

## A Modified Two Stage Technique of Administering an Inferior Alveolar Nerve Block in Children

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### Abstract:

The administration of an inferior alveolar nerve block in young children is a very challenging task. A painless block facilitates good behavior and cooperation from the child. A two stage technique of administering the inferior alveolar nerve block has been described in literature as a way to decrease the pain of injection. This paper describes a modification to the two stage technique which aims to make the injection experience comfortable for the child.

### Key Words:

Inferior alveolar nerve block, local anesthesia, two stage technique.

### Introduction:

Administration of local anesthesia (L.A) in young children is a challenging procedure. It is an indispensable tool which can lay the foundation for a very cooperative child. But without appropriate care being taken, this very procedure can lead to severe apprehension in the child. Dentists treating children make a conscious effort to administer a painless L.A by developing small modifications to traditional techniques depending on their skill, personality and confidence.<sup>1,2</sup> Literature on pharmacologic management of child's behavior has generally concentrated on sedation and general anesthesia with limited attention to local anesthetic administration methods specific to children. Hence, this is an important area which merits more focus.

The inferior alveolar nerve block (IANB) is a common, but arguably the most challenging intra oral injection to be administered in young children. A two stage technique has been suggested by various authors to decrease the pain of injection during the administration of the IANB.<sup>3, 4</sup> As the name suggests, the two stage

technique proposes administration of the block in a phased manner. In the first stage, the needle is inserted submucosally and 0.4ml of the local anesthetic solution is slowly given over 1 minute. After 5 minutes of the first injection, the needle is reinserted and advanced to the target site and 1.2-1.5ml of the solution is deposited.<sup>4</sup> The two stage technique is very useful in young children because as the submucosa is already anaesthetized in the first stage, the operator can concentrate on depositing the local anesthetic solution at the proper target site without worrying about the child having to experience the pain associated with the needle penetration.

This paper describes a 'modification' to the two stage technique. Here, two different syringes will be used during the two stages of the IANB. In the first stage, a disposable U-40 insulin syringe (A U-40 insulin syringe has 40 units per ml) will be used to anesthetize the submucosa. This will be followed by the second stage injection where a conventional 2ml disposable syringe will be used to deliver the local anesthetic solution at the target site. The advantages and rationale of

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using the U-40 insulin syringe in the first stage is subsequently discussed. This paper describes in detail the modified two stage technique method of administering the IANB in young children.

### **Materials and Method:**

The adherence to the proper basic injection protocol as applicable to children is very important for this modified two stage technique to be successful. This includes the use of tell-show-do, distraction, euphemisms, continuous positive verbal reinforcements and a flavored topical anesthetic.

The syringes used in this technique are the disposable U-40 insulin syringe (U-40 insulin syringe, Dispovan, Hindustan syringes and Medical devices Ltd, India) and the conventional 2ml disposable syringe with a 26G X 1 1/2 inch needle (Unolok, Hindustan syringes and Medical devices Ltd, India).

In the first stage, a U-40 insulin syringe is loaded with 0.5ml of local anesthetic solution. (Xylocaine 2%, AstraZenicaPharma India Ltd, India). The site of the needle penetration is approached from the same side of the oral cavity for the first injection as precise control is required for painless deposition of the local anesthetic solution.

**Fig 1: The disposable U-40 insulin syringe.**



If approached from the contralateral side as routinely practiced, the tongue can push the barrel of the syringe making it very difficult for the operator to control the needle.

The cheek mucosa is made taut and the bevel of the needle is positioned firmly in contact with the mucosa. The cheek mucosa is stretched, released and gently manipulated till about 2mm of the needle enters the mucosa. A conscious effort is made NOT to push the needle into the

mucosa. The stretch and release is believed to lessen the discomfort associated with needle penetration based on the Gates control theory of pain. The theory implies that light shaking and manipulation of the mucosa, disproportionately activates greater number of large fibers (touch) that inhibit previously activated small fibers associated with pain.<sup>5</sup>

Once 2mm of the needle has entered the mucosa, 0.5 UNIT of the local anesthetic solution is gently deposited. Sudden deposition of the local anesthetic solution in a 'flow' has been known to cause discomfort during the injection. After an interval of 2 seconds, another 0.5 unit is deposited. This process of depositing the local anesthetic solution in small quantities with two-four second intervals between the increments is continued till the needle is inserted to almost its full length into the mucosa. The remaining local anesthetic solution is now deposited slowly following aspiration. The whole process of injecting this 0.5 ml should take at least 2 minutes. In the second stage, the conventional technique is used to administer the IANB using the 2ml disposable syringe at the rate of 1ml/minute<sup>6</sup> (Fig 2) and this is done after 5 mins of the first injection.

**Fig 2: The 2ml disposable syringe.**



### **Discussion:**

Advantages of using the U-40 insulin syringe for the first injection:

The U-40 insulin syringe is a 1ml syringe attached with a 30 gauge, 8mm ultra short needle.

The insulin syringe due to the small diameter of its barrel and plunger allows the operator better control to deposit very small quantities of the local anesthetic solution.

The ultra short 8mm needle gives more stability with less deflection during the initial mucosal penetration and subsequent injection.

The fine diameter of the 30 gauge needle also aids a more comfortable initial penetration. Diana and associates reported that the mandibular alveolar nerve block is less unpleasant and children cry less when administered with a 30 gauge needle than when it is delivered with a 27 gauge needle.<sup>7</sup>

The 1ml syringe is also visually less threatening to the child in case he/she sees the syringe.

There is a concern about the aspirating ability of the 30 gauge needle. Malamed recommends the use of a 25 gauge needle for intra oral injections.<sup>8</sup> But, there is no conclusive evidence in literature against the use of a 30 gauge needle. Trapp and Davies reported that in vivo human blood may be aspirated through 23, 25, 27, and 30 gauge needles without a clinically significant difference in resistance to flow<sup>9</sup>.

### Conclusion

This paper focuses on a modified two stage technique of administering the IANB with special emphasis placed on the slow delivery of the L.A solution. L.A in children should be given extremely slowly and gently. If given quickly and with discomfort, it may result in poor child behavior in the future dental appointments. L.A. given painlessly and slowly is time well invested and will facilitate the other procedures much better.

The modified two stage technique has the potential to administer the IANB painlessly in young children. But, this technique like any other has a learning curve, and requires practice to become an extremely reliable and effective technique.

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