

# Use of microwaves for axillary sweat control

Who is not concerned?

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Hyperhidrosis is a rare disease usually starting in childhood or adolescence, localized to axillae, extremities, the face or the trunk. The diagnosis can be made when sweating exceeds thermoregulatory needs, although the number of apocrine and eccrine glands is not increased (fig. 1). Quality of life and social activities are highly affected and patients seek therapies reducing the amount of sweat (1). For axillary disease, beside deodorants with aluminium salts, usually insufficient in this condition, many different therapeutic solutions have been proposed. Some of them were abandoned due to excessive side effects, toxicity or insufficient efficacy. This is the case for the topical glutaraldehyde therapy, which is obsolete, and oral medications such as beta-blockers.

Surgical techniques are still used and include axillary curettage of glands, endoscopic laser therapy, skin excisions. Sympathectomy is nowadays very rarely proposed.

Among non-surgical approaches for axillary hyperhidrosis, intradermal botulinum toxin injections achieve the most dramatic sweat reduction, but repetition is required (2). Deodorants with aluminium salts or lonthophoresis rarely produce satisfactory sweat control. Recently, microwave therapy for hyperhidrosis was presented as the first non-invasive therapy of axillary hyperhidrosis with definitive results (3). In early 2017,

it remains the only non-invasive FDA-cleared therapy in this indication.

## Microwaves in hyperhidrosis

The high affinity of microwaves for water allows a relatively selective heating of dermal and superficial hypodermal eccrine and apocrine glands. Shrinkage of glands is observed when dermal target temperature reaches at least 60 °C. Histology has shown a major long-term reduction in eccrine and apocrine gland density after only 1–2 treatment sessions.

The Miradry (Miramar laboratories, USA) device releases microwaves in a predetermined depth range with concomitant epidermal cooling in order to avoid superficial skin damage.

Combining superficial cooling and dermo-hypodermal heating, the device is able to reduce definitively unwanted body odor and excessive sweating in most patients. Sweat reduction exceeds 80 percent in most patients after 1–2 sessions. Unwanted body odor is controlled in almost all patients. Patient satisfaction is very high. Resistance to Miradry therapy occurs in 2–3 percent of patients and could result from unusual depth of sweat glands, exceeding the maximal treatment zone.

Tumescent local anesthesia is now applied before microwave therapy, allowing higher treatment parameters and less side effects than with the previous topical anesthetic schema with low anesthetic volumes. Immediately after therapy (fig. 2), major sweat reduction is observed. Side effects include 24–48 hours of pain and 1–2 weeks of swelling. Focal and regressive hyposensitivity in the treated area or in the surrounding skin can sometimes be present for 1–2 months. Transient bruising, crusts, and indurations have also been described.

Hair follicles are also targeted by microwaves, and hair reduction associated with therapy, reaching 70–80 percent decrease in hair density, is usually considered a very positive side effect. Microwaves are colour-blind and can therefore be used in all hair colours and diameters (4).

Axillary glands represent only 2 percent of total eccrine glands in the body, and their suppression

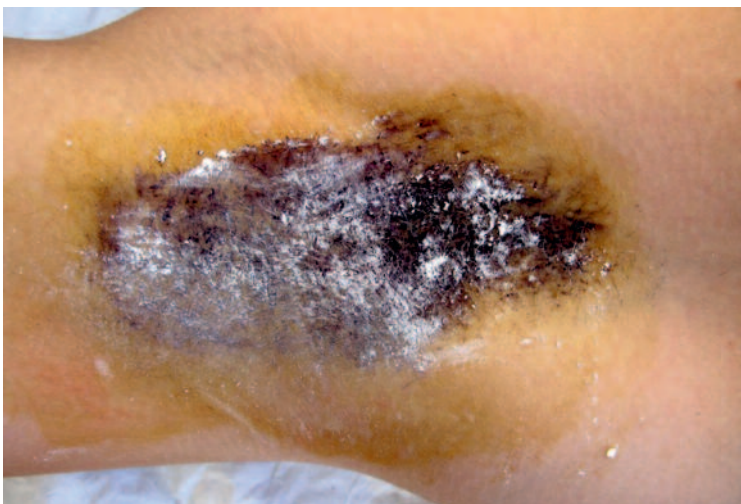


Figure 1: Starch iodine test (Minor test) revealing axillary hyperhidrosis when dark zones appear.

does not affect the thermoregulatory capacity. Until the end of 2016, over 70 000 treatments have been carried out worldwide, confirming the high safety and efficacy profile of this device.

Miradry was developed and first marketed in 2013 strictly for patients with axillary hyperhidrosis. However, when demonstration of efficacy, safety and reproducibility was confirmed in hyperhidrosis patients, the indication spectrum for the therapy became much larger, and the proportion of so-called lifestyle patients, undergoing the procedure just for social and comfort reasons, rose progressively.

Botulinum-toxin-refractory or -resistant patients are typically interested in a definitive sweat-reduction therapy with microwaves. Similarly, the controversy about potential carcinogenetic effects of aluminium particles in deodorants (5) increases population interest for alternative sweat-reduction therapies, particularly for the non-invasive category including microwaves.

Future perspectives for microwave therapy include development of higher treatment parameters, the advent of palmar hyperhidrosis management, and the extension of indications for other body sites. Microwave therapy for hair removal is also a growing demand, as both hair density and sweat production are targeted by this therapy.

In conclusion, microwave therapy for hyperhidrosis as well as lifestyle patients is a very effective, safe and promising therapy (6), allowing major reduction in unwanted body odors, sweat production, and hair density of axillae. Increased population knowledge about this new therapeutic option will probably stimulate a growing proportion of patients to consider this non-invasive therapy. ▲

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**Figure 2:** Treated axilla immediately after microwave therapy. Systematic coverage of sweat zones with little overlap is mandatory to avoid persistent sweat production. The treatment surface usually exceeds the hairy area because sweat glands are often localized also beyond the axillary hair zone.

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