MAXILLARY MOLAR EXTRACTION USING SINGLE BUCCAL INFILTRATION

Uzair Bin Akhtar¹, Mahrukh Nisar¹, Komal Akram¹, Talal Ahmad², Malik Ali Hassan Sajid³, Shoaib Younus⁴

¹ Department of Oral and Maxillofacial Surgery, Sharif Medical & Dental College, Lahore.
² University of Health Sciences, Lahore
³ Department of Oral and Maxillofacial Surgery, FMH College of Medicine & Dentistry, Lahore.
⁴ Department of Oral and Maxillofacial Surgery, Institute of Dentistry, CMH Lahore Medical College Lahore Pakistan

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Abstract

Objective: This study aims to compare the efficacy of single buccal infiltration with palatal infiltration. It will also determine that if maxillary molar can be extracted without palatal infiltration and is palatal infiltration required?

Materials & Methods: This is a comparative cross-sectional study. The study included one hundred and fifty patients that required maxillary molar extraction. The patients were divided into two groups, the study and the control group, and included both male and female patients. The study group included patients who were given single buccal infiltration while the control group was given both buccal and palatal infiltration. The time taken to achieve anesthesia was assessed using Qualitative Sensory Testing (QST), and the pain was assessed using the Visual Analog Scale (VSA) and Face Rating Scale (FRS).

Results: The minimum pain assessed by giving single buccal infiltration for the extraction of the maxillary molar is an average of 65 %. This is slightly less or equal to the amount of discomfort and pain that palatal anesthesia causes.

Conclusion: It is concluded that single buccal infiltration can be used to anesthetize maxillary molar teeth and is useful in most cases, but not all maxillary molars can be extracted using a single buccal infiltration. Moreover, the amount of pain observed suggests that it is slightly less than the amount of pain palatal infiltration causes. Therefore, it is suggested that future investigate aspects that can pre-operatively determine the factors that may favor single buccal infiltration.

Keywords: Cross-sectional, Palatal infiltration, Qualitative Sensory Testing, Visual Analog scale and Face Rating Scale.

INTRODUCTION

A dental extraction is a procedure that involves the removal of the tooth from the socket, and the tooth socket consists of an alveolar bone. There are several reasons for the extraction of a tooth, which most commonly includes dental caries and periodontal disease. The other indications are shown in table 1 which includes traumatic injuries, prosthetic and orthodontic treatments requisites, failed endodontic procedures, pericoronitis and tooth impaction, general medical pre-requisites which includes any cyst,
odontomas or carcinoma, financial factors which obsoletes restorative procedures, patient request (in cases where patient refuses restorative treatment) and aesthetic reasons.\textsuperscript{1,2}

**Technique for Anesthesia**

Several injection techniques are available and can be used to anesthetize soft and hard tissues of the maxilla. These techniques include Supra-periosteal (infiltration), Periodontal ligament (PDL) injection, Intraseptal injection, Intracrestal injection, Intra-osseous injection and Nerve Blocks (anterior, middle and posterior superior alveolar nerve block, maxillary nerve block, greater palatine, nasopalatine, anterior, middle superior alveolar nerve blocks). The decision for the selection of anesthetic techniques depends on the outlook of the treatment that is to be provided.\textsuperscript{3}

The subperiosteal injection (also called local infiltration) is the most commonly used technique in achieving pulpal and soft tissue anesthesia in the maxilla. This infiltration not only has a high success rate but also provides atraumatic, technique insensitive ease for administration.\textsuperscript{3} However, its central dilemma is that it is also one of the most traumatic injections that are locally administered to the palate.\textsuperscript{4} The reasons for its traumatic technique are very rich nerve supply and firm mucosal attachment. To reduce this discomfort there are several newer techniques that can be used and includes pressure applied to the area of needle penetration, a fine gauge needle, conventional topical anaesthetics, eutectic mixture of local anaesthetic (EMLA) cream, topical cooling of the palate (e.g. topical ice), computerized delivery systems, and transcutaneous electronic nerve stimulation (TENS).\textsuperscript{5} Most of these methods mentioned are not available in every clinical setup, and with limited resources in a teaching hospital, it is not possible to use these modern techniques. So, the present scenario requires alteration from conventional techniques and a need to design an atraumatic technique utilizing minimum anesthetic injections.

**Conflict for Administration of Palatal Anesthesia**

As explained earlier, the local palatal infiltration is poorly tolerated by the patients, and the amount of discomfort it creates induces anxiety in the patient that affects fear control management throughout treatment and future endeavors. The palatal injection lasts for a brief period which is comparatively less than the time required for the extraction and still requires pain management, and also it is relatively more painful than the relief it provides.\textsuperscript{6} Furthermore, studies have concluded the use of single buccal local infiltration for successful anesthesia of maxillary molar teeth extraction. Keeping in view the relative risk (pain of palatal infiltration) versus the relief (pain relief), the question that arises is that, Can we use single buccal infiltration for extraction? If yes, then is palatal infiltration required? For this purpose, this study aims to determine the efficacy of single buccal infiltration for maxillary molars in comparison with palatal infiltration.

**MATERIALS AND METHODS**

This was a comparative-cross sectional study. Patients who reported to the Oral and Maxillofacial Department, Sharif Medical and Dental College, Sharif medical city, JatiUmra, Lahore, Pakistan, between January 2019 to April 2019 were included in this study. The inclusion criteria consisted of 1) Both male and female patients were included, 2) Patients with one of the indications of tooth extraction. Exclusion criteria consisted of 1) Patients with systemic diseases including diabetes mellitus, hypertension, pregnancy, etc 2) Patients with underline pathology (cyst, carcinoma) 3) Smokers and alcoholics. After a thorough history taking and careful clinical examination, the patients were selected, allotted randomly to groups, and were informed about the study and consent was signed. This one-centered study consisted of two groups, one study group, and one control group, each group, were allotted 75 patients each and included both male and female patients. The study group was given single buccal infiltration; in comparison, the control group was given both buccal and palatal infiltration. After 10 minutes of administration, the efficacy of anesthesia was monitored using Qualitative sensory testing (QST) in which observations were made on Sensitivity to touch, cold, and pinprick stimuli were evaluated on the injected site and the corresponding non-anesthetized areas.\textsuperscript{7} First, the stimuli were applied to the non-injection site and immediately followed by an application on the injection site. The touch stimulus was applied with a cotton swab in a single stroke over 1 to 2 cm of skin area. The cold stimulus was applied with a stainless steel dental spatula (kept cold in ice water, \( \sim 0 ^\circ C \)) for 1 to 2 s.\textsuperscript{8,9} The pinprick stimulus was applied...
Maxillary molar extraction using single buccal infiltration with a dental probe with a force that causes pain but does not penetrate the skin for 1s. Participants were asked to report hypersensitivity, hyposensitivity, or normal sensitivity. The results were calculated on the presence or absence of sensation in yes and no and presented in percentage. For assessment of pain, Visual Analog Scale (VAS) (1-10) and Face rating scale (FRS) (Wong-Baker face scale) was used with facial expressions marked with reading at 0-10 (0-no pain, 2-hurts a little, 4-hurts a little more, 6-hurts even more, 8-hurts whole lot, 10-worst pain).

RESULTS

The data collected was assessed in EXCEL and presented in percentage. The study consisted of 150 patients who participated in the study, 75 patients in each, and in the study group, 64% (48 individuals) were male, and 36% (27 individuals) were females. The control group consisted of 75 patients with 62.7% male (47 individuals) and 37.3% (28 individuals) female patients. The qualitative assessment consisted of three parameters sensitivity to touch, cold and pinprick sensation measured as Hypersensation, Hyposensation, and Normal sensation. In the study group, it was observed that 40% of individuals felt hypotension to touch, 15% felt the normal sensation to touch, and 45% felt hyper sensation. In the control group, it was observed that 50% of individuals felt hyposensation to touch, 10% felt the normal sensation to touch, and 40% felt the hyper sensation. Regarding cold sensation in a study group, 15% of individuals felt hyposensation, 73% felt normal, and 12% of patients felt hyper sensation, and regarding Pin-Prick sensation, 49% of patients felt hyposensation, 37% patients felt hyper sensation 14% felt normal. Regarding cold sensation in the control group, 10% of individuals felt hyposensation, 80% of patients felt normal, and 10% of patients felt hyper sensation, and regarding Pin-Prick sensation in the control group, 55% patients felt hyposensation, 40% patients felt hyper sensation and 5% felt normal. Visual analog scale (VAS) consisted of reading from 0-10 and are divided into mild (2-3), moderate (4-7), and severe (8-9-10). The observed readings for a study group with single buccal infiltration were 55% mild pain, 35% moderate pain, 5% no pain and 5% reported severe pain. The observed readings for the control group were 41% mild pain, 48% moderate pain and 13% severe pain. The Face rating scale (FRS) reported in our study group is 85% mild with scale reading of 2, 12% as moderate with reading at 6, 1% with no pain, and 2% with severe pain. Moreover, the FRS data for the control group is 65% mild pain, 28% moderate pain and 7% severe pain. This data is represented in table 2.

DISCUSSION

A dental extraction is a routine procedure in dentistry. One of the pre-requisites for this procedure is pain and anxiety control. The most common method for this purpose is the administration of local anesthesia, but this can be difficult in some cases due to fear of needles and pain they might cause, especially when infiltration is given in palate of the maxilla. Palatal infiltration is one of the most traumatic injections used in dentistry. This traumatic injection induces extreme pain, which induces anxiety in the patients, and many patients poorly tolerate mild to moderate pressure pain executed during the

<table>
<thead>
<tr>
<th>Cause</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caries</td>
<td>Involves periapical lesion, broken dental roots</td>
</tr>
<tr>
<td>Periodontal disease</td>
<td>Gingival recession, bone resorption, and mobility</td>
</tr>
<tr>
<td>Traumatic injuries</td>
<td>Blunt trauma including accident, fights or due to occlusion and parafunctional habits leading to vertical and horizontal tooth fracture</td>
</tr>
<tr>
<td>Prosthetic and orthodontic treatment</td>
<td>Pre-requisites for treatment purposes</td>
</tr>
<tr>
<td>Failed endodontic treatment</td>
<td>The tooth with failed endodontic treatments that cannot be restored otherwise</td>
</tr>
<tr>
<td>Tooth impaction and pericoronitis</td>
<td>Partially or completely impacted teeth</td>
</tr>
<tr>
<td>General medical health</td>
<td>Any cyst, odontomas or carcinoma</td>
</tr>
<tr>
<td>Financial factors</td>
<td>Restorative treatment too expensive for the patient</td>
</tr>
</tbody>
</table>

Table 1: Causes of Tooth Extraction

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application of elevators and forceps. This not only increases the duration of the treatment but adds the burden of post-operative pain management at the site of injection. Our study aimed to assess the efficacy of single buccal infiltration in extracting maxillary molars. We compared single infiltration with palatal infiltration and assessed the pain using qualitative assessment, visual analog scale and face rating scale. It was observed that there is an insignificant difference between giving single buccal infiltration and the discomfort palatal infiltration causes. Our findings are in line with (Badenoch-Jones and Lincoln, 2016) that maxillary molar can be extracted with single buccal infiltration in many cases but not in all cases. It is also possible to extract the teeth with single infiltration as it requires ten minutes to wait before extraction, the position of the tooth in the socket, health of the periodontal tissues, bone density, tolerance of the patient. A future study on the assessment of factors that determine the selection if a palatal injection is required or not and these factors may include pre-operative radiographs, the health of periodontium, pre-operative pain assessment, and tolerance. These might provide a guide for selecting single infiltration and completely obsolete traumatic palatal infiltration.

**CONCLUSION**

In light of our findings, it is concluded that palatal anesthesia is not required in the extraction of all maxillary molars and it is possible to extract maxillary molar in many cases if not in all cases. Moreover, if future studies are conducted to discover factors that might favor only buccal infiltration can completely obsolete the discomfort which the palatal infiltration cases.

**REFERENCES**


