

## Pain Perception During Administration Of Inferior Alveolar Nerve Block In Pediatric Patients: A Comparison Between Insulin Syringe And Conventional Syringe

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Cite this paper as: Kritheka ck , Dr Dinesh kumar (2024) Pain Perception During Administration Of Inferior Alveolar Nerve Block In Pediatric Patients: A Comparison Between Insulin Syringe And Conventional Syringe *Frontiers in Health Informatics*, Vol.13, No.8, 8127-8131

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### ABSTRACT

#### Background:

Pain during local anesthetic administration is a major concern in pediatric dentistry and is a key factor contributing to dental anxiety and uncooperative behavior in children. Conventional syringes, although effective, may increase discomfort and negatively affect the overall treatment experience.

#### Aim:

To compare pain perception during inferior alveolar nerve block (IANB) administration using a conventional dental syringe and an insulin syringe in pediatric patients.

#### Materials and Methods:

This study included 40 children aged 9–12 years who were visiting the dentist for the first time. The participants were divided into two groups: Group I received IANB using a conventional syringe, while Group II received anesthesia using an insulin syringe technique. Pain perception was assessed using the Wong-Baker Faces Pain Rating Scale and Visual Analog Scale (VAS). The collected data were statistically analyzed using mean and standard deviation.

#### Results & Discussion:

The insulin syringe group showed significantly lower pain scores ( $2.4 \pm 1.5$ ) compared to the conventional syringe group ( $7.7 \pm 1.9$ ). The reduced pain perception may be attributed to the smaller needle gauge and controlled delivery of anesthetic solution, resulting in decreased tissue trauma and improved patient comfort. These findings are consistent with previous studies supporting the use of finer needles in pediatric patients.

#### Conclusion:

Within the limitations of the study, insulin syringes were found to significantly reduce pain perception during local anesthetic administration compared to conventional syringes. Their use can improve patient comfort, cooperation, and overall dental experience, making them a viable alternative in pediatric dental practice.

**Keywords:** Pediatric dentistry, Inferior alveolar nerve block, Pain perception, Insulin syringe, Local anesthesia, Dental anxiety

### INTRODUCTION

In pediatric dentistry, pain control is an essential component of patient care, especially for local anesthetic treatments such as inferior alveolar nerve blocks (IANB). Local anesthesia causes lack of sensation in a particular region of the body. The most popular method for anesthetizing children's mandibular teeth during surgical and operational procedures is inferior alveolar nerve block (IANB)(1). The discomfort and anxiety caused by administering the anesthetic solution using a traditional syringe, even in cases where this method effectively reduces pain during dental treatment, make it difficult for pediatric dentists and clinicians to create a positive overall patient experience(2). Additionally, pediatric dentists have been interested in how children react

emotionally and behaviorally to dental care for many years. Uncooperative or uncontrollable behavior in children might hinder the effective provision of dental care and lower the standard of care(3). A persistently unfavorable behavioral habit might negatively impact a child's future dental health if it is not sufficiently addressed.

This fear can stem from a variety of sources, including the fear of pain, previous traumatic experiences, or the simple apprehension surrounding unfamiliar procedures(4). The injection of local anaesthetic, while essential for ensuring pain-free dental care, is often a significant source of distress for children, many of whom have a natural aversion to needles or medical procedures(3). Understanding the nature of these phobias and the factors that influence children's attitudes towards local anaesthetic treatments is crucial for paediatric dental professionals(5). By addressing these fears with appropriate strategies, such as effective communication, behavioural techniques, and the use of child-friendly approaches, dentists can help reduce anxiety, enhance patient cooperation, and improve overall treatment outcomes(6)..

This article explores the common fears and attitudes children have towards local anaesthesia in dentistry, the factors contributing to these feelings, and strategies to manage and alleviate dental anxiety in paediatric patients. In young patients, the pain of these injections can induce fear and anxiety, which may result in bad experiences and an unwillingness to seek dental treatment in the future(7). Therefore, improving pediatric dentistry practice requires identifying methods to reduce procedure discomfort as much as possible.

### MATERIALS AND METHODS:

The current study included 40 patients of both genders and was conducted at Saveetha Dental College in Chennai. The study was explained to everyone, and their consent was acquired. Name, age, gender, and other details were noted. There were two groups of patients. Patients in Group I received local anesthetic (inferior alveolar nerve block) with a conventional syringe and needle, while those in Group II received an insulin syringe. Each patient received an inferior alveolar nerve block using the appropriate syringe, and their level of pain was assessed using the Wong-baker faces pain rating scale and the visual analog scale (VAS). The mean standard deviation was used to examine the VAS scores for the two groups.

The requirements for inclusion criteria were Children between the ages of 9 and 12 who are visiting the dentist for the first time are those who do not have any allergies or systemic illnesses. Only the mandibular primary molars require local anesthetic injections for dental procedures. Additionally, only teeth that are indicated for extraction. And then criteria for exclusion were Children that require immediate medical attention for conditions like cellulitis, abscesses, and space infections. A patient with poor health kids who struggle with behavioral control. kids who are allergic to local anesthetics.

Using the Wong-Baker face scale, evaluation was conducted. a subjective pain rating system. The kid was shown a series of six cartoon faces with varied facial expressions, ranging from highly happy to very sad. Following a brief description of each face, the kid was asked to select the one that most accurately reflected how they felt while under local anesthesia. On this scale, 0 represents no discomfort and 5 represents severe agony. (Figure No. 1) A mean standard deviation was applied once the recorded data was gathered and tabulated.

### RESULTS:

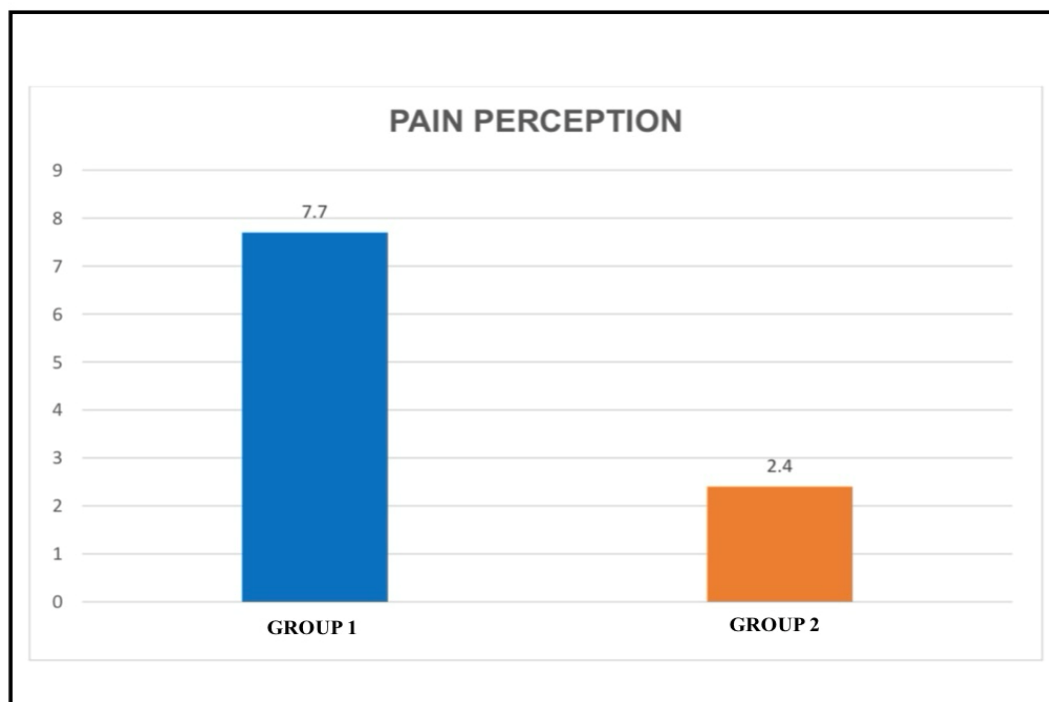
In the present study total 40 children were enrolled; in which 20 children received local anesthesia through conventional syringe and 20 children initially through insulin syringe infiltration later through conventional Syringe for anaesthetizing inferior alveolar nerve block. it was found that the mean pain score in the insulin group ( $2.4 \pm 1.5$ ) was lower than the conventional syringe group ( $7.7 \pm 1.9$ ) (table 1).

TABLE 1:

GROUP	N	MEAN	STD. DEVIATION
GROUP 1 Conventional syringe	20	7.7	1.976
GROUP 2 Insulin syringe infiltration with conventional syringe	20	2.4	1.536

This table 1 represents the assessment of pain score during administration of inferior alveolar nerve block in pediatric patients in comparison with group 1 : conventional syringe usage and group 2 : insulin syringe Infiltration with conventional syringe on administration of inferior alveolar nerve block.

GRAPH 1:



The bar graph represents the pain perception during administration of inferior alveolar nerve blocks in pediatric patients. Blue colour chart table denotes group 1 : conventional syringe usage and the orange chart table denotes group 2 : insulin syringe Infiltration with conventional syringe on administration of inferior alveolar nerve block.

#### DISCUSSION:

Pain control during local anesthetic administration remains a critical concern in pediatric dentistry, as fear of injections is one of the primary reasons for dental anxiety and avoidance of treatment(8). The present study evaluated and compared pain perception in children during local anesthetic administration using an insulin syringe and a conventional dental syringe. The findings demonstrated significantly lower pain scores in the insulin syringe group, indicating that the use of a smaller-gauge insulin syringe can enhance patient comfort and cooperation during dental procedures.

The reduced pain perception observed with insulin syringes in this study is consistent with the findings of Sagarika and Dogra (2020), who reported significantly lower Visual Analog Scale (VAS) scores when greater palatine nerve blocks were administered using insulin syringes compared to conventional syringes. Their results highlighted that smaller needle diameter and controlled delivery of anesthetic solution contribute to reduced tissue trauma and discomfort(9).

Similarly, previous comparative studies in pediatric populations have demonstrated that devices delivering anesthetic with reduced pressure and finer needles are associated with improved patient tolerance and lower pain perception(10). These outcomes may be attributed to decreased mechanical trauma during needle penetration and reduced tissue distension during deposition of the anesthetic solution. The insulin syringe, typically equipped with a 30- or 31-gauge needle, produces less resistance during penetration, which minimizes nociceptor stimulation and results in a more comfortable injection experience(11).

Pain associated with local anesthesia is multifactorial, involving both the needle puncture and the pressure created during anesthetic deposition(12). It has been suggested that tissue expansion during rapid injection may produce more discomfort than the needle insertion itself. Therefore, devices that allow slow and controlled delivery of anesthetic, such as insulin syringes, are likely to reduce patient discomfort and improve overall acceptance of dental procedures(8).

The present findings are also supported by earlier research comparing different injection systems, which indicated that the use of smaller-gauge needles does not compromise anesthetic efficacy while providing better patient comfort. This reinforces the clinical feasibility of insulin syringes as an alternative to conventional dental syringes, especially in pediatric patients who are more sensitive to procedural pain and anxiety.

From a behavioral perspective, reduced pain during injection plays a significant role in improving child cooperation, reducing disruptive behavior, and facilitating the successful completion of dental treatment(13). The use of insulin syringes may therefore serve as a simple, cost-effective, and readily available strategy to enhance patient management in pediatric dental practice(14).

Despite the favorable findings, certain limitations should be considered. Pain perception is subjective and influenced by factors such as individual pain threshold, anxiety level, and previous dental experiences. Additionally, the sample size and the single-center design of the present study may limit the generalizability of the results. Future studies with larger, multicentric populations and inclusion of anxiety assessment scales could provide more comprehensive insights into the effectiveness of insulin syringes in pediatric anesthesia.

Overall, the findings of this study, in conjunction with previously published literature, suggest that insulin syringes provide a less painful alternative to conventional syringes for local anesthetic administration in children and may be recommended as a routine practice to improve patient comfort and cooperation during dental procedures.

## CONCLUSION:

Within the limitations of the present study, it can be concluded that the use of an insulin syringe for the administration of local anesthesia in pediatric patients resulted in significantly lower pain perception compared to the conventional dental syringe. The smaller needle gauge and controlled delivery of anesthetic solution with insulin syringes appear to contribute to reduced tissue trauma and improved patient comfort.

The findings suggest that insulin syringes can serve as a simple, cost-effective, and clinically feasible alternative for local anesthetic administration in children, thereby enhancing patient cooperation and overall treatment experience. Incorporating insulin syringes into routine pediatric dental practice may help in minimizing dental anxiety associated with injections and improving the quality of care..

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