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ORIGINAL ARTICLE

ASSESSMENT OF EFFICACY OF PSA NERVE BLOCK TECHNIQUE AND LOCAL INFILTRATION TECHNIQUE IN PATIENTS UNDERGOING SURGICAL REMOVAL OF MAXILLARY THIRD MOLARS: A COMPARATIVE STUDY

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ABSTRACT:

Objectives: The purpose of this study was to evaluate the effect of PSA block injection technique with infiltration technique regarding local anesthesia for surgical extraction of maxillary third molar. **Methodology:** A prospective single-blind randomized controlled trial was designed to study the severity of pain during injection and after surgical extraction of the bilaterally and symmetrically similar upper third molar in a total of 50 patients, in addition to evaluating the need to repeat the injection. **Results:** Even though the mean pain score for all studied patients in PSA side was lower than the average pain score in infiltration technique, repeated statistical measures confirmed that no significant pain diminution occurred in the two techniques. **Conclusion:** Both methods have the same statistic equivalence for the surgical extraction of maxillary third molars with the significant advantages of PSA nerve block technique over infiltration technique that least number of necessary injections but at the same time the risk of a potential complication like hematoma also must be considered.

Keywords: Nerve Block, PSA, Third molar.

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INTRODUCTION:

Over the years, there has been a pursuit for an ideal local anesthetic technique which provides minimal discomfort during dental procedures. There is no valid consensus on the use of a particular technique or formulation during dental procedures. (1) The aim of this study was to evaluate the difference in anesthetic efficacy between infiltration anesthetic technique and nerve block techniques in patients undergoing surgical extraction of maxillary 3rd molars. Surgical removal of impacted teeth can be either uneventful and uncomplicated, or difficult, with considerable postoperative complications. (2) Maxillary third molars are often removed surgically under local anesthesia (2,3) Fear of a intraoral injection and postoperative pain can prevent patients from seeking dental care and often this fear is related to the anxious reaction of needle penetration and pain during the injection (3,4). Local anesthesia plays an vital role in edifice dental treatment comfortable. It has been called the most important drug in dentistry too. On the contrary, local anesthetic injections are seen by many patients as worrying and a reason for avoiding dental treatment (5). A range of local anesthetic drugs have been used in dentistry amongst which lidocaine is the most popular. The common techniques for providing anesthesia in maxillary molars include posterior superior alveolar (PSA) nerve block and infiltration anesthesia (6,7). The majority of the published articles studied the anesthetic effectiveness of the PSA nerve block and maxillary infiltrations either in inflamed pulps or in the normal tooth extraction (6-8). But there is no published data evaluated and compared in terms of the severity of pain during injection and after the surgical extraction of upper third molar, and the need to repeat the injection.

METHODOLOGY:

This prospective single-blind randomized controlled trial study was done to evaluate the efficacy of PSA nerve block technique and infiltration technique for extraction of maxillary 3rd molar. A total of 50 patients 25 (50%) males and 25 (50%) females were assessed who underwent a surgical removal of symmetrically bilaterally impacted upper third molars age ranged between 18 and 27 years. All the patients who were healthy and non-Smokers having no

medications or oral contraceptives in the preoperative period and were free from active local inflammatory lesions, were included in the analysis. All the patients were informed as to the nature of the surgical procedures, and informed consent was taken before surgery. An orthopantomographic (OPG) images were used to ensure the symmetry of the type of impaction and to classify all the impacted maxillary third molars according to Winter's classification (10) and Pell and Gregory classification (11). At least 2 mm of bone between the impacted maxillary 3rd molar and the maxillary sinus was present in all cases.

- Procedures

Each of the 50 patients was scheduled to undergo bilaterally and symmetrically identical upper third molar surgical extraction. The two extractions were performed in two separate sessions approximately 4 weeks apart to allow for total recovery from the first one. In each patient, the choice of which anesthetic techniques were going to be administered, the PSA block technique and on the contra lateral the infiltration technique, was made randomly. The palatal injection was combined to both techniques. A topical anesthetic gel 5% lidocaine was placed with a cotton tip applicator. After reaching the target area, aspiration was performed several times in all the planes during the administration of the injection using standard 24G 1 inch needle. The technique of the PSA block was identical (11). In the infiltration technique, after two minutes of buccal infiltration, a palatal infiltration was administered. A 1.8 mL of 2% lidocaine hydrochloride with 1:80,000 adrenaline solutions was deposited at a rate of 1 ml/min. A second or third injection was given to the patient who has experienced an additional pain. After 5 minutes of the injection of a determined dose of local anesthesia, the surgical procedure was performed. The surgical procedure was similar in all cases and was performed by the same surgeon using a standardized technique. Full thickness envelop mucoperiosteal flaps were used. Osteotomy and odontectomy was carried out using a round and straight fissure surgical bur under simultaneous continuous irrigation of cold sterile saline solution. Teeth were removed either intoto or by separation of crown and root depends upon difficulty index of each tooth. Primary closure was done with a 3-0 black braided silk suture. After surgery, all the patients were advised to take an oral antibiotic amoxicillin 500 mg t.i.d and non-steroidal anti-inflammatory drug Diclofenac potassium 50 mg t.i.d for 3 days. The suture removal was done after one week postoperatively.

Pain assessment:

Preoperative pain assessed by a professional operator who was different from the surgeon who performed the surgery. Each record was repeated three times on every case**:** during the injection, at the end of operation and after 15 minutes from the end of operation by using visual analogue scale. (Figure- 1)

Statistical Analysis:

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then it was exported to data editor page of SPSS version 20 (SPSS Inc. Chicago, Illinois, USA). Descriptive statistics included were computation of means and standard deviations. Confidence interval and p-value were set at 95% & $\leq$ 0.05 respectively. The pain VAS scores were analyzed by analysis of variance (ANOVA) for repeated measures.

RESUTLS:

In a total of 50 patients participated in this study, there was no significant correlation between age and sex with the intensity of pain. The average duration of the surgical procedure starting from the flap reflection to the end of primary closure on the PSA side, was 9.35 ± (5.18) minutes (range, 5-14 minutes); while on the infiltration side, it was 11.57± (5.28) minutes (range, 6-15 minutes), the difference was statistically significant (P<0.01). Evaluations at injection showed a 3 positive aspiration with PSA block and no any positive aspiration with infiltration technique. The most common complication of PSA nerve block i.e Hematoma was encountered in 1 case which was managed accordingly at the time of procedure. Although the average pain score for all studied times in PSA side, was lower than the average pain score in infiltration technique, repeated-measures ANOVA demonstrated no significant difference in pain reduction between the two techniques (Figure 2). No any significant differences between the PSA side and the infiltrations side in terms of needing for a second or third injection, P=0.086 but little increase in the frequency of repeating injection on the infiltration side was observed.

Figure 1: VAS (0-10) scale for pain assessment

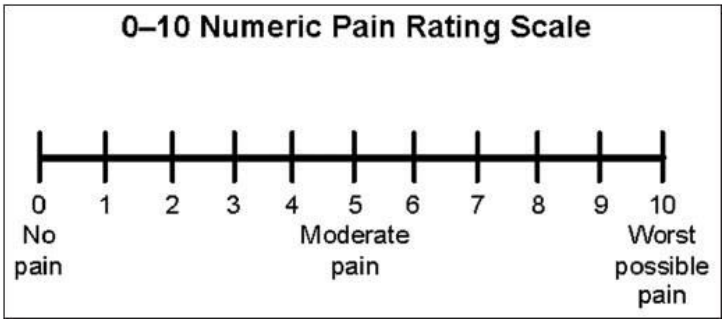
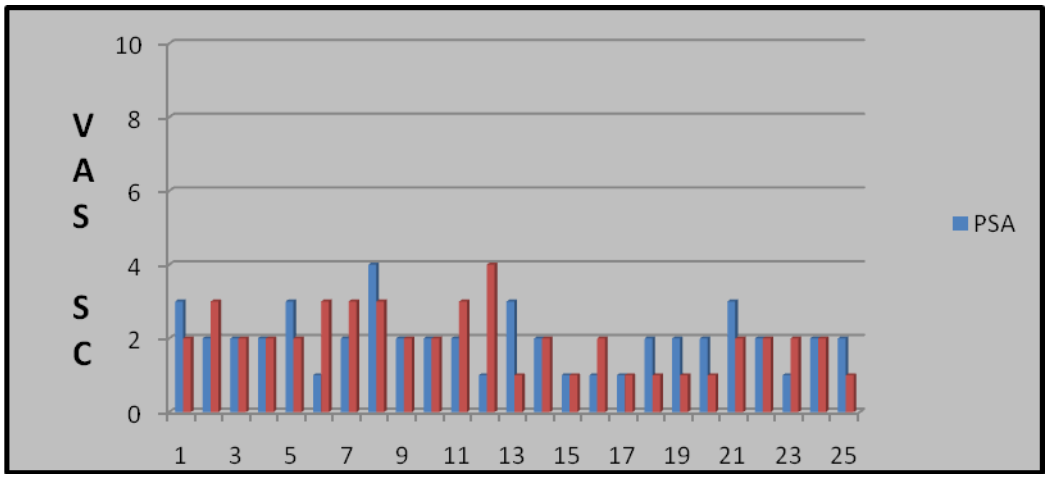


Figure 2: Pain assessment on VAS scale on both PSA and Infiltration side



DISCUSSION

The improvements in agents and techniques for local anesthesia improve the patients' perceptions, comfort and acceptance during dental treatment. The pain control is an important factor for reducing the fear and anxiety associated with dental procedures. Various factors contribute to increased pain perception such as psychological factors, genetic factors, previous history of traumatic dental experience, psychosomatic factors, neurological factors and anxiety. Furthermore, the type of the needle being used, the topography of the needle bevel, site of the injection, type of solution being used, injection into blood vessels and rate of deposition, play a crucial role in pain perception during injection. (13). For the effective pain control, the choice of local anesthetic techniques may influence the amount of discomfort produced during intraoral injection in order to propose an easy and safe method to anesthetize the dentition and surrounding hard and soft tissues during management of surgical extraction (14). The various anesthesia techniques available in dentistry are nerve block anesthesia, infiltration anesthesia, intra-osseous anesthesia, sub-periosteal infiltration, intra-ligamental, intra-pulpal, intranasal, sublingual, conscious sedation, general anesthetic techniques. Amongst these, the commonly used anesthetic techniques include nerve block and site specific infiltration techniques. Maxillary infiltration anesthesia is a common method to anesthetize maxillary teeth (15). Also the PSA nerve block has been advocated to anesthetize the first, second, and third molar teeth (12). In the current study, the success of maxillary PSA block and infiltration technique have been evaluated using the VAS while in the previous studies (16-18) they tried to use the electric pulp tester. According to the findings of the present comparative study, it can be concluded there was no difference in the pain experienced by patient using either PSA nerve block technique or infiltrations technique in surgical extraction of maxillary third molars during the injection or in the post surgical periods (Table 1, Fig. 2). This came in line with the Padhye et al. study (8) as well as the Aggarwal et al's study (9).But in the present study, analyzed parameters were related to third molar surgical extraction while the previous mentioned two studies related to conventional normal tooth extraction (8) and irreversible pulpitis (9). The strengths of this study were the consistency of only one surgeon and intra individual evaluation. There were positive blood aspirations during the PSA in the observation of Pfeil et al. (7), but our resulting data show that the results of this study are that there is positive percentage of 7.5 for PSA and without any positive aspiration in the filtration side. This finding was recorded by others (8-12) in addition to the same finding of non significant differences between the PSA side and the infiltrations side in terms of needing for a second or third injection (Fig. 3). PSA block was used to overcome the variation in the anatomy of the roots and nerve pathways or even in the presence of infection (20). Some adverse events have been reported with the PSA block including transient diplopia, mydriasis, double vision, and hematomas (21). Hematoma is usually produced by inserting the needle too far posteriorly into the pterygoid plexus of veins. (15) With good technique, hematomas should not be a problem with the PSA nerve block (7).

CONCLUSION:

The statistical analysis of the present study results has established clinical association for the surgical extraction of maxillary third molars with PSA nerve block and infiltration technique with the significant advantages of PSA nerve block technique over infiltration technique that least number of necessary injections but at the same time the risk of a potential complication like hematoma also must be considered whenever the PSA block is used which is technique sensitive procedure.

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