

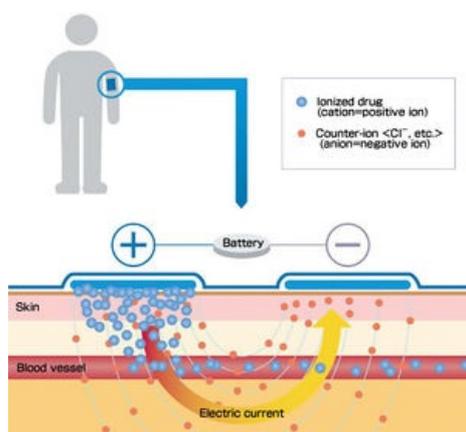
# Iontophoresis

Iontophoresis - phoresis (transfer) of ions (ions) - also called Electromotive Drug Administration is a technique which uses an electric current to deliver a medicine or other chemical through the skin (basically an injection without needle). This is not a new technique since 1900's has been sporadic used. Formally can be defined thus a non-invasive method of propelling high concentrations of a charged substance transdermally, (normally a medication or bioactive agent), by using a small electrical charge applied to an iontophoretic chamber containing a same (positively or negatively ) charged active agent and vehicle.

## Principle of iontophoresis

It is a non-invasive method of propelling high concentrations of a charged substance (normally a drug), by using a small electrical charge applied to a Iontophoretic chamber containing a charged active agent and vehicle. In a typical Iontophoretic drug delivery system we can find an anode (a positively charged chamber) a cathode (a negatively charged chamber) and two reservoirs, one that has the drug (the active agent) and another one containing bio compatible salts (the vehicle) however both the active agent and the salt have to have the same (positively or negatively) charge as the chamber they are in. We can distinguish two types of Iontophoresis according to the charge of ion to be delivered the anodal and cathodal Iontophoresis. In anodal Iontophoresis the cationic therapeutic agents and the salts are placed under the anode in the desired site on the skin while the cathode is placed somewhere else on the skin while in cathodal Iontophoresis they are placed in the opposite way. Only one electrode must be filled with therapeutic agents and the suitable salts. The electrode with the drugs and the salts is called the active agent, while the other one is called the return electrode. When a low voltage current is applied in the chamber with the contents and once they all have the same charge they will repel into the skin by the pores. Then the bio compatible salt will pass to the opposite electrode forming the electric current direction and the drugs will pass trans dermal (Fig.1). The number of ions that penetrate are directly proportional to the applied current, as we are applying the charge the skin permeability will increase and the ions will easily and easily migrate into the epidermis.

Fig.1



## Advantages of iontophoresis

### When compared with injections

- Less pain and no invasion.
- Minimizes the needle accidents.
- Allows the drug delivery by only skin contact.
- Can be used outside hospital

### When compared to pills

- Minimizes the on-set time.
- Secondary effects alleviation.
- Through this process, it is possible to delivery the drugs would be lose their potency and efficacy in the digestive organs.

### When compared to patches (adhesives)

- Shortens the on-set time.
- Drugs can be delivered quantitatively.
- Reduces the residual drug amount.

## Contraindications for iontophoresis

Contraindications for iontophoresis are important in patients with higher susceptibility to applied currents. Such patients include those carrying electrically-sensitive implants like cardiac pacemakers, those who are hypersensitive to the drug to be applied or those with broken or damaged skin surfaces.

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### **Bibliography**

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