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ORIGINAL ARTICLE

Lingual anesthesia of the lower anterior teeth, which technique is better?

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Abstract

Purpose To extract the lower anterior teeth, the oral surgeon needs to anesthetize the pulpal tissue of the accused tooth and the surrounding tissues. The lingual nerve innervates the lingual soft tissue to the lower teeth, this nerve usually anesthetized alongside the inferior alveolar nerve by a block technique. However, the lingual tissue of the lower anterior teeth usually anesthetized by either infiltration or periodontal ligament injection (PDL) techniques. This study was intended to compare between these two techniques.

Methods Forty-eight teeth were extracted from 24 patients. Non-adjacent two lower anterior teeth in the same patient were selected. The lingual soft tissue in one of them was anesthetized by PDL injection technique while the other tooth by infiltration technique.

Results The study included 24 patients (14 males and 10 females). There was no significant difference in relation to the pain during injection between the two groups, while there was a significant difference between the two groups in relation to bleeding.

Conclusions A recommendation was made to use the PDL injection technique to anesthetize the lingual soft tissue during extraction of the lower anterior teeth.

Keywords Periodontal ligament injection · Local anesthesia · Infiltration technique · Tooth extraction

Introduction

Painless dentistry is the goal of all the dentists as well as the dental patients. To achieve this goal, researchers tried to find the most effective, less complicated and as less pain as possible local anesthetic technique [1, 2]. This study is one of these trials, which was proposed to compare between the submucosal infiltration and PDL injection techniques to anesthetize the anterior lingual soft tissue during tooth extraction. To the best of our knowledge, there is no study in the literature compared between the two techniques in this area during extraction.

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Extraction of the lower anterior teeth is usually performed under local anesthesia. Labial supraperiosteal infiltration technique is used to anesthetize the pulp of the tooth and the labial periodontium; as the bone in this part of the mandible permits the distribution of the local anesthetic solution into the apices of these teeth [3], while the lingual periodontium is anesthetized by either infiltration or PDL injection techniques.

Materials and methods

Forty-eight teeth (24 patients) were selected for extraction; only the cases of non-adjacent two lower anterior teeth in the same patient were selected. The lower premolars, molars, and the upper teeth were excluded. All extractions were performed by the same oral surgeon, and all of the teeth were indicated for prosthodontic treatment with no preoperative dental infection.

The anesthetic solution used, for all the cases, was 0.4 ml of lidocaine with epinephrine 1:80000 given by a manual dental

Fig. 1 Periodontal ligament injection technique

syringe. Topical anesthesia was not used. All the selected teeth and the labial mucosa were anesthetized by a supraperiosteal labial infiltration technique. The teeth were divided into two groups; group A where the lingual soft tissue anesthetized by a PDL injection (Fig. 1) and group B where the lingual soft tissue anesthetized by a lingual infiltration technique (Fig. 2).

The needle was gently bent to facilitate the insertion of the needle into the lingual periodontal ligament space (Fig. 3).

The variables tested were the anesthetic effect, the pain during injection, and the associated complications. The pain was assessed by visual analog scale (VAS) for the two injection sites, separately.

Statistical analysis

Statistical analysis was made with the Statistical Package for Social Sciences (SPSS), version 20.0 [4]. We tested the relationship between the two groups in relation to the pain and bleeding, using Pearson Qui-Square test. The relationship was significant if probability (P) value < 0.05.

Fig. 2 Lingual infiltration technique

Fig. 3 Needle bending to facilitate insertion

Results

The study involved 24 patients (14 males and 10 females). The mean age of the patients was 58.3 years. Group A and group B included 24 teeth for each. There was no significant difference ($p = 0.079$) in relation to the pain during injection between the two groups (Table 1). In all the cases, there was no need to repeat the anesthesia as the first injection is enough to do the extraction. There was a significant difference ($p = 0.033$) between the two groups in relation to the bleeding. (Fig. 4 and Table 2).

Table 1 Score distribution of the visual analog scale between the two groups

Score	PDL		Infiltration		n	P value
	n	%	n	%		
4	1	4.2	6	25.0	7	0.079 (NS)
5	2	8.3	5	20.8	7	
6	3	12.5	5	20.8	8	
7	4	16.7	3	12.5	7	
8	7	29.2	3	12.5	10	
9	7	29.2	2	8.3	9	
Total	24	100	24	100	48	

n number of cases, %percentage, P value (Pearson Qui-Square); significant if $P < 0.05$. *NS* non-significant

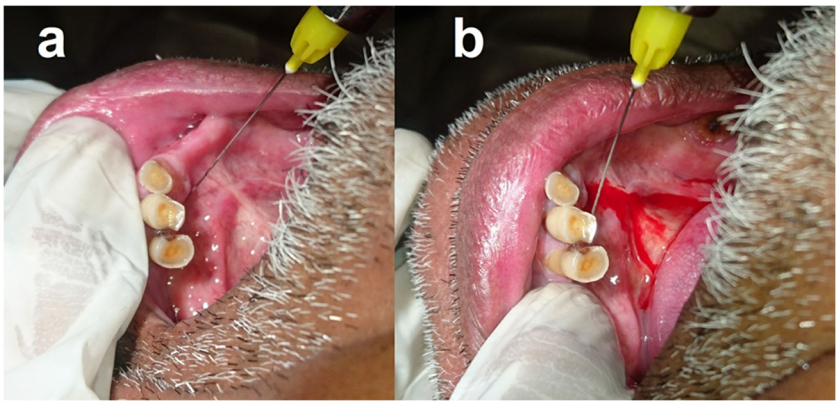

Fig. 4 Complication of the infiltration technique, **a** before needle insertion, **b** bleeding after needle insertion

Discussion

The floor of the mouth is not an easy place to play with, as sometimes a simple procedure ends with a life-threatening hematoma, which may raise the tongue to occlude the airway [5, 6]. From this perspective, the PDL injection, as a result, is safer than infiltration technique in the floor of the mouth.

In spite of the less incidence of pain in the group B, pain during injection was present in either way. Likewise, the effect of local anesthesia was efficient in the two groups that no supplement injections were needed.

The use of manual dental syringe is more convenient and practical than the use of more sophisticated devices with their advantages and disadvantages [7, 8].

The PDL injection usually cannot be used to anesthetize the lower teeth for extraction purposes; although, it could be used for conservative treatment of primary teeth [9]. For this reason, the use of PDL anesthesia in oral surgery is restricted to the soft tissue only or as a supplement in case of inferior alveolar nerve block failure [9, 10]. The benefit of this type of studies is to transfer the surgical procedures to as minimally invasive as the evidence allowed [11, 12].

Table 2 Bleeding episodes during needle insertion

Bleeding episodes	PDL		Infiltration		*n*	*P* value
	n	%	*n*	%		
Bleeding	2	8.3	8	33.3	10	0.033 (S)
No bleeding	22	91.7	16	66.7	38	
Total	24	100	24	100	48	

n number of cases, %percentage, *P* value (Pearson Qui-Square); significant if $P < 0.05$. *S* significant

Conclusion

For the discussed reasons, a recommendation was made to anesthetize the lingual soft tissue in the anterior mandible by PDL injection rather than infiltration technique.

Compliance with ethical standards

Conflict of interest The author declares that he has no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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