

Microwave technology for the treatment of abdomen localized adiposity 9 months follow-up

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Dear Editor,

Microwaves (MWs) are one of the most recent non-invasive fat reduction technologies to emerge. Onda system (DEKA M.E.L.A, Florence, Italy) is an innovative microwave platform that takes advantage of microwaves' specific biological interaction with subcutaneous fat cells. It comes with two handpieces for selectively concentrating microwave heating in both deep and superficial subcutaneous tissues. An effective handpiece contact cooling system is used to further protect the surface layers of the

skin during microwave transmission. This system's technological features enable microwaves to be delivered effectively and safely providing localized adiposity,^{1,2} cellulite,^{3,4} and skin laxity treatments all in one device.^{2,5} The many studies that have been carried out up to now report the effectiveness of microwaves on various body areas (such as under the chin, arms, buttocks, abdomen) with a maximum follow-up of 3 months.^{2,4} In this preliminary study we wanted to evaluate a longer-term follow-up (9 months) to better evaluate the effects. For this reason, a retrospective study data was collected from a private medical aesthetic center in Bogotá between March 2019 and May 2022. Among patient older than 18 years treated for localized adiposity reduction using microwaves with a minimum of three sessions (range from 3 to 8 sessions), those who came to the follow-up visit 9 months after their last treatment were included in the study. The study group consisted of 7 females, aged between 31 and 60 years old. Before undergoing treatment with the Onda device, each patient was visited to assess his/her suitability and any possible medical contraindication to the procedure. Clinical evaluation and anthropometric data were collected by the treating physician (the same in all cases). Anthropometric measurements taken before and after treatment include: weight (kg), body mass index (BMI), abdominal circumference (cm), both superior and inferior abdominal skinfold measured with a body fat caliper (mm) taken by holding it firmly between the thumb and index fingers. Among the variables associated with the device: the type of handpiece used, the power and the emitted dose for each area. Each patient was asked not to submit to any food restriction or modification of their usual activities. Once the procedure was explained to the patient, a consent form was signed, a complete body photographic record was taken, and the previously described anthropometric parameters were measured on the treatment areas. The areas of interest were delimited, then divided into areas of 15×15 cm². Skinfold test results by area were introduced in the system that automatically selects the appropriate handpiece, *Deep* or *Shallow*, according to the value given by the body caliper (thickness >2 cm but <5.5 cm was identified to define treatment suitability). Power and/or dose, initially pre-established by the device, were used adding 20-30% in each session with a 5°C cooling, if the patient doesn't complain any discomfort. After cleaning with normal saline solution, a Vaseline layer was applied in the treatment area to obtain adequate contact between the handpiece and the skin, a better coupling, and greater fluidity of movement. The handpiece indicated by the device was used, keeping it perpendicular and in permanent contact with the skin, making soft continuous movements on each selected areas for at least 7-10 minutes to cover the zone completely and homogeneously. The interval between sessions was 20-45 days following the previously described procedure. 7 women were included in the study and treated on the abdominal area. Mean values at baseline and at 9-months follow-up were measured and analyzed using t-test, considering p<0.05 significant. Data are displayed in the Table 1.

The reduction of the abdominal circumference (from

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Informed consent: informed consent was obtained from all subjects involved in the study.

Data availability: data that support the study findings are available on request from the corresponding author.

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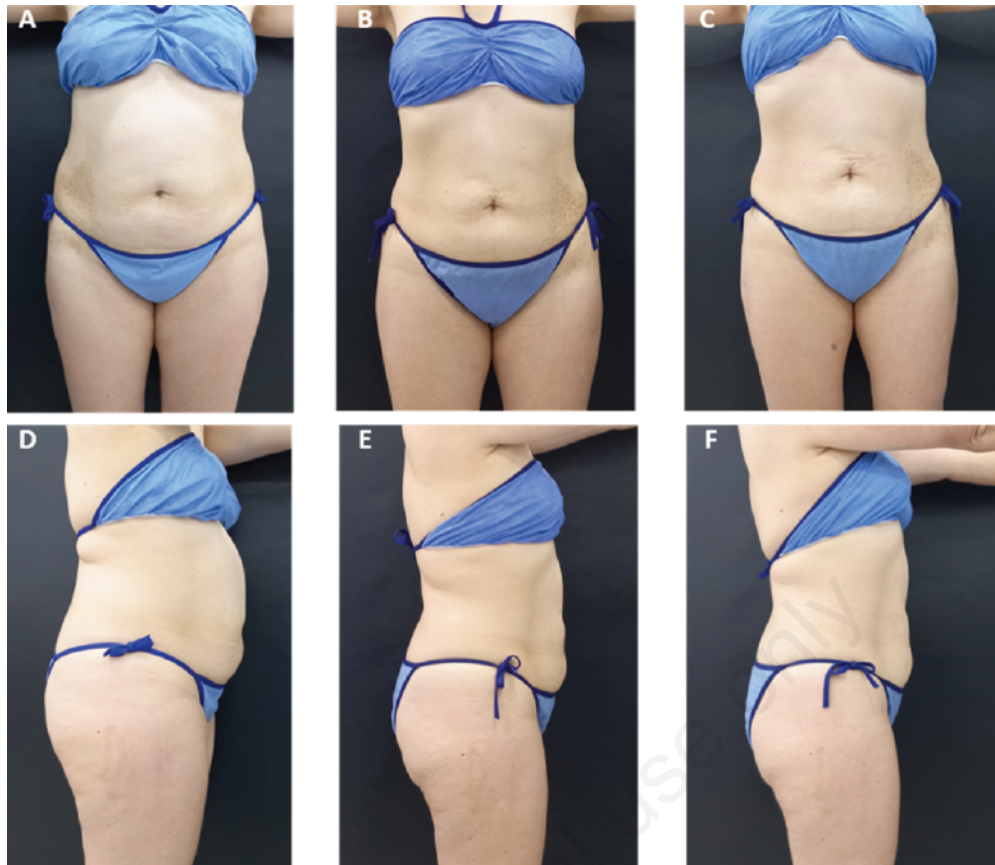


Figure 1. Abdominal frontal view of a female patient at baseline (A), 1 month follow up after the last Onda treatment session (B) and 9 months follow up after the last Onda treatment session (C). Abdominal lateral view of the same female patient at baseline (D), 1 month follow up after the last Onda treatment session (E) and 9 months follow up after the last Onda treatment session (F).

Table 1. Mean and standard deviation (SD) for the anthropometric measurements taken at baseline and 9 months after the last treatment.

	Baseline (mean±SD)	9-months follow-up (mean±SD)	p
Abdominal circumference, cm	94.43±12.03	81.71±4.35	<0.05
Superior abdominal skinfold, mm	29.57±12.30	20.57±10.80	<0.05
Inferior abdominal skinfold, mm	34.57±9.02	21.86±6.28	<0.01
Weight, kg	71.45±8.95	63.70±5.26	0.11
Body mass index	29.65±3.96	25.83±2.47	0.14

94.43±12.03 to 81.71±4.35) and of the abdominal skinfold both superior (from 29.57±12.30 to 20.57±10.80) and inferior (from 34.57±9.02 to 21.86±6.28) was statistically significant while for weight (from 71.45±8.95 to 63.70±5.26) and BMI (from 29.65±3.96 to 25.83±2.47) it is not. These results suggest that the reduction of localized adiposity obtained with microwaves is long-lasting if there is no significant weight gain. Photographic evaluation confirmed the abdominal reduction and the aesthetic improvement as shown in Figure 1. The microwaves act on the adipocytes bringing them into a condition of severe stress which causes their death. The increase and decrease in weight in this phase are mainly linked to the change in the volume of fat cells, not in their number.⁶ Therefore, if the weight and the BMI did not vary significantly from the baseline to the follow-up, while instead the abdominal circumference and the upper and lower abdominal

folks decreased, it is possible to think of a further confirmation of the action of the microwaves which lead to the reduction of number of adipocytes in a specific localized area. The presence of measurement biases that could alter the results were considered. A single previously calibrated measuring instrument was used, and participants' physical evaluation was made by a sole investigator. Further studies are needed to evaluate long term results in a larger sample of patients.

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