A Modern Approach to the Treatment of Cellulite

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KEYWORDS

• Cellulite • Laser lipolysis • Skin laxity • Nd: YAG laser for cellulite

KEY POINTS

- Cellulite is a well-documented condition and, although many treatment options have been purported, few have lasting clinical results.
- The use of laser and light-based devices, in both a noninvasive and a minimally invasive fashion, has augmented the understanding and approach to the treatment of cellulite.
- Understanding the structural components that underpin cellulite anatomy allows for a more specific targeting approach.

INTRODUCTION

Cellulite is a topographic alteration of the skin and subcutaneous adipose that has been reported as early as 150 years ago but yet still affects patients today. It is quite prevalent, almost ubiquitous in postpubertal women and can be thought of as a female secondary sex characteristic.[1] Cellulite formation has a complex pathophysiology that includes expansion of subcutaneous fat, fibrotic dermal septae, as well as dermal laxity and atrophy. Many factors are also thought to influence the formation of cellulite; a genetic predisposition, along with hormonal influences, structural adipose differences, and inflammation may all contribute. It is thought that in cellulite the adipose cells are arranged in chambers surrounded by bands of connective tissue called septae, which span to connect muscle to the inferior portion of the dermis. The adipose cells that are encased within the perimeters of this area expand with water absorption, thereby stretching the connective tissue. This connective tissue can contract and thicken, holding the skin at a nonflexible length, while the surrounding tissue continues to expand with weight, or water gain. This expansion results in skin dimpling and an orange peel appearance, mainly in the pelvis, thighs, and abdominal areas.[2] Many devices and treatments have focused on these purported structural alterations as targets for therapy, some with better results than others. Even with many technological and pharmacologic advances, cellulite has been extremely recalcitrant to a wide array of treatments.

CELLULITE ANATOMY AND GRADING

The topographic appearance of cellulite is multifactorial in nature. The overall contour deformity is that of skin depression admixed with lax inelastic epidermis. The area of cellulite can comprise isolated depressions or a cluster of such that leads to an overall rippled appearance. The depressed areas can be either ovoid or linear in

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shape. Ovoid areas of cellulite tend to be more prominent on the buttocks or posterior thigh regions. Cellulite can be broken down into 3 main structural components: (1) adipocytes and collections of fat cells that are arranged in clusters surrounded by bands of connective tissue; (2) these connective tissue septae, which connect underlying muscle to the subdermal layer; (3) cells held within the perimeters of this area expand and stretch the connective tissue. Eventually this connective tissue contracts and sclerosis holds the skin at a nonflexible length, while the surrounding tissue continues to expand with weight, or water gain. Nurnberger and Muller[3] described an anatomic hypothesis of cellulite based on gender-related differences in the structural characteristics of dermal architecture. They reported that dermal septae of affected women are thinner and more radially oriented than those of unaffected men; this facilitates herniation of adipose tissue into the dermis.

GRADING

There are multiple scales of cellulite grading based on the clinical severity. Nurnberger and Muller described a scale of 3 grades:

- Grade I: Skin is smooth when standing.
- Grade II, mild, moderate, severe: Grade II is defined as orange peel or mattress appearance when standing.
- Grade III, mild, moderate, severe: Grade III is defined as grade II cellulite plus raised and depressed areas and nodules when standing (**Fig. 1**).

Curri also described a cellulite grading scale, ranging from grade 0 (absence of cellulite) to grade III cellulite (skin dimpling on standing as well as in supine position and can be exacerbated by skin pinching). It is important to grade the severity of cellulite properly to gauge which treatment would be most effective.

Before any procedure, the physician should take a thorough medical history and physical examination of the area (**Box 1**). It is important to note any bleeding problems or infections in the past. The time course when the patient first noted the cellulitic areas should be ascertained along with a history of any previous surgical or noninvasive procedures. Any trauma of the area should be ascertained. Also any lymphatic or vascular insufficiency or surgery of the area should be assessed. For any nonsurgical or surgical procedures, a medication and allergy history should be taken, highlighting any medications that interact with the cytochrome P450 enzymes.

Fig. 1. Modified Muller Nuremberger scale showing different grades of cellulite.