

ORIGINAL ARTICLE

## Unipolar radiofrequency treatment to improve the appearance of cellulite

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### Abstract

**Background:** Previous studies suggest that radiofrequency (RF) energy may be effective as a treatment for cellulite. **Objective:** This bilateral paired blinded comparative study assesses the efficacy and safety of a unipolar RF device for improving the appearance of cellulite using a new quantitative cellulite grading system. **Methods:** In this randomized, blinded, split-design study, 10 individuals (aged 32–57 years) with a clinically observable excess of subcutaneous fat and cellulite (minimum grade 2 out of 4) on the thighs received up to six unilateral treatments (number of treatments at the investigator's discretion) at 2-week intervals with unipolar RF. The untreated side of the thigh served as an internal control. Treated thighs were randomly assigned by alternate allocation. Results were evaluated using study participant questionnaires and by two blinded evaluators (JSD, KAA) using photographs and the author's (MAA) cellulite grading scale at each treatment visit and at 1-month and 3-month follow-up visits after the final treatment. A novel quantitative four-point cellulite grading system is presented and applied, which separately grades dimple density, dimple distribution, dimple depth, diameter and contour. **Results:** All participants responded to treatment (mean of 4.22 and range of three to six treatments). The blinded evaluations of photographs using the cellulite grading scale demonstrated the following mean grading scores for the treated leg versus the control leg: dimple density of 2.73 vs 3.18 (11.25% mean improvement), dimple distribution 2.89 vs 3.32 (10.75% mean improvement), dimple depth 1.47 vs 1.54 (2.5% mean improvement), and mean score of 2.36 (SEM 0.45) vs 2.68 (SEM 0.57) (8.00 ± 2.84% mean improvement). The treatment was painless and side effects included minimal to moderate erythema which resolved within 1 to 3 hours. No crusting, scarring or dyspigmentation was observed. **Conclusions:** This randomized, blinded, split-design, controlled study employing a quantitative four-point grading scale demonstrated that this unipolar RF device is safe for the treatment of cellulite. Clinically visible and quantified improvement which did not achieve statistical significance but showed a trend toward improvement was observed in all patients following a mean of four treatments at 2-week intervals.

**Key words:** Body sculpting, cellulite, lasers, laxity, radiofrequency, skin tightening, unipolar, wrinkle reduction

### Introduction

The application of heat or thermal injury to skin resulting in shrinkage of redundant or lax connective tissues by collagen denaturation was first observed with ablative laser resurfacing (1). Since then, skin tightening and the treatment of cellulite specifically have been explored with non-ablative technologies. The most-studied category of devices in this arena is radiofrequency (RF) devices, which encompass that part of the electromagnetic spectrum with frequencies ranging from 3 kHz to 300 MHz. The delivery of RF is termed monopolar when the energy is applied as current between a single electrode tip and

a grounding plate. When the energy is applied between two points on the tip of a probe, the electrode is considered bipolar. A newer application of RF involves the emission of electromagnetic radiation (EMR) rather than current. When RF is delivered as EMR, the delivery is called unipolar and no grounding pad is necessary.

A monopolar RF device (ThermaCool, Thermage) was the first to achieve approval by the US Food and Drug Administration (FDA) for facial wrinkle reduction in 2002, which was followed with approval for off-the-face treatments in 2006 (2,3). RF devices that combine bipolar RF with diode laser energy (4) or diode laser and intense pulsed light