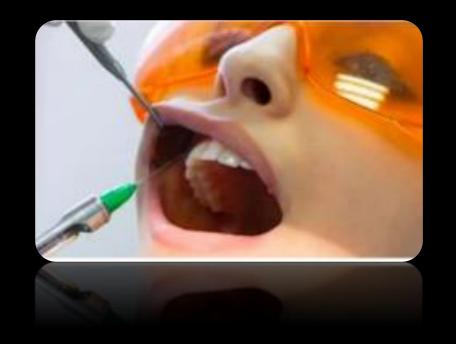






advances in local anesthesia in pediatric dentistry

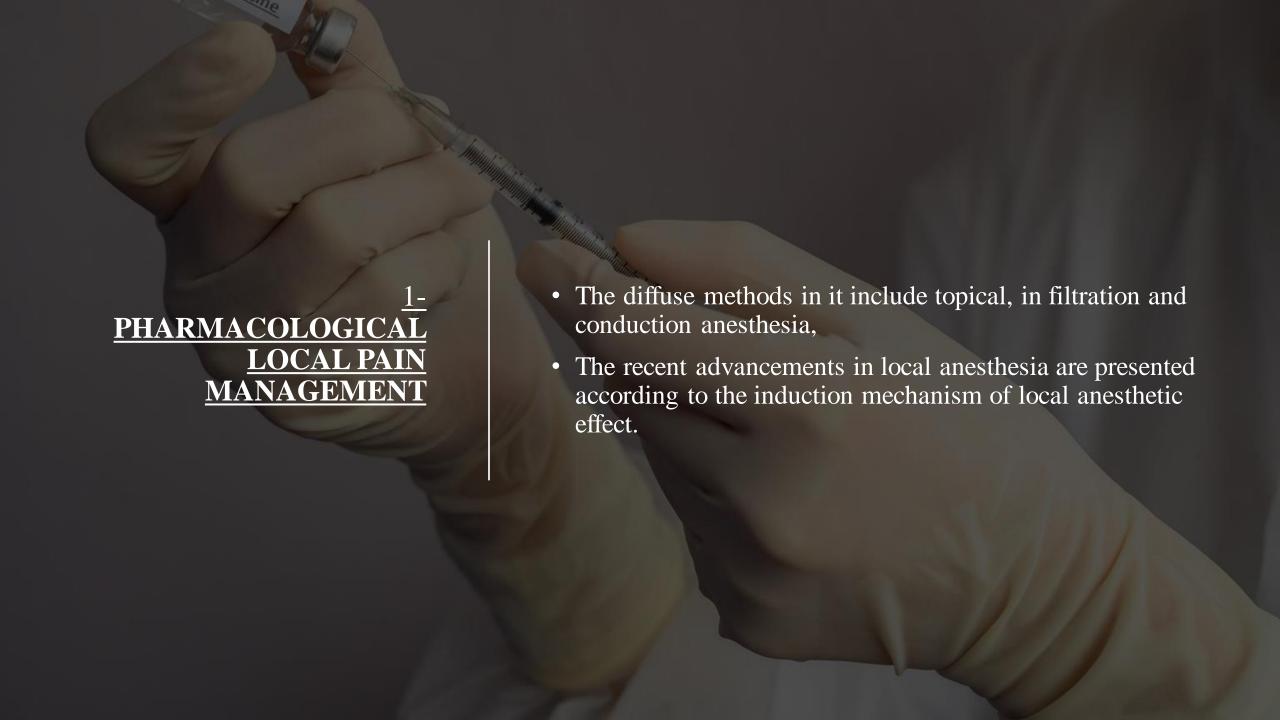




By
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advances in local anesthesia

• Recent progress in the field of local anesthesia has led to development of **newer agents**, **delivery devices and also modification in injection techniques**. This allow the clinician a treatment approach associated with improved pain control and reduced risk of adverse effects, essential for pediatric patients.





I. Diffuse local anesthesia1-Topical anesthesia.

A-Lidocaine patches

- The lidocaine patch is a transoral delivery system of lidocaine via a mucoadhesive base attached to the oral mucosa. The anesthetic agent is absorbed by the mucosa and the reported onset of anesthetic effect is within 2 minutes of application and may last up to 30 minutes after removal. Indications for use include super facial mucosal and gingival procedures, and topical analgesia before injectable local anesthesia,
- <u>disadvantages</u> include its high cost and poor adhesion to the oral mucosa

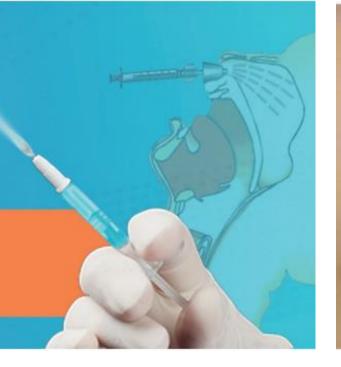
1-Topical anesthesia.



• B- *EMLA - cream*

Mixtures of anesthetic agents aimed for topical anesthesia are called eutectic mixtures for local an-esthesia (EMLA). Such formulations are considered to have lower melting points, which promotes easier absorption in the oral mucosa.

<u>Indications</u> for use include procedures on the oral soft tissues causing minor pain. Further studies are needed to determine the appropriate dose and duration of exposure in children to prevent the risk of overdosing and adverse effect







c. Intranasal spray

• This is a novel technique for achieving local anesthesia of maxillary teeth by infiltration of an anesthetic solution through the nostrils by a metered device.. The method allows to perform conservative dental manipulations requiring pulpal anesthesia of maxillary anterior teeth, canines and premolars in adults and children weighing more than 40 kg.



2. In filtration anesthesia a-Jet-injection

- is instrument that uses a highpressure jet of liquid medication to penetrate the skin and deliver medication under the skin without a needle.
- Limitations of the method include difficulty in positioningthe device in the posterior region due to its size, contraindicated use for achieving nerve blocks, in-adequate pulpal anesthesia and risk of small residual hematomas



2. In filtration anesthesia b- Vibrotactile devices

• Reduce the pain of needle injection by applying pressure, vibration, micro-oscillations, or a combination of them such as Dental Vibe. The applied physical stimuli modify or interfere with pain signals by closing the neural gate of cerebral cortex, aimed to decrease the pain perception due to distraction.



c. Modification in techniques anterior middle superior alveolar (AMSA) and palatal approach to anterior superior alveolar (P-ASA) nerve blocks

- These are two recently defined techniques for maxillary teeth analgesia without occurrence extraoral soft tissue anesthesia. In childhood dental care this feature is critical due to the reduction of self-injury risk as a result of collateral lips and cheeks numbness, occurring with the use of traditional infiltration methods.
- The AMSA nerve block achieves pulpal anesthesia of the maxillary incisors, canines and premolars on the side of the injection
- **P-ASA technique** anesthetizes six frontal teeth, from canine to canine, as well as the palatal and labial gingiva, mucoperiosteum and bone covering these teeth.

2. Vascular-diffuse local anesthesia.



The STA (single tooth anesthesia) system is an intraligamentary CCLAD system with an additional function for dynamic pressure sensing,

- <u>The advantage</u> is the rapid onset of profound pulpal anesthetic effect, with mild to moderate injection pain. The prolonged duration of the anesthetic administration .
- Safety precautions should be considered when intraligamentary anesthesia is applied on primary teeth close to developing permanent teeth, as some researchers report risk of enamel hypoplasia occurrence.







b-Computer-assisted intraosseous anesthesia (CAIO)

- Intraosseous anesthesia is considered to be a successful alternative to conventional anesthetic infiltration, as the anesthetic agent injected directly into the cancellous bone adjacent to the tooth required to be anesthetized. It, is found to reduce the injection pain and the time of onset of the anesthetic effect.
- Two main techniques of CAIO application are
- transseptal and osteocentral in filtration.
 Consideration should be given to the location of permanent teeth germs when applying the method in primary dentition



2. NON-PHARMACOLOGICAL LOCAL PAIN MANAGEMENT

• 1. Laser analgesia

Laser analgesia is a non-invasive, non-thermogenic biomodulation of the dental pulp reactivity. Laser pulses alter the behavior of a neuronal cell membrane causing a temporary disruption of the NaK pump. This leads to loss of impulse conduction, and thus an analgesic effect is achieved. The analgesic effect, together with the lack of contact and vibration in the manipulations, are prerequisites for accepting laser treatment as effective in reducing the anxiety associated with dental treatment in children and adolescents.





2-Electronic dental anesthesia (EDA)

• Electronic dental anesthesia (EDA) is a technique for achieving local anesthesia by the application of electrodes, providing transcutaneous electric nerve stimulation (TENS). It is mainly used as a supplementary method to conventional local anesthesia. The limitations of this method include increased salivary flow and an inability to use metal instruments freely. Although EDA cannot replace injectable local anesthesia, it can be used to relieve pain during various minor dental procedures in pediatric patients, due to its analgesic and nonpharmacological physiological effect.





3-"Virtual anesthesia"

• The most widely used behavioral techniques for relieving dental anxiety are verbal. The current progress in the field of virtual reality devices presents more engaging forms of distraction. Virtual reality may also have analgesic potential, leading to new term creation - "virtual anesthesia".





3. REVERSAL OF LOCAL ANESTHESIA

• The prolonged duration of soft-tissue anesthesia is often an undesirable effect of infiltrative local anesthesia in dental patients. Self-induced soft tissue trauma, a sensation of altered face appearance, impaired speech and eating are some of the post-operative side effects of local analgesia. These effects are more disturbing in pediatric patients. Various means for reversal of the local anesthetic action have been developed for a faster recovery from anesthesia.

REVERSAL OF LOCAL ANESTHESIA

• Phentolamine mesylate (OraVerse) is a short-acting alpha-adrenergic antagonist, leading to an increased clearance of local anesthetic solution from the injection site, reducing the duration of action. Since it is an antagonist to the vasoconstrictor and not to the anesthetic agent compound, it is mainly recommended for use in non-surgical treatment. Despite its limitations, Ora verse is described as safe and effective means for reducing the duration of soft-tissue anesthesia induced by local anesthetic infiltration, and its associated functional deficits in adults and children after 6 years of age.



CONCLUSIONT

 Dental clinicians should be informed of the new developments in local anesthesia, as painless treatment is an integral element of quality dental care. In children and adolescents, itis an essential aspect of patient behavior management. The use of age-appropriate terminology, distraction, topical anesthetics, as well as effective injection techniques, can serve to buildup trust and promote dentist-patient relationship.

