

Assessment of the Effectiveness of Pain Relief in Children during Dental Appointments

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Abstract

Relevance: Subjective assessment of pain in children is traditionally determined by means of visual-analog scales. The need for ensuring comfortable dental treatment in children is obvious; therefore, in order to obtain the most reliable data it is necessary to develop scales to assess pain and effectiveness of pain relief depending on the age of the child.

Aim: To develop analog-visual scales designed to assess the efficacy of anesthesia during outpatient dental interventions in children depending on the age of the child.

Materials and Methods: Analog-visual scales were developed to assess the efficacy of anesthesia in children at outpatient dental appointments depending on the age of the child. One hundred patients aged 4 to 12 years were examined.

Results: The scales were based on the child's reactions and behavior during dental treatment with the use of local anesthesia. In the age group from 4 - 7 years the analog-visual scale was filled in by the doctor, the child and the parent, and in the second group of patients aged from 7 to 12 years the scale was filled in by the child and the doctor, since in this age group children could independently correlate what they were experiencing with the picture on the scale.

Conclusion: The developed scales of subjective assessment of the efficacy of local anesthesia in children make it possible to determine the quality of the studied anesthetic agents and methods in pediatric dentistry.

Keywords: Pain; Pain Assessment Scale; Local Anesthesia; Pediatric Dental Care

Relevance

Emotional manifestation of pain in children is different, varying in intensity, duration and quality. The specifics of children's fears lies in the fact that children see them through the prism of their vivid imagination, which might lead to the development of negative consequences in the form of dentofobia [1], which complicates the possibility of dental treatment in the future.

Due to the fact that the need for dental care in children reaches 90% [2], the pediatric dentist is faced with an acute need for effective pain management [3], the use of which can be difficult if the young patient experiences initial anxiety. Identifying children's fear of injection, treatment, and subsequently developing an individualized approach to each child largely determines the success of treatment [4]. According to the results of a sociological survey of dentists working at children's outpatient dental appointments, 94.5% of respondents noted that the emotional state of a child interfered with providing quality dental care and in 88.1% of cases, doctors had to discontinue the appointment [5].

It is customary to assess pain levels in children in all fields of medicine subjectively; the analysis of scientific papers on the availability of analog-visual scales [6] demonstrated the current lack of a well-developed method for subjective assessment of painful sensations experienced by children during dental appointments [7]. It has also been determined that in order to obtain data on painful sensations in children, the opinion of the child, parents and physician must be taken into account, as the opinion of the child alone is not always objective [8]. That is why it is important to identify excessive anxiety in patients at dental appointments and manage it [9]. The patient's emotional state directly affects the pain sensitivity of dental hard tissues. When the level of negative emotions is high (more than 60%), an increase in the thresholds of pain sensitivity has been noted in some patients [10].

Aim of the Study

To develop analog-visual scales designed to assess the effectiveness of pain relief during outpatient dental interventions in children depending on their age.

Materials and Methods

The employees of the Departments of Anesthesia in Dentistry and Pediatric Dentistry of Moscow State Medical University named after A.I. Evdokimov developed an analog-visual scale for assessment of effectiveness of pain relief in children in outpatient dentistry.

We examined 100 patients aged 4 to 12 years who required local anesthesia for the treatment of caries and its complications. The patients were divided into groups according to the age criterion: from 4 to 7 years old and from 7 to 12 years old. In the first group 40 patients from 4 to 7 years of age took part in the trial, 28 of them were boys and 12 were girls. The second group, in which the efficacy of anesthesia in the treatment of caries and its complications was assessed, comprised 60 patients aged 7 to 12 years, of which 35 were boys and 25 were girls.

Results and Discussion of the Study

In order to obtain subjective assessment of local anesthesia performed as part of an outpatient pediatric dental appointment, an analog-visual scale was offered to be completed by the doctor, the child and the parent in the group of patients from 4 to 7 years old. For the children's convenience, the scale was additionally designed for boys and girls separately, as it was more convenient for the children to identify themselves with the pictures of children of their gender (Figure 1).

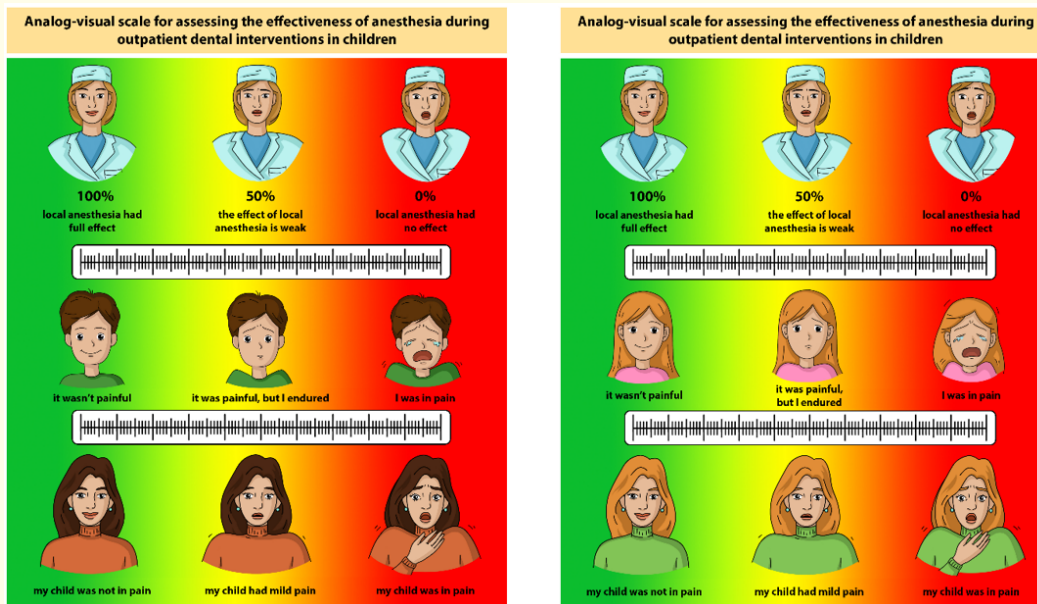


Figure 1: Analog-visual scale for assessing the effectiveness of anesthesia during outpatient dental interventions in children. 4 - 7 years old.

To determine the effectiveness of pain management in this group of patients, the analog-visual scale is divided into three parts: “patient - child”, “doctor” and “parent”. To indicate the intensity of pain, the scale is graded from green, indicating no pain during treatment, to red, signaling severe pain in the patient; the scale is also graded from 0 to 100%. Descriptors used by the child allow to clarify how the child assesses their level of pain and are as follows: “it wasn’t painful”, “it was painful, but I endured”, “I was in pain”. The physician uses the following descriptors to determine the effectiveness of local anesthesia: “local anesthesia had full effect”, “the effect of local anesthesia is weak”, “local anesthesia had no effect”. The child’s parent or guardian uses the following descriptors: “my child was not in pain,” “my child had mild pain,” “my child was in pain”.

At the end of treatment, the child, the doctor and the parent fill out an analog-visual scale based on the child’s reaction and behavior.

A percentage score at the level of 100-90% corresponds to the patient’s descriptor of “it wasn’t painful”, the doctor’s descriptor “local anesthesia had full effect”, i.e. the depth of anesthesia was sufficient for the dental intervention. The provision of dental care was painless, effective, and complete. A parent’s score in this range indicates that the child was free of pain.

A percentage score of 50% corresponds to the descriptor “it was painful, but I endured”, the doctor’s descriptor “the effect of anesthesia is weak” this indicates that the effectiveness of pain relief was inadequate during the dental intervention. Observing the child’s posture and facial expressions, parents note the presence of painful sensations during treatment.

A percentage score of less than 20 to 0% corresponds to the patient’s descriptor “it was painful”, the doctor notes that the effect of anesthesia did not come, the dental intervention is painful and its continuation is impossible. Observing the child’s reaction, parents note the persistence of pain during treatment.

Children aged 7 - 12 years (second group) were able to evaluate the treatment on their own, without the help of their parents. Children in this age group were willing to correlate their sensations to the ones of the child on the scale after dental care was provided. The scale is divided into two parts: “child” and “doctor”. A percentage scale from 0% - red zone, signaling pain during treatment, to 100% - green zone, characterizing complete effectiveness of pain relief and absence of painful sensations during all dental manipulations, is used to determine the intensity of pain (Figure 2).

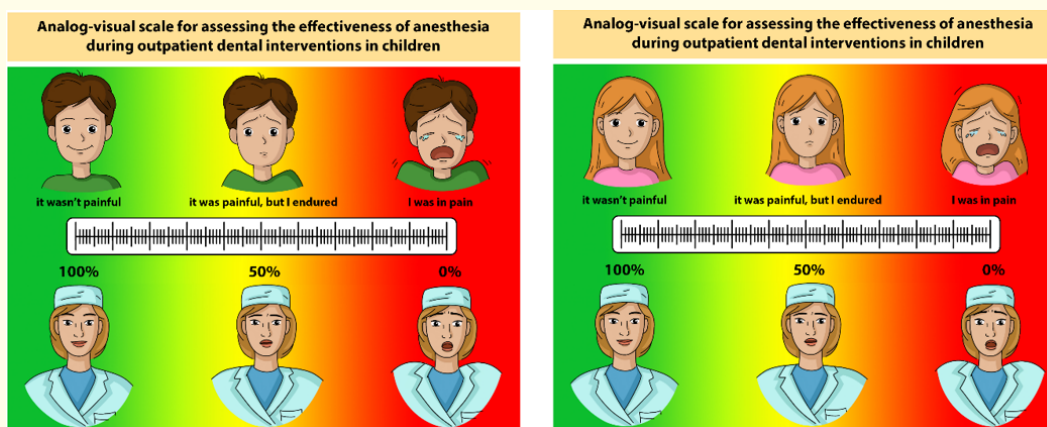


Figure 2: Analog-visual scale for assessing the effectiveness of pain relief in children at a dental appointment. 7 - 12 years old.

The painlessness of dental care corresponds to the patient descriptor “it wasn’t painful”, the doctor’s descriptor “local anesthesia had full effect”, the mark of the percentage score at the level of 100 - 90%, that is, the depth of anesthesia was sufficient for dental intervention.

In the case of insufficient effectiveness of anesthesia during dental treatment, the score of 50% corresponds to the patient’s descriptor “it was painful, but I endured”, the doctor’s descriptor “the effect of anesthesia is weak”.

The mark of the percentage point indicator at the level less than 20% corresponds to the patient’s descriptor “it was painful”, the doctor notes that proceeding with the treatment was impossible because of the lack of anesthetic effect, the doctor’s descriptor “local anesthesia had no effect”.

Conclusion

The developed analog-visual scales for subjective assessment of the effectiveness of local anesthesia in pediatric dentistry depending on the child’s age determines the possibility of taking into account the opinion of a doctor, a parent, and a child as well as allows not only to determine the effectiveness of local anesthesia carried out but also to reveal psycho-emotional stress of a child during treatment. This method of evaluation can be recommended to determine the quality of the new anesthetic agents and methods in pediatric dental practice.

Main Points:

1. The use of analog-visual scale developed specifically for children is expedient for subjective assessment of painful sensations in children during dental intervention.

2. The developed scales of subjective assessment of efficacy of local anesthesia in children allow us to determine the quality of the studied anesthetic agents and methods in pediatric dentistry.

Conflict of Interests

The authors declare no conflict of interests.

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