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# EFFECTIVENESS OF LOCAL ANAESTHESIA SPRAY VS SUPRA PERIOSTEAL INFILTRATION IN MOBILE ANTERIOR / POSTERIOR TEETH – A COMPARATIVE STUDY .

Maxillofacial Surgery

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## ABSTRACT

**Objectives –** To compare the Effectiveness of local Anesthesia spray vs supraperiosteal Infiltration in mobile anterior or posterior teeth – a comparative study **Methods–** The study is an observational study and is being carried out in outpatient section of Department of Oral and Maxillofacial Surgery of a tertiary care hospital in Kelambakkam. 20 individuals diagnosed with periodontal pathologies in opposing quadrants that presents as Grade III mobility are advised for extraction as treatment plan. One Group will receive 10% lidocaine spray around the periapical and periodontal areas. Second Group will receive supraperiosteal Infiltration. Pain tolerance will be recorded while performing the dental extraction at 3, and 5 minutes and at end of the procedure. The pain tolerance between the teeth that was extracted by administration of local anaesthetic spray and with those receiving supraperiosteal infiltrations will be compared. Readings of the two groups will be recorded and subjected to statistical analysis. The extraction procedure will be performed by a single operator. The study is single blinded. **Results –** There is a significant difference in the efficacy of 10% lignocaine spray and Supraperiosteal Infiltration as in controlling pain during extraction of tooth, in adults **Conclusion:** The efficacy of supraperiosteal Infiltration was superior compared to 10% lignocaine spray respectively. The patients who received supraperiosteal infiltration perceived less pain during extraction of tooth when compared to patients who received 10% lignocaine spray. There is a significant difference in the efficacy of 10% lignocaine spray and Supraperiosteal Infiltration as in controlling pain during extraction of tooth, in adults. Hence, we advocate the use only of an infiltration prior to any dental extraction.

## KEYWORDS

Supraperiosteal infiltration, local anesthetic spray, periodontitis

## INTRODUCTION

Any dental extraction requires the use of a local anesthetic agent. An ideal dental extraction if to be carried must be painless to be patient also keeping in mind the doses of anesthetic medicine delivered and the technique of anesthetic injection. Mostly patients are apprehensive towards the idea of being injected by the dentist than the procedure itself [1]. But local anesthetic injection can't be eliminated completely from practice in all dental extraction. Our hypothesis is that dental extraction can be carried out by using only using a local anesthetic spray rather than performing a supra periosteal injection in grade III mobile teeth. So study was performed where in one quadrant local anesthesia was delivered with administration of a supraperiosteal infiltration and for the other quadrant local anesthetic spray was administered. Since patients with grade III mobility do not experience any form of acute pain, this population was included in the study. The results were statistically analyzed.

## METHODS AND MATERIALS

Total of 50 patients were employed in this study. The study was carried out at the department of oral and maxillofacial surgery at Chettinad dental college. The study design and research methods were approved by the institutional ethical committee. Details of the study, possibility of pain or pressure during the surgical procedure were explained to patients and their informed consent was obtained. Detailed case history was taken and it was checked if the patient meets the criteria for study. Once chosen for the study, the patient was given local supraperiosteal infiltration for the tooth to be extracted in one quadrant and pain tolerance was recorded at three checkpoints using the visual analogue scale. Readings were recorded during at three different checkpoints, at the third and fifth minute after administration of spray and just before start of procedure. Dental extraction of the indicated tooth was carried out as per protocol and post operative instructions were given to the patient. The patient was then asked to report after three days after extraction of tooth in the opposite quadrant. Similar protocols were followed and the patient was given local anesthetic spray this time before extraction in the opposite quadrant. Pain tolerance levels were recorded at the third and fifth minute of the procedure using the Visual Analogue Scale. Dental extraction was then carried out as per protocol and post extraction instructions were given. Data was classified as Group A and Group B for quadrants which involved local anesthesia infiltration and local anesthetic spray respectively. SPSS 22.0 software is been used to perform the statistical analyses. Independent Samples Test will be used to determine the statistical significance.

### Subjects And Methods

- **Type Of Study:** Comparative Study
- **Study Design:** Cross sectional study
- **Study Population:** Patients reporting to Department of Oral and Maxillofacial Surgery - CDCRI
- **Sample Size:** 50 patients
- **Subject Selection:** Patients diagnosed with periodontal pathologies (PERIODONTITIS) that presents as Grade III mobility in opposing quadrants are advised for extraction as treatment plan.

- **Inclusion Criteria**

Patients with multiple grade III mobile periodontally compromised teeth in opposing quadrants.

- **Exclusion Criteria**

- Patients with associated comorbidities
- Patients under anti-coagulant therapy
- Anxious patients who are not willing for use of Local anaesthetic spray.

## RESULTS

An independent samples test was used to compare groups. Levene's test for equality of variances was performed and a t –test for equality of means was performed. The homogeneity test was carried out with the lavene's test to see the data variation. The results of the normality test obtained that data that was not distributed normally were the difference in Group A and the difference in Group B, while the results of the homogeneity test obtained data that were not homogeneous were the difference between the Group A and the difference in the Group B. A statistically significant value p=.045

was obtained which is considered as a statistically significant difference in pain score of patients in both groups.

The patients had a significant decrease in pain during the procedure with the administration of supraperiosteal infiltration rather than those who underwent dental extraction after administration of 10% lignocaine spray.

Patients had more pain during extraction where Local anesthetic spray was given and those who had supraperiosteal infiltration had significant less pain during procedure.

A 'P' value = 0.47 was obtained which was be considered to be statistically significant.

**Table 1.**

| TABLE 1. Independent Samples Test | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| yy | Equal variances assumed | 1.639 | .217 | -2.158 | 18 | .045 | -1.80000 | .83400 | -3.55217 | -.04783 |
| | Equal variances not assumed | | | -2.158 | 15.421 | .047 | -1.80000 | .83400 | -3.57341 | -.02659 |

The above table shows the data obtained from the Independent Samples Test, a Lavene's test for equality of variances and a t-test for equality of means was done to check for statistical significance.

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A statistically significant value p=.045 was obtained which is considered as a statistically significant difference in pain score of patients in both groups. Patients had more pain during extraction where Local anaesthetic spray was given and those who had supraperiosteal infiltration had significant less pain during procedure.

**Table 2.**

| TABLE 2.ANOVA | | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | Df | Mean Square | F | Sig. |
| Between Groups | 1.333 | 28 | .190 | .623 | .728 |
| Within Groups | 3.667 | 22 | .306 | | |
| Total | 5.000 | 50 | | | |

The above table shows the analysis of variance done for this study

## DISCUSSION

Supraperiosteal injection (commonly known as local infiltration) is indicated whenever dental procedures are confined to a localized area in either the maxilla or mandible [2]. The terminal endings of the nerves innervating the region are anaesthetized. The indications are pulpal anaesthesia of all the maxillary teeth (permanent and primary), mandibular anterior teeth (primary and permanent) and mandibular primary molars when treatment is limited to one or two teeth. It also provides soft tissue anesthesia as a supplement to regional blocks[2]. The contraindications are infection or acute inflammation in the injection area and in areas where dense bone covers the apices of the teeth, i.e., the permanent first molars in children[2]. It is not recommended for large areas due to the need of multiple needle insertions and the necessity to administer larger total volumes of local anesthetic that may lead to toxicity[2].

Dental anxiety is a common issue that persists among the population , this can be a cause which can prevent the patient from reporting for dental treatment itself[9]. Usually this fear can be due to multiple reasons, one of them being the administration of injections at the dental office[4]. This was the background from which study was done.

The visual analog scale (VAS) is a pain rating scale 1,2,3,4,5,6,7,8,9,10 first used by Hayes and Patterson in 1921[5].Scores are based on self-reported measures of symptoms that are recorded with a single handwritten mark placed at one point along the length of a 10-cm line that represents a continuum between the two ends of the scale “no pain” on the left end (0 cm) of the scale and the “worst pain” on the right end of the scale (10 cm)[5]. The visual analogue scale or visual analog scale (VAS) is a psychometric response scale which can be used as a measurement instrument for subjective characteristics or attitudes that cannot be directly measured.10 Measurements from the starting point (left end) of the scale to the patients' marks are recorded and are interpreted as their pain. It was created for use in hospitals where pain levels need to be assessed quickly with patients who might not understand the local language[5]. This scale was used in our study for recording patient's perception of pain.

The results from study proved that there was only a statistically significant result in pain reduction in quadrants where the extraction was carried out with supraperiosteal infiltration. This is hence proves that supraperiosteal infiltration is only effective in pain reduction rather that local anaesthetic spray. This can be due to the fact that administration local infiltration can only anesthetize the apical dental plexus, which is still vital even in case of a periodontal compromised tooth. Thus keeping in mind safe doses, an infiltration can be administered before dental extraction.

It is common for patients to fear insertion of a needle before doing any dental procedure. This formed the basis of this study. But since it is proved from this study that infiltration provides a significant anesthetic effect than local spray administration, other methods to reduce pain during needle insertion can be employed. A topical local anaesthetic in the form of gel/spray must be given prior to infiltration. This can significantly reduce the pain perceived by the patient while getting a local anaesthetic injection done.

There are many recent advances that can avoid pain while administration of a local anaesthetic like use of vibrotactile devices(vibraject, dentalvibe, accupal)[6]. CCLAD is a new and widely used effective system of painless delivery of local anaesthetic agent[7]. These devices controlled the flow rate and time of injection of local anaesthetic drug. Other devices include the jet injectors, which are fast and easy to use, with little or no pain, less tissue damage, and faster drug absorption at the injection site[8]. The examples include: Syrijet. MEDJET HI III.

Thus, there is a large variety of painless injection techniques that are available and there is more scope for dental practitioners to use these advanced techniques to deliver painless treatment. Clinicians should be aware of the latest technologies and employ them in their day-to-day practice.

## CONCLUSION

The efficacy of supraperiosteal Infiltration was superior compared to 10% lignocaine spray respectively. The patients who received supraperiosteal infiltration perceived less pain during extraction of tooth when compared to patients who received 10% lignocaine spray. There is a significant difference in the efficacy of 10% lignocaine spray and Supraperiosteal Infiltration as in controlling pain during extraction of tooth, in adults. Hence we advocate the use only of an infiltration prior to any dental extraction.

### Ethical Approval

Ethical approval and clearance for study has been obtained from the Institutional Human Ethical Committee (CARE-IHEC II). Ref no: IHEC-I/0337/21

### Key Messages

Most patients reporting foe dental extraction fear the idea of administration of an intra oral local anaesthetic injection before the procedure. This is however used as an important measure to reduce pain while performing the procedure. This study aimed to see if the use

of an injection can be avoided by substituting with a Local anaesthetic spray.

**Conflict Of Interest Statement**

The authors whose names are listed certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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