

# Treatment of Hyperhidrosis by Tap Water Iontophoresis

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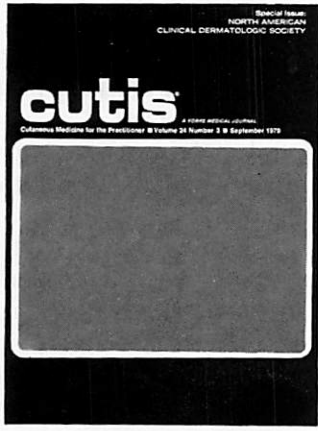
Fred Levit, MD, Chicago, Illinois



The treatment of hyperhidrosis by tap water iontophoresis is a simple, effective, and safe procedure. It is performed in the office and requires no special equipment. The patient is seated at a table and the hands are placed in a tray containing tap water. A low-voltage electrical current is passed through the water and the hands, which causes the sweat glands to be temporarily paralyzed. The treatment is usually performed once or twice a week for several weeks. The results are usually long-lasting and the procedure is well-tolerated by most patients.

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A patient with hyperhidrosis of the hands is treated by tap water iontophoresis. The patient is seated at a table and the hands are placed in a tray containing tap water. A low-voltage electrical current is passed through the water and the hands, which causes the sweat glands to be temporarily paralyzed. The treatment is usually performed once or twice a week for several weeks. The results are usually long-lasting and the procedure is well-tolerated by most patients.



Reprinted from **cutis** August Issue

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# Treatment of Hyperhidrosis by Tap Water Iontophoresis

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Iontophoresis has been demonstrated to be an effective treatment for hyperhidrosis. The technique is simple and can be used in the practitioner's office. Once patients are euhidrotic, they can be taught to give the treatments to themselves, and the iontophoresis therapy can be continued at home.

A number of recent publications have confirmed the effectiveness of iontophoresis, using tap water or water with added medications, in the treatment of hyperhidrosis of the palms and soles.<sup>1-4</sup> Nonetheless, the method is not widely used. This may be understood at least in part by the lack of sufficiently explicit details explaining the method of treatment. In this paper details of the method will be presented which should enable any physician to use it. The method described herein uses tap water without any added medications. This is done both to avoid the side effects noted with added anticholinergics and because the tap water alone has been found to be effective.

The treatment consists of passing a direct current through the skin of sufficient magnitude and duration to obstruct the sweat ducts. In the United States a Food and Drug Administration approved device, such as the R.A. Fischer galvanic generator (Figure 1) should be used as the source of current, although a similar device can easily be constructed.<sup>5</sup> The device used must be able to produce about 90 volts so as to drive a current of up to 20 milliamperes through the skin. The current is delivered to the skin while the hands or feet are immersed in a pair of pans, each of which has an electrode which is also in the water.

The electrode pans are easily made from photographer's plastic developing trays. The 11 by 14 inch size is most suitable. A hole is punched or drilled

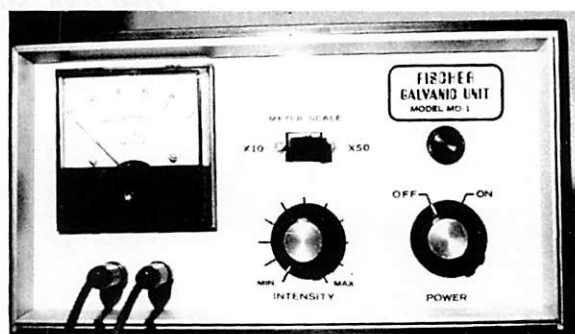


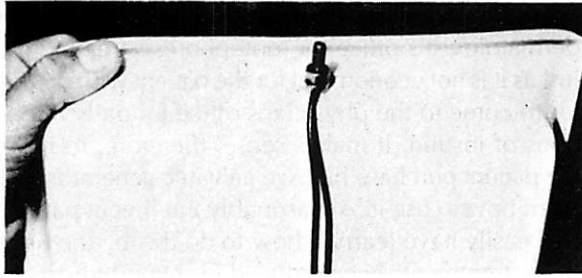
Figure 1. A commercial direct current generator suitable for iontophoresis.

through the end of the tray just above the bottom. A quarter inch metal bolt with a nut threaded tightly against its head is pushed through the hole from the inside of the tray and another nut is then screwed down against the outside of the tray. A third nut then serves to clamp the wire from the galvanic generator to the bolt, which now serves as the electrode (Figure 2). Metal pans should not be used, because if they contact each other they will short circuit the output of the galvanic generator and thus cause a shock.

The set-up for giving a treatment is as follows:

1. Enough tap water is placed in the pans so that when the patient's hands are placed therein the water will come about half way up the side of the hands.
2. One end of each electrode wire is firmly connected to the bolt on a pan and the other end plugged into the receptacle on the generator.
3. The intensity control on the generator is turned to the minimum position and the generator is plugged in and switched on.
4. The patient's hands are inspected for scratches, cuts, or hangnails and any which are found are covered with a smear of petroleum jelly. Then, the hands are placed in the pans with the fingers pointing toward the electrode and the heel of the hand pulled

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**Figure 2.** The plastic photographers tray with the wire from the DC generator connected to the bolt which serves as the electrode.

toward the end of the pan away from the electrode (Figure 3).

The patient should be standing or seated comfortably, since the treatment takes twenty minutes. If the feet are to be treated then they are placed in the pans, which can be put on the floor. If this is done, care should be taken that the electrode wires are not stretched and will not be accidentally pulled out of the generator.

The treatment is administered by gradually turning up the intensity control while watching the milliammeter. The patient should be asked to inform you when a tingling sensation is felt and when or if it becomes uncomfortable. When the patient reports that the sensation is uncomfortable (the control is then turned back slightly) or when a current of 20 milliamperes is being delivered without discomfort, the timing of the treatment is begun. The current is passed through the hands in this direction for ten minutes. Then the intensity control is slowly turned down to the minimum position. The electrode wires are then unplugged from the generator and reversed so that the one formerly in the positive jack is now in the negative jack. The intensity control is again slowly raised and the treatment is continued for another ten minutes. The reason for reversing the terminals for the second half of the treatment is that the anode may possibly be more effective than the cathode in suppressing sweating, although this has been questioned.<sup>3</sup>

The following precautions should be taken:

1. Be sure that the electrode wires are firmly pressed into the jacks on the generator and that the other ends are firmly clamped under the nut at the pans. If the flow of current is suddenly interrupted by the wire falling off or becoming unplugged, the patient will receive a shock. This is uncomfortable but not dangerous. The patient should be instructed not to try to remove his hands from the pans while



**Figure 3.** The hand ready for treatment. Note that the water level is halfway up the side of the hand and the electrode is almost submerged.

the current is flowing since this will also result in a shock.

2. Cuts or scratches on the skin that is in the water must be covered with petroleum jelly. An uncomfortable stinging sensation will be felt in any open cut while the current is flowing. The petroleum jelly prevents the water from contacting the open surface and so prevents current from flowing through that area.

3. The intensity control must be at the minimum setting when the hands are placed in the pans. At the minimum setting there is no voltage difference between the pans and no current will flow. If the intensity control is turned up, a slight shock may be felt as the hands are inserted.

4. The intensity control should be turned up rather slowly after the hands are in the pans. It should take about ten seconds to be brought up to whatever level the patient will tolerate. If it is simply spun up the patient will get either an uncomfortable tingling or a slight shock. Similarly the control should be turned down slowly at the end of the treatment period.

5. At least for the first few treatments, the time of iontophoresis should be limited to twenty minutes. If necessary, and if the patient tolerates it well, twenty-five to thirty minutes can be used. If the time is too long or the current too great for a particular patient, then it is possible to produce some blistering at the waterline. It should be emphasized, however, that this occurrence is uncommon and with the 20 milliamp/twenty minute schedule it is unlikely to occur.

6. It would probably not be wise to treat a patient with a cardiac pacemaker. I am not aware that any-

one has ever done so, but the possibility of interfering with the functioning of the pacemaker exists. Similarly, the presence of a known cardiac arrhythmia is probably a contraindication to treatment. Of course, most of the patients with hyperhidrosis are usually healthy young adults in whom no contraindication exists and who tolerate the procedure casually. Children have also been treated, although they do not tolerate the same current levels as adults.<sup>4</sup>

Treatments should be repeated three or more times weekly, until a definite reduction in sweating becomes apparent. This may begin after two or three treatments or may take ten or more treatments. Most patients notice first that a stronger stimulus is needed to start the sweating. After a few more treatments, they notice that still stronger stimuli are required and that the amount of sweating is less after it has been initiated. Once a euhydrotic state has been approximated, it is possible to reduce the frequency of treatments. Initially, they are reduced to once a week, and then they are given only when the patient notices an increase in sweating again. Some patients can go as long as four to six weeks between treatments. Occasionally it is necessary to give several treatments spaced closer together, and then go back to the wider spacing.

It is possible to treat the axillae. A pad is made of either thick felt or a stack of gauze squares. The electrode wire must terminate in a square of metal which is held between two of the pads. The pads are saturated with water and placed against the axillae. The electrode must be kept from slipping from between the pads and they must be kept saturated during the treatment. Results of treating the axillae have been variable and not uniformly good.<sup>2,3</sup>

It is obvious that it is not economical for a patient

to have to spend the rest of his life coming to the dermatologist's office for iontophoresis treatments, just as it is not economical for the patient with diabetes to come to the physician's office for daily injections of insulin. It makes sense, therefore, to have the patient purchase his own galvanic generator and learn how to use it. A reasonably intelligent patient will easily have learned how to do this by the time office treatments have reduced his hyperhidrosis to acceptable levels if some effort is made at instructing him.

In giving himself iontophoresis treatments it is not possible to have both hands in the pans at the same time because it is necessary to manipulate the controls. Placing one of the pans on the floor enables the patient to treat one foot at the same time as one hand is treated. Doing the left foot and hand for ten minutes (reversing polarity at the end of five minutes) and then doing the right hand and foot in the same way is quite satisfactory. Some patients have had a spouse learn to give the treatments and this enables them to treat both hands at once. They are also able to give the treatments to themselves at whatever intervals and for whatever duration is needed.

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#### Announcement

The Third Annual Postgraduate Course and Workshop in Medical Mycology (Dermatomycology) will be held on September 15-17, 1980 at University of California, San Francisco, California. Enrollment for this program will be limited and is acceptable for Category 1 credit towards the American Medical Association Physician's Recognition Award and the Certification Program of the California Medical Association. For further information, please contact: Extended Programs in Medical Education, Room U-569, University of California, San Francisco, CA 94143, (415) 666-4251.