

COMPARISON OF “INFILTRATION” AND “BLOCK” TECHNIQUE IN CONTROL OF EXTRACTION PAIN OF PRIMARY MANDIBULAR CANINE IN 7 – 9 YEARS OLD CHILDREN

Ghasemi D,¹Ferdosizadeh F,² Soroush Z³

1. Assistant Professor, Department of Pediatric Dentistry, School of Dentistry, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran

2. Post Graduate Student, Department of Pediatric Dentistry, School of Dentistry, Qazvin University of Medical Sciences, Qazvin, Iran.

3. Private Practitioner, Isfahan, Iran

ABSTRACT

Aim: Pain control is of significant importance in all dentistry procedures. Providing anesthetic is perhaps the hardest part of the treatment in children. The most common method in providing anesthesia in mandible is the inferior alveolar nerve block. As the block injection has a lasting anesthesia effect in children and also could cause traumatic injury to soft tissues, a substitute injection technique is needed. This study compared the two infiltration and block techniques for extraction of mandibular primary canines.

Materials and Method: In this clinical experimental study, 45 children aging 7 to 9 years old requiring extraction of mandibular primary bilateral canines were chosen. Patients were received a block injection in first session and then received an infiltration injection on the other side at the second session respectively. The patient pain was recorded at the instance of injection and extraction based on SEM scale. Data were analyzed by paired T-test and Wilcoxon at significance level $P < 0.05$.

Results: This study showed that SEM results in infiltration technique was lower compared to that of block technique; which reveals that the child can better bear the pain of infiltration injection. The two techniques showed significant difference according to SEM scale.

Discussion: Regarding the obtained results and the disadvantages of block technique, it seems that infiltration technique is a better substitute for block technique in extraction of the mandibular primary canine in seven to nine years old children.

Keywords: Block and Infiltration Anesthesia, Extraction, Inferior Alveolar Nerve, SEM Scale.

Introduction

One of the most important aspects of children behavioral management during dental treatments is pain control. Since providing a proper and deep anesthesia is mandatory for all the dental operations, an easy injection with the least pain and complications is of great importance. In fact, local anesthesia is obtained by a proper and precise injection, which not only causes patient's convenience and pain reduction, but it also increases patient's confidence on the dentist.¹⁻³

Thus, in addition to making a good rapport with the child, it should be tried in each visit to reduce the amount of pain to minimum and try to control painful conditions to deliver optimized and the most effective services to the patient in dental operations.

The most common anesthetic technique in the maxilla is the infiltration or supraperiosteal technique and in the mandible is inferior alveolar nerve block. The method of injection is almost similar in both the adults and children. The only difference for this technique is that the injection in children should be done rather lower and posterior than the adults, since the mandibular foramen in the younger patients is lower than the occlusal levels of primary teeth.¹

One of the most common complaints after mandibular block is trauma to soft tissue due to biting the lips, tongue, and the inner side of cheeks, as well as emergence of sequels such as trismus or hematoma after delivering anesthesia.^{4,6} Thus, there is a necessity of a substitute injection. Ligament injection is proposed to substitute block injection, which is also doubtful due to the risk of endanger

the permanent teeth germs and possibility of enamel hypoplasia in those.⁷

One of the other substitute methods is using infiltration injection for primary molar teeth anesthesia with different anesthetic agents.^{1,8,9} Easier application, lesser rate of anesthesia in soft tissues, and shorter anesthetic time are among the advantages of infiltration technique as compared to the block method.⁶ Moreover, there is the possibility of bilateral dental operations in a session due to the local effects of the infiltration technique.⁹

Inferior Alveolar Nerve Block is frequently used nowadays for extracting primary mandibular canines. Although most dental surgeons believe that removing or filling primary canines can be done by infiltration technique, no valid research exists in this regard.⁵

In studying the effects of the two anesthetic methods, namely infiltration and mandibular nerve block in restoring, pulpctomy and extracting mandibular primary canines, Ghaeth HY *et al*⁵ did not observe any significant differences between the two techniques. In analysis of the efficiency of infiltration and block anesthesia in 3-9 years old children by using the SEM scale, Oulis *et al*¹⁰ found out that both techniques have equal efficiency for the restoration operations, but the infiltration technique has less efficiency than the block technique for removing and pulpctomy of mandibular teeth.

Regarding the disadvantages of inferior alveolar nerve block technique and limitations in the studies about comparison of these two techniques, the aim of this study is the comparison of inferior alveolar nerve block and

infiltration techniques for removing mandibular primary canines in 7-9 years old children.

Materials and Method

In this clinical experimental study, 45 children with 7-9 years of age, who presented to the pediatric dentistry department of dental school of Qazvin university of medical sciences requiring bilateral extraction of primary canines with at least $\frac{3}{4}$ of the root length were randomly selected. These children were systemically healthy, had no disorders due to their pain and were cooperative (Frankle scale 3 and 4).¹

The protocol was explained to the parents before starting the treatment and written informed consents were obtained. Children received inferior alveolar nerve block for the extraction of mandibular primary canines in the first session and infiltration anesthesia was done in their next visit.

Anesthetic cartridges contained lidocaine solution (2%) and Epinephrine 1/80,000. All injections were done by a specialized dentist. The needles with gauge #30 and length of 21 mm were used for all infiltration injections, in which once the needle introduced into the tissue, a little amount of the solution was deposited. After a few seconds, Needle advanced in the mucobuccal fold towards the apex of the mandibular primary canine and the rest of the anesthetic solution was injected. #30 gauge Needles with the length of 25-30 mm were used for all the mandibular nerve block injections. The method of block injection was such that the thumb was placed on the occlusal table of the molars, in such a way that its tip laid on the internal oblique ridge and the finger ridge placed against the retromolar pad. The syringe placed between the two primary molars on the other side of the jaw.

SEM scale was used to evaluate the pain during the treatment. It includes recording the patient's sound, eyes and movements after each injection. This scale was recorded by a trained nurse in the required form prepared for each child.⁹ Pain reactions were recorded in injection stages and during removal of the teeth. The data was analyzed by using SPSS 20, Wilcoxon statistical and t-paired tests, and the significant level was considered as $\alpha < 0.05$.

Results

There were significant differences in three SEM indices between the two methods and cooperation of the patients with infiltration technique was significantly better than when mandibular nerve block technique had been used (P -value < 0.001). [Figure 1 & 2]

According to paired t-test, it was determined that the mean values of SEM during injection and removal of primary canines are significantly lower in infiltration technique as compared to the block technique (P -value < 0.001).

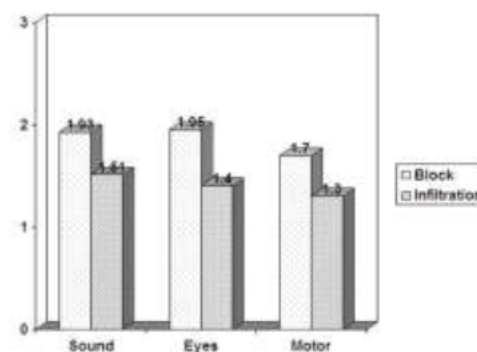


Figure 1: SEM index mean during injections in the two different techniques

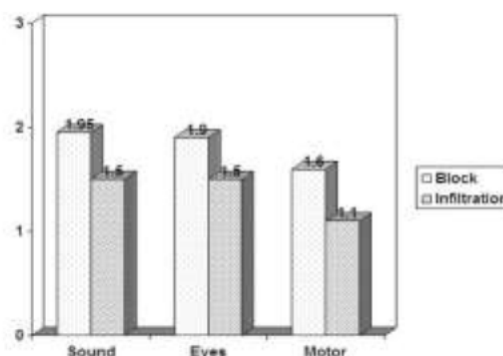


Figure 2: Mean values of SEM indices during tooth removal in the two different techniques

Discussion

According to the results of the study, the mean rates in SEM in infiltration injection were lower than those obtained in block technique, and the significant differences were observed both during injection and the removal of primary canines.

According to Ghaeth HY *et al.*,⁵ the effects in the two anesthetic methods of infiltration and mandibular nerve block in restoration, pulpctomy, and removal of mandibular primary canines were similar in 89 children with 6-9 years of age who required bilateral dental treatments, and no significant difference was found between the two methods. Furthermore, in addition to removing primary canines, restoration of teeth and pulpctomy were also considered in that study, and no significant difference was observed between infiltration and block injection techniques. However, the results are in conformity with the present study, since it regards infiltration anesthesia in removing primary canines at least similar to block injection. The results of the studies by Ram *et al.*¹¹ on 4-6 years old children, and Jones *et al.* on 3-16 years old children showed that during block injections, children show more painful reactions, and block injection was significantly more painful than infiltration injection in those children. Although VAS scale was used instead of SEM scale in the study by Jones *et al.*,¹² and the children were between 3-16 years of age, the results of the above

two studies are in conformity with the current research results.

The study by Sharaf *et al.*⁴ showed that block injection leads to negative reactions in children with 3-5 years of age, and it is definitely more painful than infiltration injection. Although that study has dealt with analyzing the efficiency of block and infiltration injections in primary molars, but the results conform to the results of this study. Donohue¹³ showed that there is the possibility of an acceptable anesthesia for primary mandibular molars by the infiltration technique. Also, in comparing the two anesthetic block and infiltration for restoration treatments of second mandibular molars, Jafaerzadeh and Forghani¹⁴ concluded that only the considered area can be anesthetized limitedly by infiltration technique for the children between 5-8 years of age, who need restoring mandibular molars.

Moreover, Ghasemi *et al.*¹⁵ stated that infiltration technique could be a proper substitute of block injection in pulpotomy of first primary mandibular molars in children. The results are in conformity with the present study.

Although SEM scale was used, different results were achieved in the study by Oulis *et al.*¹⁰ indicating that anesthetic efficiency of infiltration for removing mandibular primary molars is less than that in block technique. The reason for this difference can be related to selecting the type of teeth studied and the age of children, since only the primary canine was considered in the present study and the children had 7-9 years of age. However, the children with the age range of 3-9 were studied in the study by Oulis *et al.*, and the removed teeth were first and second primary molars.

The limitation in the study was finding the children requiring bilateral removal of mandibular canines. It can be proposed for the future studies to include other dental treatments such as restoration treatments by using mandibular infiltration technique.

Conclusion

There was a significant difference in this study between block and infiltration injection techniques. Hence, infiltration injection can be an appropriate substitute for extracting primary canines in children with the age of 7-9 years.

References

1. Dean JA. McDonald and Avery's Dentistry for the Child and Adolescent: Elsevier Health Sciences; 2015.
2. Arali V, P M. Anaesthetic efficacy of 4% articaine mandibular buccal infiltration compared to 2% lignocaine inferior alveolar nerve block in children with irreversible pulpitis. J Clin Diagn Res 2015;9(4):ZC65-67.
3. Bagherian A, Sheikhfathollahi M. Children's behavioral pain reactions during local anesthetic injection using cotton-roll vibration method compared with routine topical anesthesia: A randomized

controlled trial. Dent Res J (Isfahan) 2016;13(3):272-7.

4. Jung IY, Kim JH, Kim ES, Lee CY, Lee SJ. An evaluation of buccal infiltrations and inferior alveolar nerve blocks in pulpal anesthesia for mandibular first molars. J Endod 2008;34(1):11-3.
5. Yassen GH. Evaluation of mandibular infiltration versus mandibular block anaesthesia in treating primary canines in children. Int J Paediatr Dent 2010;20(1):43-9.
6. Elbay ÜŞ, Elbay M, Kaya E, Yıldırım S. Effects of two different anesthetic solutions on injection pain, efficacy, and duration of soft-tissue anesthesia with inferior alveolar nerve block for primary molars. J Clin Pediatr Dent 2016;40(6):456-463.
7. Malamed SF. Handbook of local anesthesia: Elsevier Health Sciences; 2014.
8. Sharaf AA. Evaluation of mandibular infiltration versus block anesthesia in pediatric dentistry. ASDC J Dent Child 1997;64(4):276-81.
9. Zafarmand A, Aghaeepoor N, Tehrani NA. Effectiveness of mandibular infiltration compared with mandibular block technique in second primary molar pulpotomy. J Dent Sch (Shahid Univ Med Sci) 2004;22(3):470-477.
10. Oulis CJ, Vadiakas G, Vasilopoulou A. The effectiveness of mandibular infiltration compared to mandibular block anesthesia in treating primary molars in children. Pediatr Dent 1996;18(4):301-5.
11. Ram D, Peretz B. Reactions of children to maxillary infiltration and mandibular block injections. Pediatr Dent 2000;23(4):343-6.
12. Jones C, Heidmann J, Gerrish A. Children's ratings of dental injection and treatment pain, and the influence of the time taken to administer the injection. Int J Paediatr Dent 1995;5(2):81-5.
13. Donohue D, Garcia-Godoy F, King DL, Barnwell GM. Evaluation of mandibular infiltration versus block anesthesia in pediatric dentistry. ASDC J Dent Child 1993;60(2):104-6.
14. Jafaerzadeh M, Forghani A. A Compressional two anesthetic technique (mandibular block versus infiltration) in restorative treatment of Class I second mandibular molars in 5-8 years children. J Isfahan Dent Sch 2007;2(2):9-12.
15. Ghasemi TD, Pooyafard A, Javadinejad S. Comparison of infiltration and inferior alveolar block anesthesia techniques in controlling pulpotomy pain in the primary mandibular first molars. J Isfahan Dent Sch 2011;6(4):244-249.

Corresponding Author

Dr. Fatemeh Ferdosizadeh
Post Graduate Student,
School of Dentistry,
Department of Pediatric Dentistry,
Qasvin University of Medical Sciences,
Qasvin, IRAN
Email Id: - fatemehferdosizadeh@gmail.com