

Updates in Cellulite Reduction



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KEYWORDS

• Cellulite • Fibrous septae • Subcision • Cellfina • Cellulaze

KEY POINTS

- Cellulite refers to the dimpled appearance of the skin's surface most commonly found on the buttocks and thighs of women.
- Because its pathophysiology has long been misunderstood, it has historically been challenging to treat and durable treatment options have been lacking.
- More recently, treatment options have been developed targeting the fibrous septae that are now understood to play a key role in the pathogenesis of cellulite.
- Two novel devices, Cellfina and Cellulaze, offer a means to methodically transect these fibrous septae, and have been demonstrated to provide effective and lasting results.
- Cellfina offers several distinct advantages when compared with Cellulaze, including minimal patient downtime, fewer adverse effects, and results that are not user dependent but remain longer lasting.



Video content accompanies this article at www.advancesincosmeticsurgery.com.

INTRODUCTION

Cellulite describes the topographic dimpling and nodularity of the skin's surface that is most commonly found on the posterolateral thighs and buttocks of women. Although no precise epidemiologic data exist on its prevalence, it is thought to affect 80% to 90% of postpubertal women [1]. Despite being so common, many women view it unfavorably and as an imperfection. Although it is thought to be physiologic rather than pathologic, one should not overlook that it can cause significant distress. One study reported that 86.4% of participants believed that their cellulite negatively impacted their quality of life, with nearly one-third of them indicating that it had a moderate to severe impact [2]. Another

observational study found that 70% of patients being treated for cellulite believed that their cellulite hampered their lives “greatly” [3]. For these reasons, patients have spent billions of dollars on treatments that, until recently, provided minimal improvement at best.

ETIOLOGY

To truly appreciate the advances that have been made in the treatment of cellulite, it is valuable to briefly review the treatment modalities that have been trialed in the past. However even before doing so, one must first understand the pathophysiology of cellulite.

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Although the terms fat, adipose, and cellulite are sometimes used by patients interchangeably, it is important to realize their similarities and differences. Adipose tissue, also known as body fat, refers to a type of connective tissue comprised of adipocytes, collagen, blood vessels, and nerves. There are two main reservoirs for fat tissue in the body: visceral fat and subcutaneous fat. Subcutaneous fat, which is the target for body contouring procedures, such as liposuction and cryolipolysis, is often considered cosmetically undesirable but is not thought to contribute to obesity-related metabolic and cardiovascular diseases the same way visceral fat does [4]. Although subcutaneous fat makes up a component of cellulite, not all subcutaneous fat is cellulite. Cellulite specifically describes the nodularity and dimpling of the skin that results from underlying subcutaneous fat herniating between subcutaneous fibrous connective tissue. This is an important distinction because many treatments that are used to target subcutaneous fat have been trialed and failed for the treatment of cellulite. Patients may request a treatment that is known to target subcutaneous fat, such as cryolipolysis, to treat their cellulite. It is important to educate such patients on expectations, because although it may provide some benefit in reducing subcutaneous fat, it is unlikely to reduce the topographic changes that define cellulite.

This discrepancy in response to treatment is better elucidated by understanding the anatomic structure of subcutaneous tissue, and the changes that are seen in cellulite. Subcutaneous tissue is made up of two unique layers of adipose tissue, which are referred to as the superficial and deep layers. These layers are separated by a sheet of connective tissue primarily made up of collagen known as the superficial fascia. This superficial fascia runs parallel to the skin and muscle and fibrous bands of collagen then course orthogonally through this subcutaneous tissue from the undersurface of the dermis to the deep fascia adjacent to the muscle [5].

The observation that cellulite predominantly affects women may be explained in part because of differences in the anatomic structure of this superficial subcutaneous layer of fat. When compared with males, this superficial adipose layer in women is made up of larger fat-cell chambers, which can project upward into the dermis and change the overall appearance of the skin. Additionally, the fibrous bands that course vertically through the subcutaneous tissue run in a crisscrossing fashion in men, whereas they are oriented perpendicularly in women [5]. This difference is paramount because in males the orientation allows for the

downward tension created by these bands to be evenly distributed across the skin. In contrast, in females the orientation of the fibrous bands creates localized points of pressure that tether the dermis to the subcutaneous tissue. The combination of larger fat-cell chambers and localized points of tension in women leads to the rolling, dimpled appearance that is the hallmark of cellulite [5]. The sexual dichotomy of the orientation of fibrous septae and the resulting role in their pathogenesis of cellulite has been demonstrated using MRI [6].

Although it is clear that the formation of fibrous septae tethering the muscle to the dermis is integral for the formation of cellulite, the specific elements that contribute to the formation of these fibrous septae and ultimately the formation of cellulite has been a matter of debate for years. Although this debate still continues, it is now largely agreed to be an interplay of several complex factors including persistent low-grade inflammation, microvascular dysfunction and tissue edema, localized adipocyte hypertrophy, collagen denaturation, tissue laxity, and connective tissue fibrosclerosis [7,8].

TREATMENT OPTIONS TO DATE

Because these factors (persistent inflammation, microvascular dysfunction and tissue edema, localized adipocyte hypertrophy, collagen denaturation, and tissue laxity) have all been implicated in the formation of cellulite, they have also been the target of treatment of cellulite over many decades. However, years of research have also made it clear that once cellulite has manifested itself, targeting these factors implicated in the pathogenesis of cellulite has not provided clinically significant results. The diverse array of techniques that have been trialed in the past and the etiologic factor of cellulite being targeted is outlined in Table 1. These are presented as a reference and to acknowledge what has been tried in the past. Unfortunately, none of these treatments were shown to provide significant or durable results as demonstrated by two systemic reviews on the treatment of cellulite that included 73 and 67 studies, respectively [9,10]. As these reviews highlight, many of the included studies suffered from flaws including small sample sizes, lack of reporting of statistical significance, lack of a control group or randomization, or were nonblinded. Furthermore, the endpoints used in these studies are widely variable and have been subjective, inconsistent, fail to measure a valid indicator of cellulite severity, or lack extended follow-up.

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