# EFFICACY OF APPLICATION OF ICE PACK BEFORE ADMINISTRATION OF LOCAL ANESTHESIA

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## ABSTRACT

AIM:

The aim is to analyse the efficacy of application of ice pack before administration of local anesthesia. OBJECTIVE:

This study is done to estimate the efficacy of application of ice pack before administration of local anesthesia. BACKGROUND:

One of the most important and challenging aspects of child behaviour management is the control of pain. Pain and anxiety can reduce the efficacy of anesthesia in pediatric patients. The prior application of topical anesthesia helps to alleviate, but does not eliminate, pain associated with needle insertion and anaesthetic agent injection. Difficulty in pain assessment frequently leads to under treatment of pain in children. Drug factors that can contribute to the anaesthetic overdose include vasoactivity, concentration, dose, route of administration, rate of injection, vascularity of the injected area and presence of vasoconstrictors. REASON:

The purpose of this study is to evaluate the efficacy of application of ice pack before administration of local anesthesia.

## Keywords: Ice pack, local anesthesia, pain scale, venham scale, children, mindset

#### **INTRODUCTION:**

One of the most important and challenging aspects of child behaviour management is the control of pain. Children who undergo early painful experiences during dental procedures are likely to carry negative feelings toward dentistry into adulthood. Therefore, it is important that clinicians make every effort to minimise pain and discomfort during dental treatment. Because of the likelihood of the pediatric dental patient experiencing discomfort during restorative and surgical procedures dentists turn to the use of local anaesthetics and/or analgesics to control pain. The simplest and most effective method of reducing pain during dental procedures is via an injection of local anaesthetic[1]. Since the introduction of local anaesthetics, the injection has produced pain and anxiety in patients. Yet, local anesthesia is necessary and is arguable the greatest advance in paediatric dental care. For more operative procedures in dentistry, when anesthesia is properly administered, it is a dentists greatest aid in treating children comfortably. Today there is little excuse for not using local anesthesia because it offers the advantages of child/patient comfort, cooperation, and operators better performance. Unfortunately even with this advance in dentistry, pain and anxiety continue to be a problem with injections.

To deal with these concerns, dentists have used topical anesthesia and prolonged injection time during the administration of local anesthesia in an effort to reduce pain. These techniques have helped, but they have not eliminated the pain associated with anesthesia injections, and administering local anesthesia with the traditional syringe continues to be painful for children and adults alike [2,3]. There is also evidence that dental fear and anxiety in adults is often learned in childhood. Thus dentists continue to search for techniques to make injections less painful. Anaesthetic injection is the dental procedure that produces the greatest negative response in children. Pain and anxiety can reduce the efficacy of anesthesia in pediatric patients. This fear of anesthesia is often manifested as a behaviour management problem, with a few pediatric patients lacking good coping skills and displaying hysterical behaviour

in anticipation of discomfort [4,5,6]. Anxiety is an emotional state that helps normal individuals defend themselves against a variety of threats and dental anxiety refers to patient's specific response towards dental situation-associated stress. Many terminologies have been used over a period of time to explain the concept of dental anxiety, dental fear, and dental phobia. Dental fear is usually associated with known stimuli like injections or drills whereas dental anxiety is borne out of an unknown threat that is not immediately present.[7]

Anxiety is the most disturbing experience for children, a response that sometimes can only be controlled with techniques beyond local anesthesia. It is well recognised by the dental profession that avoidance of routine care by some patients occurs because of the negative connotations associated with intra oral local anaesthetic injections. The prior application of topical anesthesia helps to alleviate, but does not eliminate, pain associated with needle insertion and anaesthetic agent injection. Children frequently lack the verbal and cognitive skills necessary to report physical discomfort and pain intensity. Assessment and effective management of pain in this population, therefore depends upon the observation and expertise of the care provider. Difficulty in pain assessment frequently leads to under treatment of pain in children. Specific distress behaviours like cry, facial expression, body movement, have been used to define and describe pain in young children. To sfacilitate the objective measurement of pain, clinicians and researchers have incorporated these behaviours different scales. A principal method of assessing aim in children is behavioural observation, such as body language and oral expression. Behavioural reactions and the degree of physical pain are not always correlated. Hester found that children who responded to painful stimuli with facial or motor behaviour rated their pain less than those who exhibited fewer behavioural reactions[8].

Behaviours such as irritability, restlessness, depression and aggression are frequently attributed to causes other than pain because of the lack of tools to assess pain as a contributing or causative factor. With reliable and valid pain assessment scales that do not necessarily rely on verbal descriptions of pain, health professionals may more readily assess the intensity of a child's pain and manage it effectively. Reliable and valid pain assessment scales are critical for conducting research on pain perception and management. Pain is a common side effect of most procedures in the emergency department. Even with minor surgical wounds, there is some degree of local inflammation that stimulates the surrounding nociceptors and causes pain during the healing process . Postoperative analgesia can help prevent chronic pain and is also essential for better recovery and patient satisfaction. Narcotics are very important in postoperative pain management, but they have some dose-dependent side effects, thus multimodal analgesia is preferred. Cryotherapy is a relatively noninvasive and cost-effective technique for pain management in cases of trauma or disease. It has been used in sports medicine to relieve pain caused by soft tissue injuries due to the relatively small number of side effects. Cryotherapy can also be used to reduce postoperative pain. Another recommended method to relieve the pain of injection is cooling of the injection site. This technique has been used in sprains, burns, fractures, bruises, insect bites, and sports injuries. In several studies, ice has been used to relieve pain from a local anaesthetic injection, control postoperative pain, and prevent oedema. Ethyl chloride was used for pre-injection anesthesia as well as for pain control in minor surgical procedures, minor sports injuries, and myofacial pain in other studies. There are a few dental studies in this field. Harbert performed the first study in this issue in 1989. He found cooling of palatal area before injection relieved pain perception. Kosaraju et al., compared 5-s application of a refrigerant (1,1,1,3,3-pentafluoropropane/1,1,1,2-tetrafluoroethane) and a 2-min application of a topical anaesthetic gel (20% Benzocaine gel) in the posterior palatal area before injection of a local anaesthetic solution with a 30-gauge needle in 16 adult participant. They reported that the application of a refrigerant as a pre-injection anaesthetic was more effective compared to the use of a topical anaesthetic gel in reducing the pain experienced by participants who received a posterior palatal injection[9,10].

Assessment of anxiety can be done by the following methods. Venham's picture test is a projective, psychometric, self-measure test which is used to measure the state anxiety of the young child. It permits the child to respond non-verbally, minimising the distortion produced by the subject's attempt to give socially desirable responses. It comprises of eight cards, with two pictures in each card, one "anxious" figure and one "non-anxious" figure. The child was asked to point the picture they felt most like at that moment. All the cards were shown in their numbered order. If the child pointed at the "anxious" figure, a score of one was recordedTherefore, the scale has a range of zero (minimum score) to eight (maximum score). It is quick to administer in 2 to 3 minutes, if the child pointed at the "non-anxious" figure, a score of zero was recorded . Venham's clinical anxiety rating scale is used to measure the situational anxiety of the child by the clinician. It is an interval rating scale in which the rating procedure is reliable, valid and can be easily integrated in clinical or research activities. It is a six-point scale, with scale points anchored in objective, specific and readily-observable behaviour. Therefore, the aim of the present study was to compare the effect of topical cooling of injection sites before administration of local anesthesia in the pediatric subjects[11,12].

#### **MATERIALS AND METHOD:**

In this pilot study, a total of 20 paediatric patients were considered. Among them 10 were considered as a control group and 10 were considered as a test group. The participants in the test group were given a ice pack at the site of injection before administration of local anesthesia and the other 10 were considered as a control group. The selection of participants is between 4-12 years is considered. Finally the intensity of pain is estimated by using Venham pain scale. This study is done to reduce the pain before administration of local anesthesia.

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# **RESULTS**:





Chart 1 indicates the number of paediatric participants experience no pain with ice pack and without ice pack. Among the 10 participants in the test group 6 of them experience no pain with ice pack and among the 10 participants in the control group everyone had pain without ice pack.



Chart 2 indicates the number of paediatric participants experience mild pain with ice pack and without ice pack. Among the 10 participants in the test group 4 of them experienced mild pain with ice pack and among the 10 participants in the control group 3 of them experienced mild pain without ice pack.



CHART 3

Chart 3 indicates the number of paediatric participants experience moderate pain with ice pack and without ice pack. Among the 10 participants in test group no one experienced moderate pain with ice pack and among the 10 participants in the control group 5 of them experienced moderate pain without ice pack.



## CHART 4

Chart 4 indicates the number of paediatric participants experienced severe pain with ice pack and without ice pack. Among the 10 participants in test group no one experienced severe pain with ice pack and among the 10 participants in the control group 2 of them experienced severe pain without ice pack.

## **DISCUSSION:**

A clinicians ability to administer an effective, safe and atraumatic local anesthesia injection to a child (or adult) is a major factor in creating a patient with a life long acceptance of dental treatment. Rather than avoiding local administration for fear of traumatising the paediatric patient, the clinician should strive to learn and use the latest modalities of local pain control to create a pleasant and comfortable dental experience for the patient. The most likely responses to dental stimuli in case of children reporting for first dental visit would be either fear or anxiety. Anxiety is associated with short-and-long-term impairment in social, academic, familial, and psychological functioning[13].

Acute pain is a serious issue worldwide and represents a major clinical, social, and economic problem. Under-treatment of pain due to poor medical practice results in many adverse effects. Additionally, cryotherapy can prevent neural plasticity and chronic pain by decreasing free nerve ending sensitivity, increasing nerve firing thresholds, and slowing synaptic activity. These neural effects increase the patient's pain threshold and can diminish the need for pharmacologic interventions, such as narcotics or local anaesthetic. Ice is a therapeutic agent used in medicine as an integral part of injury treatment and rehabilitation. A number of theories have been put forward to explain the mechanism of action of topical cooling to reduce pain. Topical cold application is believed to stimulate myelinated A fibres, activating inhibitory pain pathways, which in turn raises the pain threshold. It slows the nerve conduction, causes temporary vasoconstriction of superficial blood vessels, decreases metabolic rate, and thus required blood flow of the cells which were not originally involved in the injury; and there by control the extent of the inflammatory reaction and oedema. Ice packs can be made with any form of ice; however, commonly used forms are cubed ice and crushed ice [14,15,16].

In the present study cubed ice was used. A number of theories have been put forward to explain the mechanism of effect of injuries and induction of analgesia at a local level, which include decreasing tissue metabolic rate and vasoconstriction leading to a decrease in the inflow of inflammatory mediators and a decrease in oedema. This might explain the successful application of topical cooling to reduce bruising, bleeding, and oedema in sports injuries and after orthopaedic surgeries[17]. Local cooling muscle tissue reduces its tone via a reduction in the activity of muscular spindles[18]. Topical cold application stimulates myelinated A fibres, activating inhibitory pain pathways, which in turn raises pain threshold. Cold has also been demonstrated to work at the spinal level to inhibit stretch reflex and reduce muscle spasm. One of the study support the idea that topical cooling amplifies pain threshold to stimuli such as needle stick during local anaesthetic injection and helps patient management during dental procedures. Cooling of the injection site before local anaesthetic is an easy, reliable, and effective technique with no additional cost and can be beneficial to apply to all paediatric patients with fear and anxiety during dental procedures in which injection of local anaesthetics is necessary. Pre cooling injection site before infiltration anaesthesia significantly reduces the pain perception in paediatric patients when compared to local anaesthetic gel. Pre cooling of the injection site before infiltration anaesthesia significantly reduces the pain perception in paediatric patients when compared to local anaesthetic gel. Pre cooling of the injection site before infiltration anaesthesia significantly reduces the pain perception in paediatric patients when compared to local anaesthetic gel. Pre cooling of the injection site before infiltration anaesthesia significantly reduces the pain perception in paediatric patients when compared to local anaesthetic gel. Pre cooling of the injection site before in

## CONCLUSION:

This study was done to reduce the pain caused by the injection in the paediatric patient by evaluating the intensity of pain using venham pain scale. Our result shows that there is reduction of pain after providing an ice pack at the injection site before administration of local anesthesia. The response is yet to analysed by obtaining more than 50 paediatric participants.

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