

Letters to the Editor

Dermatitis caused by electromagnetic radiation

Dear Sir

We read with interest the recent report of dermatitis caused by radio-frequency electromagnetic radiation (1). With increasing use of radio-frequency and electrical stimulation devices in all areas of medicine, we should become increasingly aware of this problem. We have recently seen a 77-year-old man, who developed dermatitis directly beneath the electrode for an Odstock dropped-foot stimulator (ODFS). This device acts to stimulate the common peroneal nerve to enable dorsiflexion of the foot in cases of dropped foot, which is timed using a foot switch worn in the shoe under the heel. After several weeks of successful use, he developed a florid dermatitis beneath the electrodes on the calf. Changing the brand of electrodes made no difference. He described the condition as occurring only when electrical current was being passed; the electrodes alone, whether new or used, did not cause dermatitis. The dermatitis was severe enough to prevent further use of this stimulator.

Patch tests with a plastics and glues series, as well as components of the electrodes, were entirely negative. There have been previous reports of patients reacting to various components of electrodes such as methacrylate (2), and propylene glycol in conductive gel. Clearly, our patient reacts to electrical current being passed through the skin, which is probably an irritant phenomenon similar to that

observed with iontophoresis (3). The primary mechanism of electric field interaction with the skin is the creation of aqueous pathways, which increase the permeability of the skin to ions and macromolecules (4).

Although this phenomenon has already been described with TENS, there are no previous reports of similar problems with foot stimulator devices.

Yours sincerely

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References

1. Strobos M A, Coenraads P J, De Jongste M J L, Ubels F L. Dermatitis caused by radiofrequency electromagnetic stimulation. *Contact Dermatitis* 2001; 44: 309.
2. Marren P, De Berker D, Powell S. Methacrylate sensitivity and TENS. *Contact Dermatitis* 1991; 25: 190.
3. Singh J, Gross M, Sage B, Davis H T, Maitach H I. Effect of saline iontophoresis on skin barrier function and cutaneous irritation in 4 ethnic groups. *Food and Chemical Toxicology* 2000; 38: 717-726.
4. Gowrishankar T R, Pliquett U, Weaver J C. Changes in skin structure and electrical properties following high voltage exposure. *Ann N Y Acad Sc* 1999; 888: 183-184.