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RESEARCH ARTICLE

EVALUATION OF THE SUCCESS RATE OF PERIODONTAL LIGAMENT INJECTION IN PRIMARY MAXILLARY MOLARS ANESTHESIA IN 3-8 YEARS OLD CHILDREN

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ABSTRACT

Aim: The purpose of this study was to investigate the success rate of PDL injection in primary maxillary molars anesthesia.

Materials and Methods: This study was performed using a sequential double blind randomized trial design. In this study 82 children aged 3–7 years old who required pulpotomy, restoration, SSC and extraction on their primary maxillary molars were selected. The teeth of these children were anesthetized with periodontal injection and the dental treatments were performed on each patient. Signs of discomfort, including hand and body tension and eye movement, verbal complaint and crying (SEM scale), were evaluated by a dental assistant who was blinded to the treatment allocation of the patients.

Results: Results of this study showed that during treatment 76.09% of child patients had verbal complaint, 4.87% of cases cried and no patient had body and eye movements. The success rate of PDL injection was 92.47%.

Conclusion: Results showed that periodontal ligament injection can be used as an alternative to infiltration in maxillary primary molars.

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INTRODUCTION

One of the most important problems in the pediatric dentistry is patient management during dental treatment. (Macdonald *et al.*, 2011) An efficient pain control during the treatment affects on patient comfort and cooperation during dental procedures. (Wright *et al.*, 1991; Berggren and Meynert, 1984; Milgrom *et al.*, 1992) Adverse experiences in childhood could be result patient's dental fear in childhood or even adulthood. Researchers believe that child pain control leads to successful behavior management. (Macdonald *et al.*, 2011) With the exact local anesthesia patient can be comfort and trust the dentist. (Sharaf, 1997) The most common method of local anesthesia in maxillary teeth is supra periosteal or infiltration injection. This method anesthetize dental pulp, around of dental root, buccal periosteum, connective tissue and mucosal membrane. (Malamed, 2004) but due to the one centimeter thickness of bone on the buccal roots of primary second molars in primary and beginning of mixed dentition (Jorgensen and Hayden, 1980; Wright *et al.*, 1983), supra periosteal injection may be not effective and should complete with other injection in

tuberosity region (Macdonald *et al.*, 2011). PDL injection is an easy technique and has some advantages such as limited soft tissue anesthesia, short duration of anesthesia and needs small amounts of the anesthetic material that can be very important in child patients. (Faulkner, 1983; Kaufman *et al.*, 1983; White *et al.*, 1988)

This injection method creates a pulp anesthesia in a limited region without need to additional injection in tuberosity region or soft tissue and doesn't lead to extensive anesthesia in the soft tissue (Macdonald *et al.*, 2011). Studies showed that this type of injection cause no unwanted effects. One study that evaluate PDL injection technique in dental procedures, found that success rate of this method in restorative treatment is 91.5% and in pulpal treatment is 50 % (Malamed, 1982).

Another study reported that PDL injection produces an effective anesthesia in the molar and success rate of this technique is 92%. (Walton and Abbott, 1981) Results of a study showed that the deepest anesthesia with this injection is seen in molar and premolar and the least in the mandibular lateral teeth. (Endo *et al.*, 2008) Based on the results of a study periodontal ligament injection produces sufficient anesthesia for extraction (Edwards and Head, 1989). In another study the success rate of periodontal ligament injection for restoration,

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pulpotomy and extraction was reported 91.46 % (Haghgoo, 2008). The purpose of this study is to investigate the success rate of PDL injection in primary maxillary molars anesthesia.

MATERIALS AND METHODS

This study was conducted at the dental clinic of Shahed University from June to December 2012. The study was performed using sequential double blind randomized trial. In this experimental study 82 children aged 3–7 years old who required dental treatment including restoration, pulpotomy, SSC and extraction for their maxillary molars were selected. These children were healthy, did not have any contra indications for local anesthesia and were cooperative (3,4Frankleclassification). Informed consent was obtained from the parents of the children. All children participating in the study were treated by the same operator.

After application of benzocaine gel as topical anesthetic, the 0.2ml of an esthetic solution (Persocain E, Lidocain Hcl Darupakhsh Pharmaceutical Mfa Co, Iran) was injected in the bottom of the middle part of the buccal gingival sulcus until blanching of the buccal tissue was observed. In the samples that required tooth extraction, palatal area was also injected. Three minutes after injection the predetermined treatments were accomplished. Signs of discomfort included eye movement, hand and body tension, verbal complaint and crying (SEM scale) were evaluated by a single rater who was not the surgeon and was blinded to group allocation. This rater was instructed about this evaluation.

RESULTS

The results of this study were derived from a sample population comprising 45 female and 37 males. Anesthesia was studied in the 42 primary first molars and 40 primary second molars. In this research 33 pulpotomy treatment, 9 tooth extractions, 34 restorative treatments and 6 SSC were accomplished. The results showed that no patient had eye or body movements, Five children (6.09%) had verbal compliant and two patients (4.87%) cried. The success rate of PDL injection was 92.47%

DISCUSSION

When anesthesia is not successful, pain during dental treatment is tormenting (Ashkenazi et al., 2005; Kanaa et al., 2012). Unfortunately, approximately 11.6 percent of children aged 26 to 155months experience insufficient levels of anesthesia during dental procedures (Nakai et al., 2000). The purpose of this study is to evaluate the success rate of PDL injection in primary maxillary molars dental treatment. Results this study showed that success rate of PDL technique for restoration, pulpotomy, SSC and extraction of primary maxillary molars is 92.47%. Haghgoo in her study showed that PDL injection can be used successfully in dental treatment of primary manibular molars (Haghgoo, 2008). Our results is in accordance with her finding. The result of Walton's study showed that PDL injection is successful in 92% of the cases (Walton and Abbott, 1981) that agrees with our study's results. However Walton

used the PDL injection in the anterior and posterior maxillary and mandibular teeth. But we studied the effect of this technique in the primary maxillary molars and it seems that our study is more accurate than Walton's study.

The results of Malamed's study showed that periodontal ligament injection is 50% effective for endodontic treatment and these results do not agree with our results. He used this technique on eight teeth and pointed out that the sample size he used was small for endodontic procedures, (Malamed, 1982) and that We injected an anesthetic agent into the middle of the sulcus on the buccal surface and observed gingival blanching. It is probable that the differences between the results of our study and Malamed's stem from this key difference. In this research for the first time the success rate of PDL injection was evaluated in dental treatment of maxillary molars

One of the advantages of PDL technique that is desirable anesthesia can be achieved with a little amount of anesthetic agent that it is important in pediatric treatment. In this research we studied the effect of PDL injection for primary maxillary molars anesthesia for different dental treatments. It is recommended that in another study the effect of PDL injection on any type of dental treatment be evaluated. In addition, we suggested the effect of PDL injection will be comprised for different treatments of primary maxillary molars with infiltration injection in similar treatments.

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