

Periodontal ligament injection v/s oral nerve block

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Abstract

As we all know local anesthesia is used for reversible blockade of nerves, which leads to a transient loss of sensation. Local anesthesia is used in a variety of dental procedures such as tooth extraction, root canal treatment, traumatic injuries and the list will go on. But, it has been found that inferior alveolar nerve block technique is associated with many bad side effects. So, periodontal ligament injection technique is a safer alternative to oral nerve block in various dental procedures. In this article, we have done the comparison between the PDL injection and oral nerve block.

Keywords: Local anesthesia, Periodontal ligament injection, Local infiltration techniques, Oral nerve block techniques, Inferior alveolar nerve block, Effectiveness, Comparison, Side effects, Safe, Pulpal anesthesia.

Introduction

The periodontal ligament (PDL) injection is used in cases where oral nerve block technique is not fully effective. It is also used where only a short duration of anaesthesia is needed, thus preventing the patient from adverse side effects, like the lip and tongue numbness.¹ Inferior alveolar nerve block (IANB) is a technique which is used for the anaesthetising the teeth and gingiva of the mandible, and the lower lip as well. It anaesthetise the inferior alveolar nerve (IAN) near the mandibular foramen. Although, inferior alveolar nerve block is used routinely in dental practice, in some cases it is ineffective.²

A proper and effective anaesthesia is essential for successful dental treatment. The patient's satisfaction about his dental treatment is very much dependent on the painless and comfortable experience he had due to an effective local anaesthesia. Thus, the proper local anaesthesia techniques and pain management are prerequisite.³ The PDL injection is more effective in patients who experience inadequate pulpal anaesthesia.⁴ Nowadays, the PDL injection is used as a preferred technique for anaesthesia. There are several criteria for any anaesthetic approach to be successful. First, adequate depth of anaesthesia is necessary; second, time of onset of anaesthesia should be as short as possible; third, duration of action of anaesthesia must be long enough to permit completion of the procedure; fourth, there should not be any irritation and discomfort during and postoperatively; and last but not the least, it should be safe to the patient.⁵

The periodontal ligament injection does not meet all of the above requirements for a primary technique, but it is safe to the periodontium and to the pulp when used in association with few operative procedures.⁶ The PDL injection for isolated anaesthesia in mandible is delivered by conventional syringe and specifically designed system, comprises of high pressure syringes and ultrafine needles. This technique has high success rate and low incidence of side effects. With time, new devices were discovered for the administration of PDL injection that are proved to have more advantage than conventional syringe technique.

However, the PDL injection technique can easily be used with any conventional syringe.⁷

The dentist generally faces difficulties during administration of local anaesthesia of the inferior alveolar nerve. The main reason of this is the improper identification of the nerve near the mandibular foramen. The success rate of mandibular anaesthetic techniques is lower as compared to maxillary anaesthetic techniques because the alveolar bone of mandible is more denser than alveolar bone of maxilla, which provides limited access to the inferior alveolar nerve and needs deeper penetration of needle into the soft tissue.⁸ Two techniques are available to anaesthetize the inferior alveolar nerve – direct technique and indirect technique. In direct technique the inferior alveolar nerve is anaesthetised first and in indirect technique the inferior alveolar nerve is anaesthetised in third position.⁹ In direct technique, an intraoral approach is used to achieve the anaesthesia of inferior alveolar nerve prior to its entry into mandibular foramen. The success rate of this method is 71 to 87% and incomplete anaesthesia is not uncommon.¹⁰ The success rate of indirect technique is 85%.¹¹

History of Past Relevance

An article called Anaesthetic Efficacy of Gow-Gates Nerve Block, Inferior Alveolar Nerve Block, and Their Combination in Mandibular Molars with Symptomatic Irreversible Pulpitis – by Masoud Saatchi: A Prospective, Randomized Clinical Trial in March 2018 and concluded that a combination of GGNB and IANB could improve the effectiveness of anesthesia in mandibular molars with symptomatic irreversible pulpitis, but it would still require supportive anaesthesia.¹²

Mohammad H Al-Shayyab published an article entitled 'Periodontal ligament injection versus routine nerve block anaesthesia for non-surgical extraction of posterior maxillary permanent tooth: comparative double-blinded randomized clinical study' (2017), and concluded that the PDL injection is associated with unsuitable patient responses and less effective anaesthesia compared to routine nerve block for the surgical extraction of posterior maxillary

permanent tooth. Therefore, the PDL injection cannot act as substitute anaesthetic technique of to routine nerve block for the non-surgical extraction of posterior maxillary permanent teeth.¹³

Hesham Khalil wrote an article called a basic review on the inferior alveolar nerve block techniques in April 2014, and concluded that although many techniques for inferior alveolar nerve block have been described in the literature, most dentists still use the traditional block approach. For selecting the most effective technique, the dentist should be experienced and fully aware of the various steps involved in local infiltration. Similarly, the pros and cons of each approach need to be recognized and taken into account, as indeed do the indications related to their fulfilment.¹⁴

K. Thangavelu wrote an article Inferior alveolar nerve block: Alternative technique in June 2012 and concluded that IANB is an effective nerve block to anesthetize IAN due to its several advantages.¹⁵

An article called Periodontal ligament and intraosseous anaesthetic injection techniques, wrote by Paul A. Moore in September 2011 - concluded that The PDL injection and the IO injection are effective nerve block techniques for managing failures of nerve block and for providing localized anaesthesia in the mandible.¹⁶

An article called periodontal ligament injection wrote by James S. Dower in November 2004, stated that conventional local anaesthesia techniques are frequently not effective, particularly for endodontic procedure. Alternative injections like the periodontal ligament injection is useful for this purpose.¹⁷

Gautam A Madan wrote an article called Failure of inferior alveolar nerve block in July 2002 and concluded that several substitutes to the inferior alveolar nerve block are available. Clinicians should try other substitute techniques also rather than repeat the inferior alveolar nerve block after it has failed.¹⁸

Gow-Gates, wrote an article called A New Technique Using Extra-Oral Landmarks in 1973 and concluded the properties of periodontal ligament injection and whether or not it can be used as a primary anaesthesia technique. He concluded that periodontal ligament injection cannot be used as a primary anaesthesia technique as it doesn't fulfil the basic criteria of effective local anaesthesia.¹⁹

Conclusion

The PDL injection is very successful blockade technique and providing specific analgesia to isolated teeth. For dentists this technique can be useful substitute to anaesthetize the circumscribed area, involving tissues in and around one or more teeth. The nerve supply of mandibular teeth and periodontal tissue caged in the bone. As the cortical plate of the mandible is thicker, which debilitates the diffusion of anaesthetic solutions into the mandible and limiting the effectiveness of local infiltration. But now a days alternative anaesthetic techniques that can overcome this barrier are available. The periodontal ligament (PDL) anaesthetic technique involves using high pressure syringe

to force the local anaesthetic solution rather than causing diffusion, through the PDL to the nerves in that area.

Conflict of Interest: None.

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