



## Dermatology Reports

<https://www.pagepress.org/journals/index.php/dr/index>

eISSN 2036-7406



**Publisher's Disclaimer.** E-publishing ahead of print is increasingly important for the rapid dissemination of science. **Dermatology Reports** is, therefore, E-publishing PDF files of an early version of manuscripts that undergone a regular peer review and have been accepted for publication, but have not been through the copyediting, typesetting, pagination and proofreading processes, which may lead to differences between this version and the final one.

The final version of the manuscript will then appear on a regular issue of the journal. E-publishing of this PDF file has been approved by the authors.

*Please cite this article as: Ruiz-Rosas AI, Ronconi L, Fusco I. Microwave technology for the treatment of abdomen localized adiposity 9 months follow-up. Dermatol Rep 2023 [Epub Ahead of Print] doi: 10.4081/dr.2023.9739.*

 © the Author(s), 2023  
Licensee PAGEPress, Italy

Note: The publisher is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries should be directed to the corresponding author for the article.

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article or claim that may be made by its manufacturer is not guaranteed or endorsed by the publisher.

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

Aura Ibeth Ruiz-Rosas<sup>1,2</sup> Lara Ronconi<sup>3</sup> Irene Fusco<sup>3</sup>

<sup>1</sup>Aesthetic Physician, Aesthetic Dermatology Service, Laser Medical Care Clinic, Bogotá, Colombia

<sup>2</sup>Professor of Dermatology, National University of Colombia, Bogotá, Colombia

<sup>3</sup>El.En. Group, Calenzano, Italy

**Correspondence:** Irene Fusco, El.En. Group, 50041 Calenzano, Italy.

(ORCID: 0000-0001-7264-8808)

Email: [i.fusco@deka.it](mailto:i.fusco@deka.it)

**Key words:** Body contouring; Microwave Technology; Abdomen Localized Adiposity; 9 Months Follow-up.

**Potential conflicts of interest:** L.R and I.F are employed at El.En. Group. The remaining authors have no conflicts of interest to declare.

**Author Contributions:** Conceptualization A.I.R-R; validation and data acquisition A.I.R-R; writing—original draft preparation L.R and I.F. writing review and editing L.R, I.F; supervision, A.I.R-R, L.R and I.F. All authors have read and agreed to the published version of the manuscript.

**Funding:** No funding was provided for this study.

**Data Availability Statement:** Data that support the study findings are available on request from the corresponding author (I.F)

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

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 [2,5] treatments all in one device. 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); 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 15x15 cm<sup>2</sup>. 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 > 2cm but < 5.5 cm were 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-values <0.05 significant. Data are displayed in the Table 1.

The reduction of the abdominal circumference (from 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 folds 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

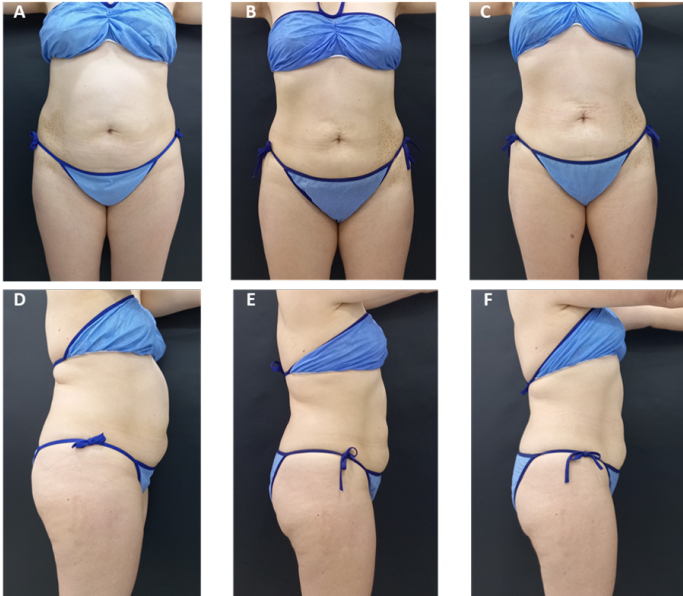
in a specific localized area. The presence of measurement biases that could alter the results were considered. A single previously calibrated measuring instrument was used, and participants' physical evaluation was made by a sole investigator. Further studies are needed to evaluate long term results in a larger sample of patients.

## **References**

1. Bonan P, Marini L, Lotti T. Microwaves in body sculpting: A prospective study. *Dermatol Ther.* 2019;32:e12782.
2. Salsi B, Fusco I. Non-invasive system delivering microwaves energy for unwanted fat reduction and submental skin tightening: Clinical evidence. *J Cosmet Dermatol.* 2022; 21:5657-5664.
3. Bonan P, Verdelli A, Tognetti L et al. Role of microwaves in edematous fibrosclerotic panniculopathy and skin laxity treatment: a preliminary study. *Ital J Dermatol Venerol.* 2021;156:104-106.
4. Bennardo L, Fusco I, Cuciti C, et al. Microwave Therapy for Cellulite: An Effective Non-Invasive Treatment. *J Clin Med.* 2022;11:515.
5. Bonan P, Verdelli A. Combined microwaves and fractional microablative CO2 laser treatment for postpartum abdominal laxity. *J Cosmet Dermatol.* 2021;20:124-131.
6. Spalding KL, Arner E, Westermark PO et al. Dynamics of fat cell turnover in humans. *Nature* 2008; 453:783-7.

**Figure legends:**

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 FU (mean±SD)	p-value
Abdominal circumference (cm)	94.43±12.03	81.71±4.35	P<0.05
Superior abdominal skinfold (mm)	29.57±12.30	20.57±10.80	P<0.05
Inferior abdominal skinfold (mm)	34.57±9.02	21.86±6.28	P<0.01
Weight (kg)	71.45±8.95	63.70±5.26	P=0.11
BMI	29.65±3.96	25.83±2.47	P=0.14