Dirección: Cra. 53 N° 50-09
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TECHNICAL DATA SHEET: LIDOCAINE 2%®
PRFTPT-010

1 GENERAL PRODUCT INFORMATION

LIDOCAINE® 2%
Lidocaine Hydrochloride 2%
Injectable anesthetic solutions used in dental treatments

Lidocaine 2% is an anesthetic solution for injection (subcutaneous small volume) for dental use, indicated to produce local anesthesia, applied the techniques by infiltration or nerve block. This product should be used by personnel with professional certification, trained to perform dental procedures.

1.1 Commercial Name and International Nonproprietary Name (INN):

LIDOCAÍNA® 2**%** (Lidocaine)
2-(Diethylamino)-2,6-acetoxylidide monohydrochloride, monohydrate. Acetamide, (diethylamino)-*N*-(2,6-dimethylphenyl)-, monohydrochloride, monohydrate.

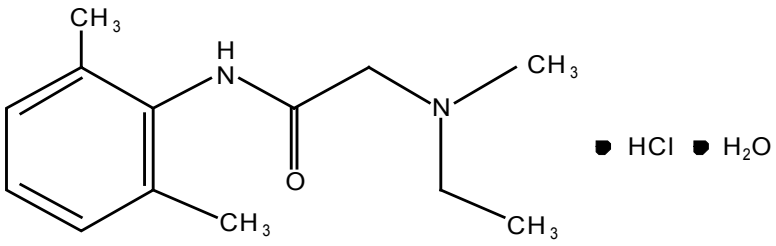
1.2 Structural Formula, Molecular Formula, and/or Empiric Formula of Active ingredients

1.2.1 LIDOCAINE HYDROCHLORIDE

- Molecular Formula: $C_{14}H_{22}N_2O.HCl$
- Molecular Mass: 234.34
-IUPAC Name: Acetamide, 2-(diethylamino)-*N*-(2,6-dimethylphenyl)-2-(diethylamino)-2'6'-acetoxylidine (CAS 137-58-6)

1.2.1.1 Structural Formula

LIDOCAINE



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2. INFORMATION ABOUT COMPOSITION ELEMENTS

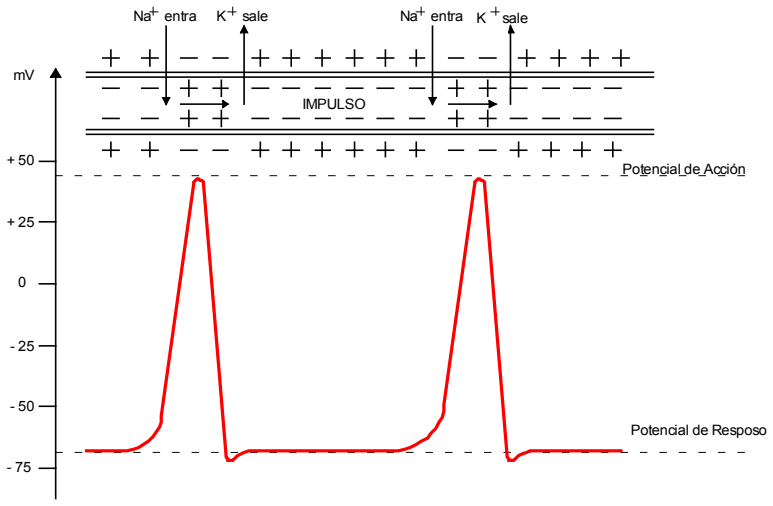
Each dental cartridge contains	
Lidocaine HCl	0.036 g
Excipients	q.s.a.d 1.8 mL

3. PROPERTIES OF THIS PRODUCT

Lidocaine is an amide-type local anesthetic used in dentistry. To exert its local anesthetic action, Lidocaine stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of nerve impulses (See Figure 1). Lidocaine has a rapid, deep, and extensive anesthetic action and is well tolerated by patients. It allows the dentist to work with the full confidence that the patient will not have a slight pain, even in delicate dental procedures such as preparation of stumps in live teeth, pulpectomies, and surgical treatment of periodontitis.

Figure N° 1

Changes in polarity and action potential in the conduction of impulses by a nervous fiber



The anesthetic action of Lidocaine is more than two times greater than that of Procaine. In equal concentration, the intensity of the anesthetic effect of Lidocaine as well the area in which it exerts its action is two times greater than those of Procaine. Due to its amino amide chemical structure which makes it so different than the

structure of Procaine and other related-local anesthetics, Lidocaine can be the right anesthetic for those people who are sensitive to Procaine. Lidocaine is completely atoxic and adverse drug reactions (ADRs) are rare when lidocaine is used as a local anesthetic and is administered correctly.

3.1 METABOLISM

Approximately 90% of Lidocaine is metabolized in the liver and is eliminated in the form of various metabolites through the kidneys. Only 10% of this substance is excreted without alteration. The average time of this drug and its metabolites in the human body is longer in patients with cardiac failure, myocardial infarction, and hepatic failure.

4. USAGE AND APPLICATIONS

Lidocaine 2% is a local anesthetic that is suitable for infiltration and nerve block anesthesia in dental procedures. It can be used in those cases in which the use of a local anesthetic associated to a vasoconstrictor is contra-indicated.

4.1 WARNINGS

Facilities for resuscitation should be immediately available when administering local anesthetics, in order to provide good aeration and ventilation in case of possible toxic reactions.

Intravascular injections of small doses of local anesthetics into the head and the neck may produce systemic adverse reactions similar to those observed in cases of accidental intravascular injections at higher doses.

In patients with acidosis or hypoxia, the risk and severity of toxic reactions may be increased. Such reactions involve the Nervous Central System (CNS) and the Cardiovascular System. Local anesthetics must be used with caution in patients with anemia, severe cardiovascular diseases or circulatory dysfunctions of any kind. The effect of local anesthetics may be reduced if the injection is made into an inflamed or abscessed area.

4.2 PRECAUTIONS

Crossed sensitivity and /or other related problems are rare when amide-type local anesthetics are used.

Amide-type local anesthetics are metabolized in the liver. This is why these anesthetics must be used with caution in patients with hepatic failure.

4.3 CONTRA-INDICATIONS

Local anesthetics should be avoided in cases of regional ischemia, hepatic failure, renal disease or hypersensitivity to lidocaine.

Lidocaine is contra-indicated in those patients suffering from known hypersensitivity to all amide-type local anesthetics and also in case of shock or heart block.

To obtain local anesthesia, Lidocaine should not be injected into an inflamed or infected area. Lidocaine is not intended for use intravenously in patients with Stokes-Adams Syndrome or severe second or third degree intra-ventricular, atrio-ventricular or sinoatrial heart block.

Excessive doses of this local anesthetic may lead to high blood plasma concentrations followed by depression of the cardiovascular system (hypotension, bradycardia, arrhythmias, unusual paleness, increased perspiration and/or cardiac arrest), toxicity of the Central Nervous System (blurred or double vision, confusion, convulsions, dizziness or daze, sensations of heat/cold, shiver, anxiety, excitation, nervousness or restlessness).

4.4 ADVERSE DRUG REACTIONS

Adverse drug reactions (ADRs) are rare when **Lidocaine 2%** is used as a local anesthetic and is employed in the prescribed dosage in dental procedures. If some adverse reactions appear, they have similar characteristics to those produced by other local anesthetics.

Adverse reactions are generally produced by high blood plasma concentrations caused by excessive doses, fast or inadvertent intravascular injections or may be due to an idiosyncratic hypersensitivity or a diminished tolerance to local anesthetics on the part of the patient. Usually, a stimulation of the Central Nervous System **(CNS)** does not appear before depression of this system.

CNS reactions: may be excitatory and/or depressant and may manifest as nervousness, dizziness, blurred vision, tremor, followed by discomfort, convulsions,

unconsciousness, and possible respiratory arrest. Cardiovascular reactions are depressant and may manifest as hypotension, myocardial depression, bradycardia, and cardiac arrest.

Allergic reactions are rare. They may be characterized by late cutaneous lesions, urticaria, edema or other anaphylactoid reactions. They can also produce tingling and numbness of lips and mouth (also known as circumoral paraesthesia).

4.5TREATMENT IN CASE OF OVERDOSAGE

The following will be the management of local anesthetic emergencies in case of overdose:

Lie the patient face up; lift the patient's legs up (30°- 45°) from his/her resting-position; if ventilation is not adequate, provide assisted or controlled ventilation with oxygen if possible.

If the pulse rate of patient is low (<40) or not shown, standard cardiopulmonary resuscitation procedures should be instituted, for example, an external cardiac massage. If the patient is unconscious and /or the ventilation is inadequate in spite of the afore-mentioned supportive measures, begin a treatment of convulsions and apply mechanic ventilation.

Convulsions: The first step in the management of convulsions consists of immediate attention to the maintenance of a patent airway and assisted or controlled ventilation with oxygen in order to stop convulsions. Should convulsions persist despite adequate ventilatory support, small increments of a benzodiazepine (such as diazepam, 25 mg, increased) or an ultra short-acting barbiturate (such as. Sodium Thiopental (50-100 mg, increased) every 2 or 3 minutes may be administered intravenously in order to stop

convulsion. Barbiturates may lead to a circulatory depression when injected intravenously. Supportive treatment of circulatory depression may require administration of intravenous fluids and, when appropriate, a vasopressor (e.g., ephedrine), as directed by the clinical situation.

This treatment may also involve the risk of respiratory depression. Facilities for providing or controlling mechanical ventilation should be available.

Neuromuscular blockers can also be used to decrease persistent convulsions. Artificial respiration is compulsory when using neuromuscular blockers.

Methemoglobinemia: If methemoglobinemia does not stop after applying adequate oxygenation, an intravenous injection of a solution at 1% of methylene blue (1-2 mg per kg of body weight (mg/kg) for a period of 5 minutes is suggested.

Allergic reactions to the local anesthetic lidocaine such as cutaneous lesions, urticaria, edema or other anaphylactoid reactions are **rare**. If they occur, they may be treated with conventional therapy.

4.6DRUG INTERACTIONS

Interactions of Lidocaine with anti-arrhythmic agents may result in addictive or antagonistic effects, but its toxic effects are always addictive. With anticonvulsants of the Hidantoine group, Lidocaine causes heart depression and is metabolized more rapidly.

The use of adrenergic beta-blockers may increase the toxicity of Lidocaine. The use of cimetidine may increase the levels of Lidocaine in the blood plasma.

The effects of adrenergic beta-blockers may be increased it these agents are used simultaneously with Lidocaine.

The use of Lidocaine can interfere with certain lab tests: Bentiromide test results may be altered; Cimetidine-phosphokinase (cpk) test values may increase in case of intramuscular injections of lidocaine.

Lidocaine effects may antagonize the effect of anti-myasthenic agents on skeletal musculature, especially in high doses.

4.7 DRUG INCOMPATIBILITIES

Lidocaine hydrochloride associated with amphoterizine causes precipitation, and is occasionally incompatible (depending on the pH and the vehicle) with ampicillin sodium.

No incompatibilities of Lidocaine with food have been found.

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5. QUALITY ASSURANCE AND CONTROL

Lidocaine 2% is manufactured under the most strict technical and quality controls. Its manufacturing process is carried out in special manufacture areas with environmental, microbiological, and operational controls made by specially trained employees. Raw materials used in this product are previously examined and approved according to requirements of pharmacopeias currently into effect.

The control process includes the control of Blister Packing and secondary packaging materials. All raw materials are furnished by qualified providers.

The product Lidocaine 2% conforms to all requirements established for this product by current pharmacopeias and regulating agencies. These specifications include appearance of product, physical properties, contents of active ingredients, and microbiological controls. All these parameters are verified during the different steps of the manufacturing process with the use of high technology equipment, standardized procedures, areas for special analysis, and specially trained employees.

6. INSTRUCTIONS FOR USE

Lidocaine 2% (20 mg/ml; 36 mg/1.8 ml) in:

Adult Patients: The maximum dose for healthy adults should not exceed 6.6 mg/kg of body weight or 300 mg per dental procedure.

Pediatric Patients: Pediatric doses must be established according to each individual by the dental professional, according to the patient's age and weight.

If the purpose is to administer this local anesthetic to pediatric patients in concentrations that are lower than the existing commercial concentrations, we advise to proceed as follows:

Dilute the commercial concentration in the amount of sodium chloride at 9% that is necessary to obtain the final concentration of the local anesthetic that will be injected.

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The dentist should use the lowest dose of the anesthetic solution that can provide the desired anesthetic effect. The patient should be carefully monitored for possible adverse reactions.

Special cases to be taken into account:

Injections into Infected Areas:

The buffer capacity of tissues will normally cause a stabilization of pH at the level of the tissue. Injections into infected areas will sometimes result in incomplete anesthesia because the infected focus produces residual acids that normally reduce the buffer capacity of tissues. An acid pH will reduce the anesthetic power of an injected solution.

Anatomic Variations:

In some patients, injections may fail due to a deviated position of the nerve or to an exceptionally thick and compact bone that constitutes a barrier for the diffusion and will make an injection through infiltration technique less effective.

Intravenous Injections:

If all or the most part of the anesthetic solution is injected intravascularly, there will be a poor anesthetic effect or not at all. Some adverse sympathomimetic effects (tachycardia, hypertension) as well an increase of the characteristic toxicity of the local anesthetic may occur.

Very Rapid Injections:

Excessive pressure during an injection may cause local irritation and postoperative pains. A very rapid injection may also cause necrosis of palate tissues due to the firmness of the ligament on the bone.

Disinfection of cartridges.

Local anesthetic cartridges must not be submerged in solutions made of anticorrosive tablets or in solutions of quaternary ammonium salts such as benzalkonium chloride. Some metal ions (e.g. mercury, zinc, cupper) are contained in disinfectant solutions and may be the cause of inflammations after anesthetic procedures. This is why local anesthetic cartridges should not be submerged into these solutions.

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For the chemical disinfection of the cartridge surface, it is advisable to use isopropylic alcohol at 91% or ethylic alcohol at 70% without denaturalizing agents. Solutions which contain heavy metals are not recommended.

Lidocaine 2% should not be used if the solution contains a precipitate.

Any amount of anesthetic solution that remains in the cartridge must be discarded.

7. COMMERCIAL PRESENTATIONS OF THIS PRODUCT

The anesthetic product **Lidocaine 2%** is marketed in the following commercial packaging:

Primary Packaging:

Glass Cartridges: Cylindrical ampoules made of type I- glass (Borosilicate glass).
Plastic Cartridges: Cylindrical ampoules made of virgin polypropylene.

Both types of commercial primary packaging have the same sliding plug and top cap: Natural-rubber plug and metallic top cap with diaphragm (aluminium and natural rubber)

Secondary Packaging:

Two types of commercial secondary packaging are available:

Blister in cardboard box per 50 cartridges.
Plastic Box per 50 cartridges.

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8. EXPIRATION DATE

Three (3) years.

9. STORAGE AND CONSERVATION MEASURES

The injectable anesthetic **Lidocaine 2%** must be stored in dry and cool areas. It should be stored at a temperature below 30º C. (111,6°F).