DO YOU REALLY KNOW IONTOPHORESIS?

SEE IF YOU CAN YOU ANSWER THESE BASIC QUESTIONS?

1. What is Iontophoresis? What are the alternatives to Iontophoresis?
   - Iontophoresis is an active transdermal drug delivery system that delivers ions of a chosen drug (medication) through the skin using an electric current. The alternatives to Iontophoresis are injections, oral medications and passive transdermal.

2. Can we deliver all drugs by Iontophoresis? What determines whether a drug can be delivered by Iontophoresis?
   - No, we cannot deliver all drugs using Iontophoresis. The drug must be water soluble, ionized and with a molecular weight small enough to be transported across the skin.

3. What medication has the FDA clear for Iontophoresis delivery?
   - The FDA has approved the use of IONTOCAINE® (IOMED’s 2% Lidocaine HCl with epinephrine 1:100,000 Topical Solution) for dermal anesthesia.

4. What are the benefits of Iontophoresis over other routes of administration, such as bolus injection, oral medications and transdermal?
   - The benefits of using Iontophoresis over:
     - bolus injections are that it is non-invasive, virtually painless and it is localized without causing adverse reactions (e.g. tissue necrosis, tendon rupture, etc.).
     - oral medications is that the medication is delivered at a specific site; therefore, eliminating systemic side effects.
     - transdermal is that medication can be delivered more quickly.

5. Are we delivering the same therapeutic dosage with Iontophoresis as an injection? Is the therapeutic result the same? Why?
   - No, we are not delivering the same dosage using Iontophoresis as an injection; we are delivering a dosage that is less than 1% of an injection. The therapeutic result is the same in most cases, since range of therapeutic concentration is wide (see Bar Chart).

6. What is the effective delivery depth by using Iontophoresis?
   - The maximum delivery depth as shown in Glass, et al. article was 1.7cm (approximate range of 1 to 2cm).

7. Does the drug delivered by Iontophoresis disperse through tissues the same way as a bolus injection? How does this effect the treatment?
   - No, the drug does not disperse through the tissues the same way using Iontophoresis as a bolus injection. A bolus of water is dispersed throughout tissue quickly by absorption of water in the drug. If a suspension is injected, the crystal of the drug will stay at the injection site for weeks. When a drug is delivered using Iontophoresis, the ions are picked up by local blood flow, move a short distance before being picked up by white blood cells.
8. Are there side effects from injecting a drug? Do these side effects occur using iontophoresis? If these side effects do not happen with iontophoresis, why not?
   • Yes, there are side effects from injecting a drug. No, the side effects that occur with injecting a drug do not occur using iontophoresis. These side effects do not happen when using iontophoresis because iontophoresis delivers less than an injection (see Bar Chart).

9. What treatment modalities should you not use before an iontophoresis treatment? Why not?
   • Ideally you should not use any treatment modalities before an iontophoresis treatment, especially ultrasound, since it changes normal impedance of skin and places foreign agents into skin that may be driven in further by iontophoresis causing side effects or adverse reactions. Other modalities that heat tissue and increase blood flow may reduce the effectiveness of iontophoresis.

10. What treatment modalities should you not use after an iontophoresis treatment? Why not?
    • Ideally you should not use any treatment modalities after an iontophoresis treatment, since it may reduce the effectiveness of iontophoresis.

11. Why should you carefully check the area you are about to treat before applying the electrodes? Should you shave an area with excessive hair?
    • Skin must be examined closely before iontophoresis to check for any breaks where current may concentrate. Shaving should never be done to remove hair at a treatment site. Clip excess hair with scissors only. This avoids creating small nicks or cuts where current could concentrate.

12. How many treatments are usually given with iontophoresis? Are there a maximum number of treatments allowed? How often should you treat the patient?
    • With classic cases, usually three (3) to six (6) treatments are given. There is no maximum number of treatments allowed. Iontophoresis can be given repeatedly if symptoms recur. Ideally patients can be treated every other day, however, if there is no significant skin irritation and it is convenient, patients may be treated every day if necessary. Some drugs require a day or two to exert their full effect.

13. Why does iontophoresis deliver a higher localized concentration of drug than oral NSAIDs, but produce none of the gastrointestinal and systemic side effects normally associated with NSAIDs?
    • Iontophoresis does not produce the GI side effects of NSAIDs, since the drugs are different and the iontophoretically delivered drug does not go systemic or reach the GI tract. Oral NSAIDs are dispensed throughout the entire body thus only a small amount reaches the target site.

14. Is iontophoresis of a water-soluble anesthetic effective for a nerve block? Why or why not? What is the effective depth of anesthesia by iontophoresis?
    • Iontophoresis of a water-soluble anesthetic is not effective for a nerve block because it does not penetrate deeply enough and in a high enough concentration to do effective nerve blocks.
15. How long does anesthesia last, following anesthetic delivery by iontophoresis? Are there ways to lengthen the time of anesthesia and what is the result?

- Iontophoretic delivery of anesthesia can last for 5 to 20 minutes. Adding a vasoconstrictor, such as epinephrine, which can lengthen the duration to approximately 90 minutes, can lengthen the duration of anesthesia.

16. Manufacturers make different sizes of electrodes. Do larger electrodes deliver more or less drug than smaller electrodes? Are larger electrodes more or less clinically effective than smaller electrodes? Does the effective delivery depth of the drug change with larger sizes?

- Electrode size or fill volume does not determine how much drug is delivered. The primary factor effecting drug delivery is the total milliamp-minute dosage delivered. Larger electrodes merely spread the same dose of drug over a larger area making it more likely that the exact treatment area will receive drug. Smaller electrodes merely make it easier to do iontophoresis on smaller sites (e.g. fingers, toes, etc.). Technically, larger electrodes deliver the drug to the same depth during a treatment if the same mA-min dosage is used (approximately 5 mm plus or minus). However, if the density of the drug in the skin is reduced below a certain point because an electrode is too large, the drug may not have the desired therapeutic effect. This is most easily understood and demonstrated with local anesthetics. All IOMED TransQ® electrodes are sized so that the proper concentration of drug is reached in the tissue if the recommended mA-min dosages are used.

17. What are the side effects of iontophoresis? How can these side effects be minimized?

- Minor skin erythema under both electrodes; mild tingling or stinging sensation during treatment; some patients who are sensitive to DC will show small white bumps like hives after treatment under the drug electrode due to histamine release from stimulated mast cells in skin (not a burn) – this should disappear in approximately 1 hour or less. With TMJ treatment, some minor transient dizziness during ramp up/down due to stimulation of parotid salivary glands. Normal side effects are minimized by cleaning skin thoroughly with alcohol wipe, using properly formulated injectable USP drugs, no shaving, taping, binding or compressing of electrodes and no pretreatment of skin with heat or ultrasound.

18. Does iontophoresis of water-soluble drugs require a prescription? Can a Physical Therapist buy the drugs without a prescription?

- Yes, iontophoresis of water-soluble drugs requires a prescription. Clinicians should follow regulations in their state.

19. Who can inject patients with inflammatory conditions? Who can administer an iontophoretic procedure?

- Physicians, including Osteopaths and Podiatrists, can inject patients with inflammatory conditions. Iontophoretic procedures can be administered by physicians plus properly trained allied health professionals (e.g. PTs, OTs, RNs, LPNs and ATCs).

20. Why is iontophoresis more cost effective than the alternatives?

- Iontophoresis is more cost effective than alternative physical therapy modalities, primarily because it requires so much less of the clinician’s time. Also, it has been shown to be effective with only a few treatments. Other modalities frequently require more sessions to be therapeutic. It has fewer risks than injections and works much more quickly than for example, a two (2) to three (3) week course of NSAIDs.