of numbness experienced in lateral part of nose, lower palpabrae and upper lip.

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MATERIALS AND METHODS

70 adult patients seeking dental extraction were selected from the Outpatient Clinic in our department of Oral and Maxillofacial Surgery.

Inclusion criteria

1. Patients of the age group of 16 years and above.
2. Healthy adult patients free from systemic disease
3. Patients who gave consent for participation in the study
4. Patients requiring extraction of bilateral maxillary anterior teeth including premolars

Exclusion criteria

1. Medically compromised patients.
2. Patients taking medications that alter pain perception
3. Systemic pathologies or allergies that contraindicate local anesthetics or vasoconstrictors
4. Pregnancy
5. Those who refused to take part in the study.

Procedure: In all patients, AMSA nerve block was given on the right side and IONB was administered on the left side. Teeth were extracted from both sites on two different appointments. In order to avoid differences due to examiner

variability, injections were performed by the same operator on both sites in every patient.

For AMSA nerve block subjects were placed in a semi supine position with head tilted upward and back. The AMSA injection site was centered halfway between the mid palatine raphe and the gingival margin of the first and second premolars (fig. 1). Site was marked using an intraoral marker after drying the palate with dry gauze piece to remove saliva. 2mL conventional Leur Lock syringe containing 1.5 ml of LA solution (2% lignocaine with 1:200,000 adrenaline) was used to deposit L.A. in palate over a period of 3 minutes as described by Velasco et.al. (2012)[3]. The adequacy of anesthesia was checked by objective signs, determined by no pain on probing after 6 minutes on buccal and palatal gingiva after injection completion. Subjective symptoms were analysed in form of feeling of tightness in palate. Blanching could be seen extending up till the soft palate (fig.2) Thereafter the extraction procedure was carried out.

Fig 1 Injection site for AMSA nerve block

Fig 2 palatal blanching observed up till the soft palate

For IONB the patient was seated in a semi supine position with neck slightly extended. The infraorbital foramen was palpated. Lip was retracted pulling the tissues taut. Needle was inserted into the height of mucobuccal fold keeping it parallel to the long axis of second premolar. The needle was slowly advanced until the bone was contacted 1.5mL solution (2% lignocaine with 1:200,000 adrenaline) was deposited over 30-40 seconds. The adequacy of anesthesia was checked by tingling and numbness of the lower eyelid, side of the nose and upper lip. Objective signs were checked by no pain on probing after 1 minute. To obtain palatal anesthesia .5mL of local infiltration injection was given on the palate at approximately the site of root apex of the concerned tooth. Amount of local anesthetic agent was kept 1.5 mL for both the blocks. In cases of inadequate anesthesia either blocks were repeated or local infiltration of anesthetic solution on buccal or palatal site was done. The patient was given standard postoperative instructions. Post operative analgesic and antibiotics were prescribed for three days. The patient was instructed to contact the operator in case of any problem.

The following clinical parameters were noted and compared for both the injections:

1. Pain on injection – Visual Analogue Scale (VAS)
2. Time taken to deposit L.A. (in seconds)
3. Time of onset of anesthesia (in minutes)
4. Requirement for supplemental palatal anesthesia
5. Pain on extraction – VAS
6. Verbal Response Scale – to assess satisfaction levels of patients for each technique

RESULTS

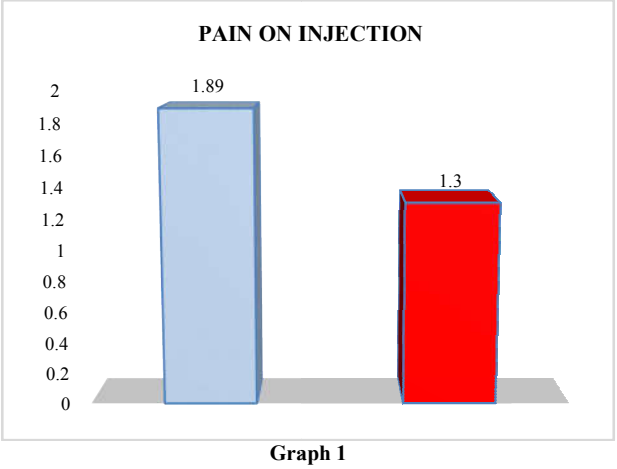
On comparison of the mean values of PAIN ON INJECTION was higher with IONB with a difference of 0.586 which is statistically significant with a p value of 0.033.(graph 1, table 1)

On comparison of the mean values of time taken to deposit local anesthetic in seconds, time taken to deposit LA solution is higher in AMSA nerve block with a difference of 78.7 which is statistically significant with a p value of <0.001. (graph 2, table 1)

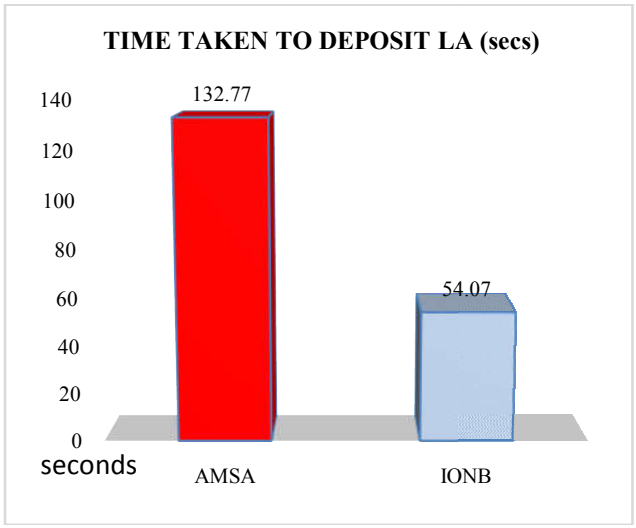
On comparison of the mean values of time of onset of anesthesia in minutes, it was higher with AMSA with a difference of 3.4357 is statistically significant with a p value of <0.001. (graph 3, table1)

On comparison of the mean values of pain on extraction assessed by VAS scale, the mean value of pain with IONB is higher with a difference of 0.457 which is statistically significant with a p value of 0.045. (graph 4, table 1)

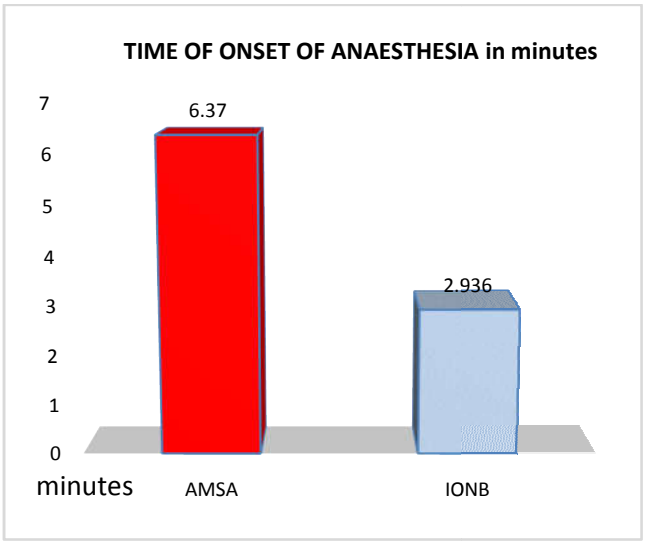
There was significant difference in the level of acceptance of the procedure, rates between patients treated with AMSA nerve block and IONB. With IONB 38 cases of 70 were very satisfied, but with AMSA 53 were very satisfied. Mc Nemars test was done to assess the categorical variables and the p value was found to be .011 which is statistically significant (table 1, graph 8) With AMSA nerve block 6 out of 70 patients required supplemental palatal injection while with IONB 9 patients needed supplemental palatal injection but this difference is not statistically significant with a p value of .250



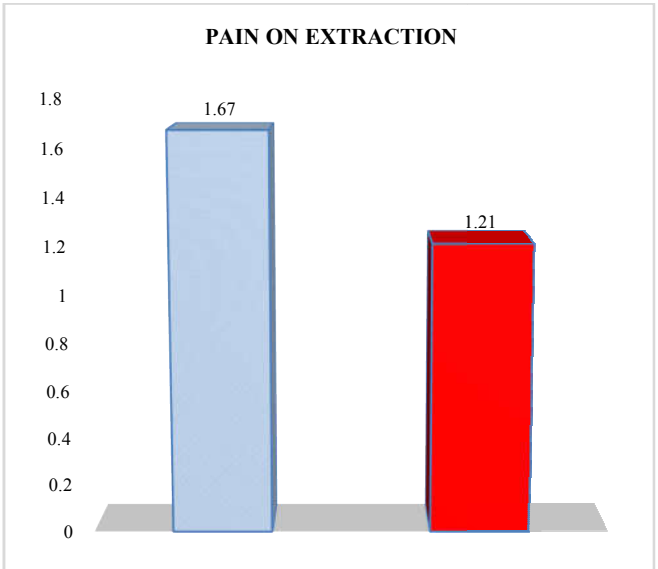
Graph 1



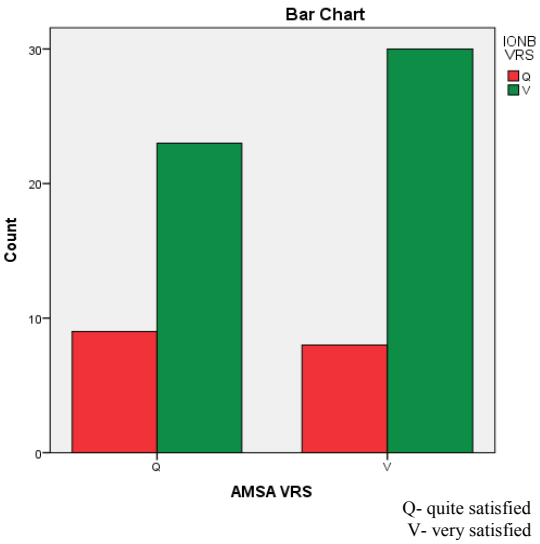
Graph 2



Graph 3



Graph 4



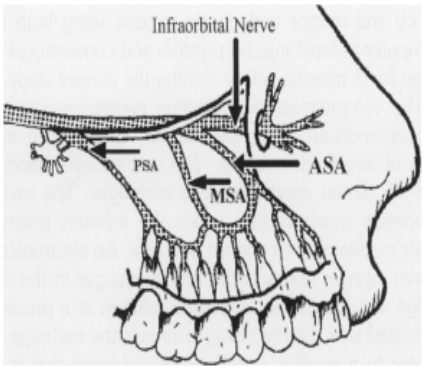
Graph 5 satisfaction levels of patients assessed by verbal response scale

Table 1 comparison of variables between AMSA nerve block and IONB

		Mean	Std. Deviation	Paired Differences		p C Value
				Mean Difference	Std. Deviation	
1	Amsa Pain on Injection Ionb Pain on Injection	1.89 1.3	1.655 1.78	0.586	2.249	0.033
2	Amsa Time Taken to Deposit La (Secs) Ionb Time Taken to Deposit La (Secs)	132.77 54.07	38.465 13.707	78.7	34.715	<0.001
3	Amsa Time of Onset of Anaesthesia (Minutes) Ionb Time of Onset of Anaesthesia (Minutes)	6.37 2.936	1.038 0.6422	3.4357	0.9361	<0.001
4	Amsa Pain on Extraction Ionb Pain on Extraction	1.67 1.21	1.783 1.006	0.457	1.87	0.045

DISCUSSION

The Middle superior alveolar nerve (MSA) and anterior superior alveolar (ASA) nerves branch from the infraorbital nerve before they exit from the infraorbital foramen (Figure 3). The MSA nerve is thought to innervate the maxillary premolars and plays some role in pulpal innervation of the mesiobuccal root of the first molar. The ASA nerve provides pulpal innervation to the central and lateral incisors and canines. The plexus where the 2 nerves join is the target site for the AMSA injection. [5]



The technique of AMSA was introduced by Friedman and Hochman.[6] AMSA achieves pulpal anesthesia of maxillary central and lateral incisor, canines and first and second premolars for an expected duration of 45 to 60 minutes, after an injection of 0.6 to 1.4 mL of anesthetic solution. They also

stated that no numbness of the lips and face, or interference with the muscles of facial expression is noted, and palatal soft tissue anesthesia is obtained.[7]

The ideal injection for maxillary teeth should result in the rapid onset of pulpal anesthesia of maxillary teeth after a single needle penetration. It should not produce collateral anesthesia, and it should only require a minimum dosage of anesthetic solution to be effective. It should be easily administered without any risk to any vital structures.[8] The main theoretical advantage of this AMSA nerve block is that it reduces the number of injections and the quantity of anesthetic solution administered in comparison with the conventional supraperiosteal infiltrative anesthesia applied in multiple injections for each tooth. It also doesn't cause numbness in upper lip, lower eyelid and lateral part of the nose thus it would be ideal to use in cosmetic dentistry. Multiple injections are required to obtain anaesthesia of the hard and soft tissues for maxillary dentoalveolar surgery.[12] Whereas greater palatine and nasopalatine blocks are used for palatal anaesthesia, posterior and superior alveolar nerves (PSA), middle superior alveolar (MSA), and anterior superior alveolar (ASA) block injections are used to anesthetize buccal tissues. The pain of these transmucosal punctures is unpleasant for the patient.[13] But AMSA injection covers large maxillary surgical fields by a single injection, eliminates repetitive trans mucosal punctures and reduces the total amount of delivered vasoconstrictor which may prove useful for cardiovascular-compromised patients[12]

The IONB has been used since long and is most commonly used nerve block for maxillary anterior teeth but IONB is more technique sensitive than AMSA nerve block since there is anatomic difficulty in defining the landmarks. Moreover IONB requires an additional palatal injection to anesthetise the palatal soft tissues. This additional injection is omitted in AMSA nerve block . The numbness caused by IONB to lower palpabrae, upper lip and lateral part of the nose is discomforting to the patient.

The sense of tightness and numbness of palatal tissues and periodontium from central incisors through second molar confirms the onset of anaesthesia in AMSA nerve block. In our study, the mean time of onset of anaesthesia for AMSA nerve block was 6 minutes. This is in accordance with other studies by Friedman and Hochman (1998)[6] and Patel (2012)[10] which reported times ranging from 2 minutes to 8 minutes. However, this is in contrast with other studies by Lee *et. al*. (2004)[7]and Velasco (2012)[3], which reported onset time ranging from 6 minutes to 26 minutes. This wide variation and gradual onset of pulpal anesthesia is most likely due to the time it takes for the anesthetic solution to pass through the palatine process[12]

In our study the lip numbness was 100% at the side where IONB was administered while no numbness was observed in the lip on AMSA site .this is in contrast with the study done by Corbett IP *et al*.(2010)[11] who observed lip numbness in 14.3 percent subjects .

The AMSA's maintenance of upper lip function allows for continuous evaluation of gingival contours unimpeded by the "lip drooping" that typically occurs with traditional anaesthetic techniques which could be of importance in esthetic dentistry.

CONCLUSION

AMSA nerve block doesn't require a buccal block and also doesn't affect the smile line which adds to patient's comfort. Moreover its anesthetic efficacy is equivalent to IONB . Thus AMSA nerve block can replace IONB especially where large surgical field is involved such as periodontal surgeries, multiple extraction in maxillary anterior region and in esthetic dentistry procedure where lip numbness with IONB poses a problem.

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