

## Editorial

# Intraosseous Local Anesthesia in Dentistry Makes Sense

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Local anesthesia in dentistry has not always received much attention. In some curricula the course is merely a few hours and students are quickly released on the patients. Clinical supervisors are often inadequately trained to assist when problems arise and act according to their personal experiences when inadequate anesthesia is obtained. The latter results in frustration when a patient keeps reporting pain during a dental procedure.

Traditional, standard or conventional local anesthesia in the maxilla comprises buccal intramucosal infiltrations and in the mandible an inferior alveolar nerve block with an amid anesthetic solution to anesthetize teeth. In dentistry lidocain, prilocain, mepivacain, bupivacain, ropivacain or articain are used, preferably with epinephrine or felypressine as a vasoconstrictor, unless the medical condition of the patient contraindicates its use. Bupivacain and ropivacain as a local anesthetic in dentistry are hardly used outside the United States. The reason for that is that articain got FDA approval only in the year 2000, while in Europe and elsewhere it was in use since 1976. The need for a long lasting local anesthetic effect, created the use of bupivacain and ropivacain in the US. Hence the subtle cultural difference between dental professionals over the world with regard to local anesthesia.

The literature and clinical experience has shown that most failures occur in the mandible. Failure rates of up to 40% are mentioned, which have been attributed to several causes, such as wrong injection site, stressed patient, infection, ionized molecules in the injected solution and anatomical variations of the lingual foramen [1-5].

Several authors have emphasized that the proper use of the correct injection solution or injecting a combination of solutions would make a difference. However, it is the opinion of the author of this paper that multiple injections at multiple sites with eventually a cocktail of amid anesthetic solutions will not solve the problem. The buccal and lingual cortex of the mandible will not be more penetrable when a combination of products is used. The main issue is the technique of administration of the local anesthetic. The so-called traditional Halsted mandibular block is based on the fact that the mandibular nerve enters the mandible about 1 centimeter above the occlusal plane of the mandibular teeth, half way the distance between the anterior and posterior border of the ramus of the mandible. This assumption may be right in some patients, but not in all. Alternatives have been proposed such as the Gow-Gates technique, which aims higher up

the ramus, closer to where the mandibular nerve exits the skull through the foramen ovale. The Akinosi-Vazirani technique tries to do the same but this time the patient is asked to keep the teeth in occlusion and the needle is inserted between the maxillary tuber and the ramus of the mandible. This technique tries to obtain a similar effect as the Gow-Gates technique, namely catch the mandibular nerve higher up its path. However none of the above technique is waterproof and guarantees 100% painless dentistry.

It is disturbing to know that in some patients mandibular anesthesia is hard to obtain. Imagine anesthesiologists have to tell their patients that there is a 40% chance of failure of the general anesthesia and that they will feel the pain! Unacceptable of course, unless one practices like in the 18<sup>th</sup> century.

Literature has shown in the past few years that the neurovascular anatomy of the mandible is not as simple as was always thought and taught. The simple "one canal neurovascular anatomical" perception of the mandible seems to be incorrect. Magnetic resonance imaging (MRI), cone beam computed tomography imaging (CBCT) and multislice computed tomography imaging (MSCT) have provided opportunities to study anatomy more profoundly [6-14]. It is clear in the mean time that the mandible is perforated both from the buccal as from the lingual by multiple neurovascular canals. The origin of these canals is not always immediately clear, but it offers a very good explanation why some patients still feel excruciating pain after a mandibular nerve block has been administered.

If the origin of these neurovascular bundles are not from the inferior alveolar nerve, but from branches of other nerves, this explains the failure rate of the mandibular nerve blocks. Literature has mentioned branches of the nerve to the mylohyoid, the lingual nerve, the buccal nerve, the facial nerve, the cervical nerve, the auriculo-temporal nerve, the glossopharyngeal nerve and the hypoglossal nerve entering the mandible [6-14]. The latter is a plea for the use of intraosseous anesthesia in dentistry, to ensure accurate and efficient local anesthesia in the mandible. If the local anesthetic can be administered directly into the cancellous bone around the teeth, it does not matter which branch of which nerve is providing sensory branches to the teeth. The anesthesia will be thorough and efficient.

It demands a change in philosophy in the minds of the dentists, who are trained and taught to perform a mandibular

nerve block, but it will certainly take away a lot of frustration at the side of the dentist and it will add a lot more confidence from the patient's side.

Intraosseous anesthesia has other advantages too, like no collateral soft tissue numbness, more or less controllable duration of the local anesthesia and better anesthetic effect in case of infection (pulpitis) which translates itself into more patient comfort and no risk of post operative lip and/or tongue biting complications.

Modern devices such as the Quicksleeper® (Dental HiTec, France) allow dentists to perform all types of administration of local anesthesia in dentistry, without any restriction. A device like this enables infiltration anesthesia, intraligamentary anesthesia and nerve blocks if wished. From the above it must be clear that intraosseous anesthesia is especially suitable for the mandible, but it does not restrict its use in the maxilla, especially in those areas where soft tissue anesthesia is more a burden than a necessity in most dental procedures.

## CONCLUSION

It states that intraosseous anesthesia to obtain local dental anesthesia in the mandible makes sense.

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