What is Iontophoresis?

The Greek ion or Iontos refers to an atom having negative or a positive charge as a results of the loss or gain one or more electrons. Phoresis refers to being carried. A direct electric current provides the electromotive force to move the ionized particle of the drug past the barrier of the skin and into the deeper layer tissue. The route of entry is through the pores, the sweat glands, and the hair follicles. In addition, the overall resistance of the skin will decrease somewhat under the influence of electricity, allowing further passive passage of the drug into the dermal layer.

The Device

An iontophoresis device consists of:

- An microprocessor controlled.
- A low voltage direct current generator, the power source it runs on a single 9-volt alkaline battery.
- Lead wires consisting of a positive lead and a negative lead. One unit has dual channel capacity, enabling treatment of 2 different sites at once. (2 channel device- allow to treat 2 different sites or use drug solutions of different polarities at the same time)
- Electrodes, consisting a buffered drug containment electrode for delivery of the drug.

How it works

Iontophoresis is a no-invasive drug system. By applying a low-level electrical current to a similarly charged drug solution, Iontophoresis repels the drug ions through the skin to the underlying tissue. In contrast to passive transdermal patch drug delivery, iontophoresis is active (electrical driven) method that allows the delivery of water-soluble ionic drugs that are not effectively absorbed through the skin. One of the patch’s gel reservoirs is prefilled with a drug. Drugs with a positive charge are placed in positive reservoir. When the patch is applied to the skin, the preprogrammed microprocessor and battery indicate an electric current between the electrodes. An ion exchange between the electrode and the drugs forces the drug into the skin. An opposite reaction at the return electrode completes the electrical circuit. The range of drugs that can be delivered transdermally is greatly expanded. Iontophoresis has the capability of delivering up to 50mg (under 500 mol w) per day of small drug such as: lidocain, a topical anesthetic- and larger drugs such as: peptides with a 3500 mol w.

Benefits of Iontophoresis

The risk of infection is reduced because it’s non-invasive. Drug solutions are delivered directly to the treatment sites without the disadvantages of injections or orally administered drugs. It provides pain-free for patients who are reluctant or unable to receive injections. It minimizes the potential for further tissue trauma that can occur with increased pressure from a fluid bolus injection. Drug dosage is accurately controlled by controlling the quantity of electrical current used to transfer the drug.

References:

http://www.unipr.it/arpa/dipfarm/erasmus/erasm14.html
http://www.empi.com/b/b4_1.html
http://www.dcu.ie/~best/idd.htm