

## "Sensifirm"

### Safety and Effectiveness Study – White Paper

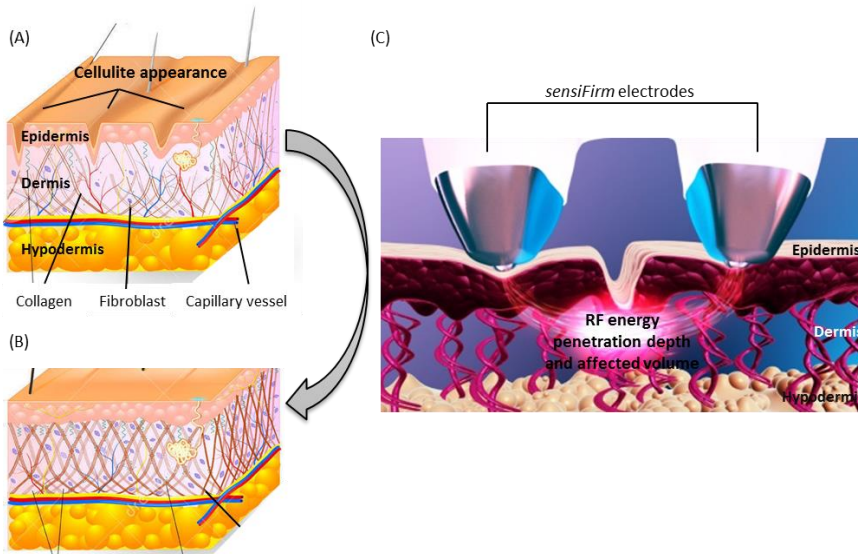
Prof. Avner Shemer, MD

#### Introduction

Cellulite is the dimpled ("orange peel") appearance of the skin, mainly in the upper thigh and buttocks of women. It occurs in approximately 90% of post-pubescent women. The pathophysiology of cellulite includes the bursting of the subcutaneous fat layer into the weakened dermis. The etiological reason for cellulite appearance is still ambiguous, but it is related to several factors: female anatomy and hormones, unwanted vascular changes resulting in a decrease in blood flow and lymphatic drainage, and chronic inflammation leading to adipocytes (fat cells) lysis and skin atrophy. <sup>1</sup>

The gold standard of non-invasive devices for improvement in the appearance of cellulite , reduction of circumferences and tightening of lax skin, which all involve a decrease in the quality and quantity of collagen fibers, is Radio Frequency (RF) (often combined with massage).<sup>2,3</sup> RF is a type of electromagnetic wave that causes increased rotation of water molecules as it oscillates, leading to efficient heating of biological tissue, a technique known and used in medicine in the form of selective electrothermolysis. <sup>4</sup>

The thermal effect of this localized electrothermolysis process induces collagen and elastin remodeling and later enhancement of their synthesis. These two proteins are responsible for strengthening the dermis and dermal-subcutaneous junction. In addition, heating induces improvement in microcirculation and lymphatic drainage. By inducing these natural biological processes, the RF technology is effective in improving skin sagging and cellulite appearance (Figure 1).



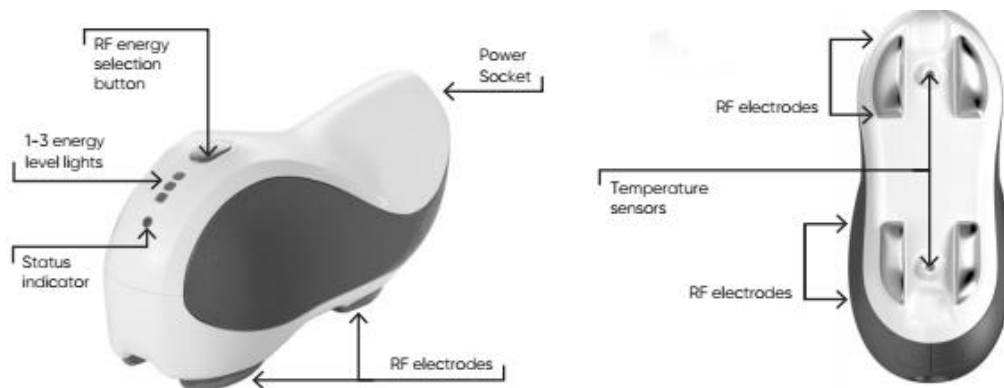
**Figure 1. Schematic illustration of sensifirm device contribution for cellulite treatment.** (A) Low quality and quantity of collagen fibers result in cellulite appearance in the epidermis layer. (B) After collagen remodeling and neocollagenesis induced by the sensifirm RF technology, the cellulite appearance is flattened. (C) The sensifirm device and RF penetration into the dermal layers.

<sup>2-4</sup> Moreover, the thermal stimulus created by RF devices is believed to lead to the breakdown of triglycerides within adipocytes, which is part of a normal lipolysis process, without direct cellular destruction. As a result, the adipocytes' volume is reduced, and subcutaneous fat layers shrink, leading to a circumferential reduction, typically of 2-4 cm. <sup>3</sup>

### Sensifirm device

The Sensifirm device features Sensica's proprietary Lipo RF™ technology. Lipo RF™ is a combination of bipolar RF (frequency of 1MHz) and massage, the latter achieved by manual movement of the device and vibration. The large distance between each pair (total 2 pairs) of the device's electrodes is responsible for the deep penetration of the RF waves and subsequent reduction in cellulite appearance and body circumferences. Sensifirm has three RF energy levels for the user to select from, according to their personal preference (Figure 2). Optimal results can be achieved with all energy levels, since the maximal effective treatment temperature of 41°C/ 105.8°F will be achieved at all levels. Furthermore, Sensifirm is equipped with two safety mechanisms: first, two redundant real-time temperature sensors that deactivate the RF when the skin temperature reaches 41°C/ 105.8°F, re-activating it when

skin temperature is lowered to 40.5°C/104.9°F; and second, skin contact sensors that ensure that RF and vibration is delivered only when the electrodes are in full skin contact.



**Figure 2. Sensifirm device, from top (left) and bottom (right) sides.**

## Study design

The objective of the study was to determine the safety and effectiveness of the Sensifirm when used in a home setting, for aesthetic purposes.

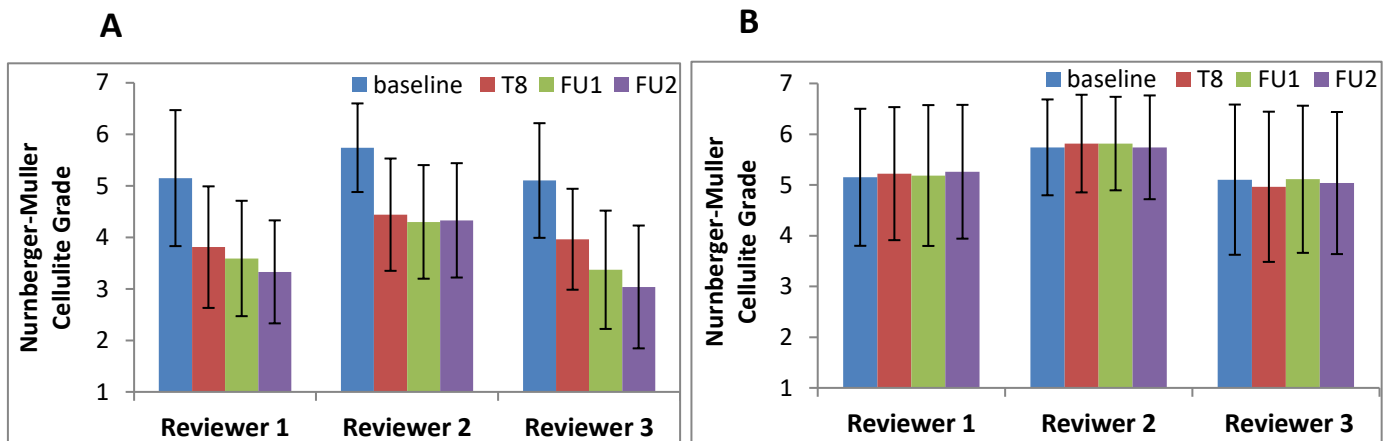
33 women (aged between 29 and 63 years old) were enrolled in the study, by the Principal Investigator (PI), Prof. Avner Shemer, after obtaining informed consent. Participants treated 1-3 body areas, according to the standard IFU, once a week for 8 weeks, for 15-20 minutes per treatment area (depending on the area) after applying a thin layer of the Base Gel on to clean and dry skin.

Clinical safety was assessed by monitoring adverse events during and after treatments, where the success criterion was defined as no severe adverse events occurrence. Clinical effectiveness was assessed both objectively, by independent and blinded board-certified dermatologists and plastic surgeons (also referred to as "reviewers") and by measuring circumferences of the body, and subjectively, by the participants themselves. Objective assessment of cellulite appearance was carried out according to the widely-used and validated Modified Nurnberger-Muller Cellulite Grading Scale (7 point scale). Improvement was defined as a decrease of at least one score in the Scale, and success criteria were predefined as improvement in at least 90% of participants as agreed by at least 2 of the 3

independent and blinded reviewers. This assessment was conducted using standardized photographs taken at baseline (pre-treatment, T0), at the end of the active treatment regimen (T8, after 8 Sensifirm treatments), and 1 and 3 months after the last treatment (follow-up period FU1 and FU2, respectively). Circumferences of the treatment areas were measured in a standardized manner, contemporaneously with the photography, and the weight of the participants was also recorded. In addition, the participants completed a satisfaction questionnaire, including treatment effectiveness, safety, ergonomics and general impression (subjective assessment).

## Results

28 women completed the whole treatment regimen and attended the follow-up visits. After the completion of the active treatment regimen (8 treatments, T8), 89%, 93% and 89% of the study participants (as assessed by 3 reviewers, respectively) showed improvement in overall cellulite appearance of the treated side, with 93% of the participants showing improvement according to agreement of at least 2 out of the 3 reviewers. The average decrease of cellulite was  $1.28 \pm 0.79$  in the Modified Nurnberger-Muller Cellulite Grading Scale (Figure 3A), corresponding to an average improvement in cellulite appearance of 18%. At the end of the follow-up regimen, 3 months after the final treatment (FU2), the reviewers had found a decrease in the appearance of cellulite in 93-100% of the participants, with an average decrease of  $1.78 \pm 0.79$  in the Modified Nurnberger-Muller Cellulite Grading Scale (corresponding to an average of 25% improvement in cellulite appearance) (Figure 3A). The untreated side remained largely unchanged during the course of the treatments and follow-up (Figure 3B).

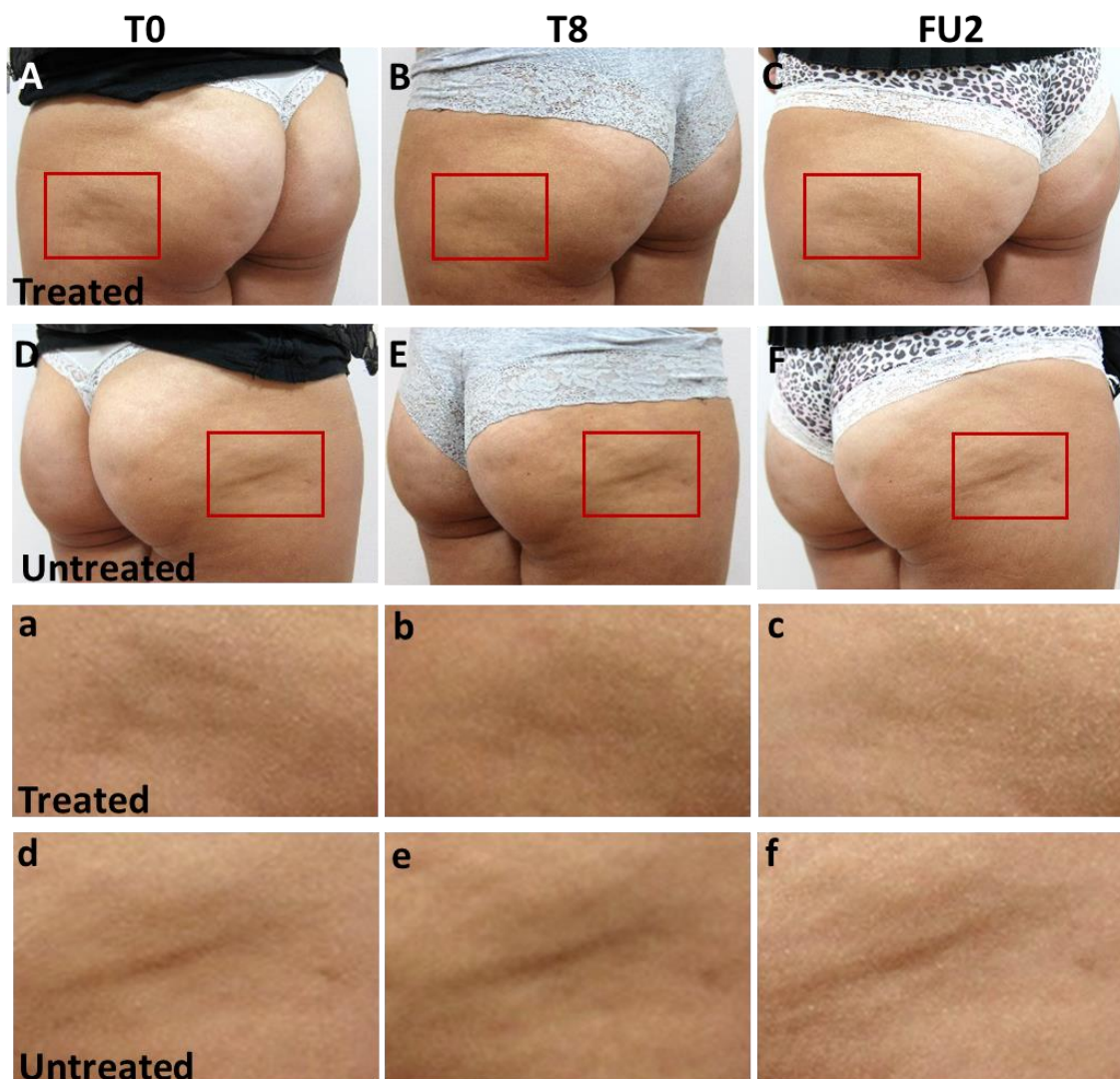


**Figure 3. Average cellulite appearance score, as assessed by 3 independent reviewers, before the treatment (baseline), after the final treatment (T8), and at the 1 and 3 month follow-ups (FU1 and FU2, respectively) after the last active treatment.** Error bars represent standard deviation. Scores are based on the Modified Nurnberger-Muller Cellulite Grading Scale, a 7-point scale, where 1 is no visible cellulite and 7 is the most severe cellulite. (A) Represents the treated side. All results are statistically significant ( $p < 0.001$ ,  $t$ -test), as tested per reviewer - comparison between baseline to each follow up (T8/FU1/FU2). (B) Represents the untreated side. Statistically significant difference in the cellulite appearance change was found between the treated and untreated sides at T8, FU1 and FU2, as scored by all reviewers ( $p$ -value  $< 1E-9$ ,  $t$ -test).

Improvement in cellulite appearance and overall skin appearance of thighs and buttocks are illustrated in figures 4-5.

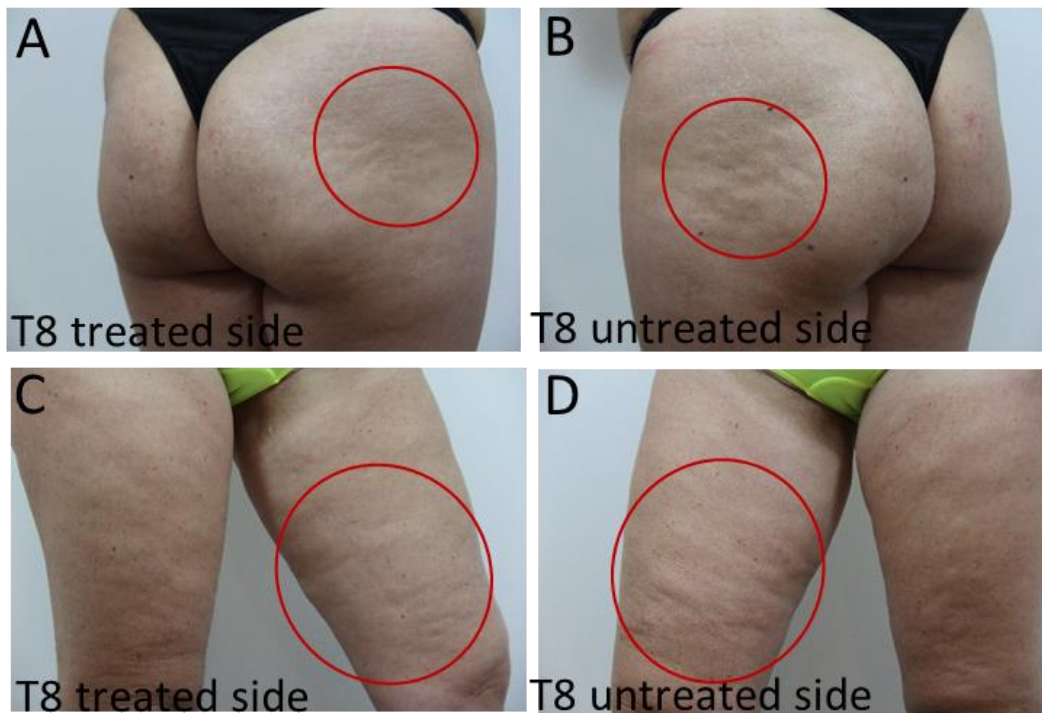
In addition to scoring the cellulite grade and body circumferences measurements at a constant body location, the participants were weighed prior to any treatments (T0) and after the completion of treatments (T8, FU1 and FU2). The analysis of circumferences reduction was carried out only for participants who did not lose weight during the follow-up period, in order to eliminate bias of circumferential reduction due to weight decrease. In contrast to the average increase in weight of the study participants, average circumferences of all areas of the body that were treated showed a decrease at all the three visits (differences of both weight and circumferences were measured between T0 and T8 or FU1 or FU2 for each

participant). 27 participants treated one of their thighs and on average showed a 2-2.3% decrease (depending on the time point) in overall thigh circumference (as measured for 24 participants that did not lose weight). 8 participants treated the abdomen. The abdominal perimeter was found to decrease by 2.2% at both T8 and FU1 and 0.2% at FU2. Moreover, tightening of the abdomen and of lax skin was observed (Figure 6). 4 participants treated one arm (3 of them did not lose weight and were included in the analysis). The average percentage of arm circumference reduction was 4.8%-8.8% (depending on the time point).



**Figure 4. Cellulite appearance improvement in the treated side after 8 treatments and last follow-up, versus untreated side control.** Images A-C represent the treated side at baseline (T0, A), after 8 treatments with the Sensifirm (T8) and at 3-month post-treatments follow-up (FU2), respectively. Red rectangles mark the treatment area with the most prominent improvement, which is shown enlarged in

the lower panel (a-c). Images D-F represent the same time points of the untreated side as A-C, serving as a concurrent visual control. Red rectangles mark the matching areas to the marked areas in D-F), shown enlarged in d-f. While images A-C show improvement in cellulite appearance, images D-F show a stagnant appearance, and even slight worsening.



**Figure 5. Cellulite appearance improvement - treated versus untreated sides.** Examples of improvement in the appearance of cellulite in buttocks and thigh region after 8 treatments. These 2 participants (first in pictures A-B, second in pictures B-C) treated only one side, as indicated on the images. The treated side for both participants looks significantly smoother than the untreated side (corresponding regions are marked by red circles).



**Figure 6. Abdominal skin tightening.** Example of improvement in the appearance of the abdomen after 8 treatments. Image A represents the baseline photograph (T0), B after 8 treatments (T8) and C at the last follow-up, 3 months after last treatment (FU2).

In this study, the safety profile of the Sensifirm device, as assessed for the 33 participants who used the device at least once, was demonstrated as being very high. No severe or unexpected

adverse events occurred during or after the study, meaning that the success criterion for safety was met. Only one minor, transient and local side effect, as described in the user manual, occurred (local and transient skin sensitivity). Moreover, the level of pain and discomfort felt by the users during treatments was very low. On a scale of 1-5, where 1 is non-existing and 5 is intolerable, the average score was 1.8 and no participant answered 5.

Furthermore, analysis of the feedback questionnaires completed by the participants revealed that the Sensifirm received a high user-satisfaction profile. At the last follow-up (FU2), participants were asked whether they would like to continue using the device for the other untreated side and whether they would like to treat additional anatomical areas. All participants answered YES to these two questions. 96% of the participants expressed some degree of satisfaction after the completion of treatment (at T8 and FU1) and 92% at the last follow up (FU2). Moreover, most participants (around 90%) found the device comfortable to use. After completion of treatments (T8), 96% of the participants reported feeling an improvement in their skin's appearance and 89% reported an improvement in the skin's texture, tightening and cellulite appearance. The general impression of the participants was very good and included statements such as: "*The treated area feels smooth*", "*My husband noticed that the treated side had improved*", "*My skin feels firmer*", "*The treatment is very pleasant*", "*I'm eager to start treating the other side*" and more.

To summarize, improvement in cellulite appearance was stable and even further improved at the long-term follow-ups (as measured at 1 and 3 months post last treatment), circumferences were reduced in the treatment areas and participants were happy with the treatment. All these elements demonstrate that the Sensifirm is both safe and effective for its intended use as an at-home aesthetic treatment.

### **Discussion & Conclusions**

The SensiFirm OTC home-use device was found to be safe and effective for treatment of cellulite on the buttocks and thighs, as well as for skin tightening in the arms and abdominal

region, when treatments were performed independently by the users in a home setting, according to the Instructions for Use.

Using all the evaluation indices (objective assessment by board certified dermatologists and plastic surgeons, measurement of circumferences and participants' subjective self-assessment), the results obtained show significant improvement in cellulite appearance in the treated side (while the untreated side remained stagnant), circumferential reduction and overall improvement in the appearance of the skin. The results of cellulite appearance and skin tightening continued to improve during the non-active follow-up period. A possible explanation for the continued improvement without additional active treatments is the long-term effect of the combined RF together with massage treatments. RF is known to induce the collagen remodeling process as well as ongoing neocollagenesis (new collagen synthesis). The heat produced by the RF waves in the dermis causes denaturation of collagen triple helixes, leading to collagen shrinkage, thus creating an immediate skin-tightening response. The RF with the massage on the treatment area enables effective energy application that is believed to improve microcirculation and influence the fibroblasts to synthesize new collagen and elastin, which leads to continued improvement of skin tightening and dermal thickening after treatment (accumulative long-term effect).<sup>2-4</sup>

Together with the high satisfaction reported in the self-assessment of the participants, this all indicate that treatments with the Sensifirm are perceived to be effective and beneficial by the non-professional users, which is of very high importance in the field of aesthetics.

To conclude, the home-use Sensifirm device is both safe and effective for overall improvement in the skin's appearance, in particular for the reduction in the appearance of cellulite and of circumferences.

## References

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