

A Simple User-made Iontophoresis Device for Palmoplantar Hyperhidrosis

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ABSTRACT

Iontophoresis is defined as passing of an ionized substance through intact skin by application of direct electric current. Tap water iontophoresis is reliable and effective method for treatment of palmar and plantar hyperhidrosis when practiced with appropriate technique and timing. One of the major setback for using iontophoresis is that the apparatus is expensive and is not readily available. A simple user-made Iontophoresis device have been described here, which could be easily constructed and used at home.

KEYWORDS: Hyperhidrosis, hyperhidrosis treatments, iontophoresis, palmar hyperhidrosis, plantar hyperhidrosis, palmoplantar hyperhidrosis, excessive sweating

PROBLEM

A 23-year-old engineering graduate presented with primary palmoplantar hyperhidrosis, for which he was advised an alternate day schedule of tap water iontophoresis.

SOLUTION

On his next visit, he presented with a very simple iontophoresis device that he devised on his own. The device was constructed with a rechargeable 12 Volt battery, two aluminum trays and copper wires, and connecting clamps [Figure 1]. He reported that iontophoresis devices were not easily available and were expensive. Hence, using his engineering background he constructed this simple device based on basic mechanism behind iontophoresis. He followed an alternate day schedule of 20 min utes immersion for initial 4 weeks, followed by once a week for next 8 weeks. He achieved an excellent reduction in palmoplantar sweating without any adverse effect,

within 3 months of starting iontophoresis.

DISCUSSION

Iontophoresis is defined as passing of an ionized substance through intact skin by application of direct current (DC).^[1] Tap water iontophoresis is a reliable and effective method for the treatment of palmar and plantar hyperhidrosis, when practiced with appropriate technique and timing.^[1] Many dermatologists consider simple tap water iontophoresis to be first line therapy for primary focal palmar and plantar hyperhidrosis.^[2] The mechanism of production of anhidrosis is not completely understood; however, obstruction of sweat duct has been suggested as a possible cause.^[3,4]

Few brands of iontophoresis devices are commercially available; however, they are expensive and are not readily available. Commercially available iontophoresis

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Figure 1: A simple user-made iontophoresis device

devices either work by converting alternating current to DC or are battery operated.

Construction of an iontophoresis device has been described by Levit,^[5] in which output of the 115 volt Isolation Transformer is rectified by the full wave selenium rectifier and then filtered by the choke and capacitors, and the potentiometer acts as a voltage divider. Levit had suggested that such devices can be constructed at home, and circuit diagram could be found in his original report,^[5] but we feel that the procedure for assembling such a device will be difficult for a layperson.

For tap water iontophoresis, patients are instructed to apply petroleum jelly with a cotton swab to cover any cuts over the treated area before the session. The trays should be filled with tap water, then, the affected areas should be immersed in the tap water. A Monday–Wednesday–Friday schedule should be followed until the condition improves; subsequently, the treatment should be tapered once a week for 8 weeks and then once a month for maintenance.^[2] The trays should be placed over a nonconductive material such as wood. Additionally, the patient should wear rubber or plastic footwear and should keep himself from directly touching the floor.

Burning and pin pricking sensations are very common and may be felt by all the treated patients.^[6] Dryness, cracking, erythema, and vesiculation have been reported due to iontophoresis.^[6] Erythema and vesiculation are transient; topical corticosteroids cream can be applied for persistent erythema and vesiculation.^[2] Pregnant women, people with pacemaker or metal implants, cardiac conditions, or epilepsy are contradictions for the use of iontophoresis machine.^[1] Once a home device is obtained and the patient has received adequate education and training, the maintenance cost and effort are minimal for the patient and health care provider alike.^[1]

Iontophoresis machines basically produce a voltage sufficient to drive a DC of 15-20 mA through the hands of patients.^[5] An ampere-meter could be used to measure the output current of such user-made devices and can upgrade the voltage of the battery, provided the output is low in terms of current. Simple user-made devices such as this one would make the process of iontophoresis very easy, safe, and cost-effective.

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Conflicts of interest

There are no conflicts of interest.

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