

CLINICAL EFFICACY OF INTRAOSSEOUS ANAESTHESIA IN TREATMENT OF DENTAL CARIES AND PULPITIS

Yu.V. Lakhtin, Doctor of Medicine, Associate Professor
Sumy State University, Ukraine

The efficacy of intraosseous anaesthesia in the treatment of dental caries and pulpitis was assessed. The author has determined the high efficiency of this method of pain relief in the treatment of the abovesaid pathology in the teeth of upper jaw and the front teeth of the lower jaw. In some cases, during the treatment of multirrooted teeth on the lower jaw additional intraligamental anaesthesia is recommended.

Keywords: intraosseous anesthesia, intraseptal anesthesia, intraligamental anesthesia, caries, pulpitis.

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Foreword. The majority of dental procedures in patients are accompanied by pain of varying severity. Therefore, one of the main conditions for the successful treatment of dental diseases is effective pain relief. It creates favourable conditions for dental treatment, provides effective performance of techniques during the treatment, removes or reduces the severity of psycho-emotional stress of patients and the cardiovascular system reaction.

In dental clinics local anesthesia is commonly used for the purpose of anesthesia. It involves injecting and application methods. The widespread use of this kind of anesthesia in dentistry is conditioned by its relative safety and quick implementation [4].

In recent years, due to the introduction of new and improvement of the previously known methods of anesthesia in dentistry, not only the additional convenience for doctors and patients was reached, but also the safety of manipulation was improved [1].

Spongy anesthesia is a type of infiltration anesthesia, involving the introduction of a local anesthetic into the cancellous bone. It is divided into intraosseous, intraseptal and intraligamental [2].

In the available literature one can find data on the evaluation of the efficacy of intraseptal anesthesia in relation to dental procedures, but the available data is contradictory and does not take into account the teeth-group specificity.

The aim of this work is clinical evaluation of the efficacy of intraseptal anesthesia in the treatment of caries and pulpitis in the teeth of different groups and topographic specificity.

Materials and methods. Analysis of the efficacy of intraseptal anesthesia was performed in 90 patients during dental

treatment of teeth of all groups: incisors, canines, premolars, molars in the upper and lower jaws on caries (109 teeth) and pulpitis (124 teeth). Anesthesia was performed with carpool syringe needle of 0.3 mm diameter and 8 mm long. As an anesthetic the representative of the amide group (4% solution of articaine with epinephrine 1: 100000) was used. The needle was inserted into the base of the distal and medial papilla relative to the analgesic tooth, 2 mm below the top of the papilla on the lower jaw (above - on the upper jaw) in its centre, at the angle of 45° to the axis of the tooth. Reaching the interdental septum, 0.1 ml of solution was injected, cortical plate was perforated and another 0.2 ml of anesthetic was injected. Spongy anesthesia is, in fact, intravenous injection, so it comes almost "on the needle" (in 1-2 minutes) in contrast to traditional methods [5, 6]. Therefore, the treatment can be performed in 2 minutes after the anesthetic injection.

Analgesic effect was scored by painful sensations of the dental surgery patient. We did not use the point scoring proposed by the authors [4], because it is difficult to assess the effect of anesthesia subjectively by 30% or 70%. The efficacy of anesthesia was assessed using the following criteria: 1 point - complete pain relief; 2 points - tooth sensitivity during intervention; 3 points - painful manipulation. Treatment of dental caries and pulpitis, where the efficacy of intraseptal anesthesia corresponded to 1 and 2 points, was continued under the intraligamental anesthesia. Administering the anesthetic in the periodontal ligament through the circular gap of the tooth in an amount of 0.1-0.2 ml we reached the absolute anesthesia.

Statistical processing of the materials

was made on parametric criteria (mean value - M, standard error - m), significant differences between the performance of independent groups - by Student's T-test using the statistical software package AtteStat 10.8.4. for MS Excel. Differences were considered statistically significant at $p \leq 0,05$.

Study Findings and Discussion.

As can be seen from **Tables 1** and **2**, the average number of points indicating the efficacy of anesthesia has been decreasing from the front single-rooted teeth to the side multirrooted teeth of both jaws. This relates both the treatment of teeth with caries and pulpitis. In single-rooted teeth of the upper and lower jaws the efficacy of intraseptal anesthesia reached 100%. In multi-rooted teeth the efficacy was a bit less; moreover it was lower in premolars and molars of the lower jaw than in the corresponding teeth of the upper jaw. This is due to the anatomical and topographical features of the alveolar bone of the jaws.

When detailing the efficacy of the studied method of anesthesia it was found out that in the treatment of caries in incisors and canines of the upper jaw 100% of the teeth multirroot. Among premolars the complete anesthesia was observed in 16 (94.1%) of 17 teeth, in 1 case (5.9%) the teeth preparation was sensitive. Upper jaw molars were cured in the absolute absence of pain in 12 (66.7%) of 18 teeth, the preparation was sensitive in 6 teeth (33.3%).

The efficacy of intraseptal anesthesia in the treatment of dental caries in the teeth of the lower jaw differed from the upper one; the quality of anesthesia was slightly lower, with the exception of incisors and canines (100% pain relief). So, in 14 (70.0%) of 20 premolars the anesthesia was complete, preparation of

4 teeth (20.0%) was accompanied by a pronounced sensitivity and 2 (10.0%) with pain. The treatment of molars was accompanied by even smaller efficacy of anesthesia. Complete anesthesia was registered only in 11 (57.9%) of 19 cases, 4 (21.1%) teeth were sensitive on the enamel-cement border and in the same number of teeth (21.1%) the anesthesia was not observed.

Pulpitis treatment under the intraseptal anesthesia, which consists not only of the tooth preparation, but also the removal of pulp, was less effective. Pulpectomy in incisors and canines of the upper jaw was done under complete anesthesia in 14 (93.3%) of 15 teeth; one tooth (6.7%) had sensitive pulp. Among premolar: in 21 (95.5%) of 22 cases the removal of the pulp was possible, in one case (4.5%) the increased nerve sensitivity was observed. In 16 molars (64.0%) of 25 the pulp extract from the root canals was not accompanied by pain, and in 9 (36.0%) cases after the opening of the pulp cavity in probing the patients reported a notable sensitivity.

Efficacy of the intraseptal anesthesia in the treatment of pulpitis in the teeth of the lower jaw was lower than in the teeth of the upper jaw. Thus, in the treatment of incisors and canines the pulp removal was painless in 17 (89.5%) of 19 teeth, in 2 (10.5%) teeth the preparation of the solid tissue was possible, but after pulp horn opening the patients reacted to probing. Pulpectomy of premolars was performed under the complete anesthesia at 11 (64.7%) of 17 teeth, the pulp in 4 (23.5) teeth was sensitive, in 2 (11.8%) teeth the response was not only to mechanical stimulation, but also to temperature. The least effective intraseptal anesthesia was marked at the treatment of pulpitis in molars. It was possible to open a horn of pulp and impose devitalizing means in 15 (57.8%) of 26 teeth, an increased sensitivity at the opening of the pulp chamber was noted in 5 (19.2%) cases, painful sounding of the bottom of carious cavity and pronounced response to thermal stimulant were recorded in 6 (23.1%) molars.

Additional intraligamental anesthesia provides fully painless manipulations in all teeth that used to have pain or sensitivity.

Thus, according to the results of

Table 1.
Efficacy of intraseptal anesthesia in the treatment of teeth of the upper jaw, points (M±m)

Pathology	Teeth-group specificity		
	incisors, canines	premolars	molars
Caries	3.0±0.0	2.9±0.06 P* > 0.05	2.7±0.1 P* = 0.004 P** = 0.04
Pulpitis	2.9±0.007	3.0±0.05 P* > 0.05	2.6±0.1 P* = 0.04 P** = 0.008

Note* - Statistically significant differences with the incisors and canines; ** - with the premolars.

Table 2.
Efficacy of intraseptal anesthesia in the treatment of teeth of the lower jaw, points (M±m)

Pathology	Teeth-group specificity		
	incisors, canines	premolars	molars
Caries	3.0±0.0	2.6±0.2 P* = 0.03	2.4±0.2 P* = 0.006 P** > 0.05
Pulpitis	2.9±0.07	2.5±0.2 P* = 0.05	2.3±0.2 P* = 0.01 P** > 0.05

Note* - Statistically significant differences with the incisors and canines; ** - with the premolars.

the study, the following **conclusions** can be made: intraseptal anesthesia in the treatment of caries and pulpitis has sufficient efficacy to carry out the necessary medical manipulations, especially for the treatment of all teeth in the upper jaw and in the front teeth of the lower jaw. In case of insufficient teeth analgesia, an extra intraligamental anesthesia provides the complete anesthesia.

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Information about author:

1. Yuriy Lakhtin - Candidate of Medicine, Associate Professor, Kharkiv Medical Academy of Post-graduate Education; address: Ukraine, Kharkiv city; e-mail: sumystom@yandex.ru