COSMECEUTICAL CRITIQUE

Cellulite

Edematous fibrosclerotic panniculopathy, or local lipodystrophy, better known as cellulite, may be best characterized as a skin surface alteration, nodularity, or dimpling that occurs in most women, typically in the buttocks and upper thighs, as well as the abdomen (Int. J. Cosmet. Sci. 2006;28:191-206). These lesions are typically depressed, compared with adjacent unaffected skin. Cellulite also is known as adiposis edematosa, dermopanniculosis deformans, status protrusus cutis, and gynoid lipodystrophy.

BY LESLIE S. BAUMANN, M.D.

Risk factors for cellulite include being female, overweight or obese, and elderly; having excess hormones or poor lymphatic drainage; and getting little exercise. Although cellulite often occurs in healthy, nonobese patients, obesity is known to exacerbate it (Dermatol. Surg. 1997;23:1177-81; J. Cosmet. Dermatol. 2005;4:221-2; Am. J. Dermatopathol. 2000;22:34-7).

Estimates of the frequency of cellulite in women range from 80% to 98% of postadolescent females across cultures (J. Dtsch. Dermatol. Ges. 2006;4:861-70; J. Cosmet. Laser Ther. 2004;6:181-5).

Etiology

The etiology of cellulite remains unclear, although several theories have been advanced (J. Cosmet. Laser Ther. 2005;7:7-10; Int. J. Cosmet. Sci. 2006;28:191-206; J. Cosmet. Laser Ther. 2004;6:181-5). Factors that have been cited as important in the pathophysiologic process include sex-specific morphologic differences, vascular changes, inflammation, and deterioration in connective tissue septa (J. Cosmet. Laser Ther. 2004;6:181-5; J. Dtsch. Dermatol. Ges. 2006;4:861-70).

One train of thought suggests that cellulite is derived from a disorder of endocrine-metabolic microcirculatory origin, in which changes in subcutaneous adipose tissue and the interstitial matrix manifest in unsightly bumps (Int. J. Cosmet. Sci. 2006;28:191-206).

The anatomy of this condition is an important factor. The morphologic differences in the fat lobes of men and women may account for the much greater frequency of this presentation in females. The degradation of collagen in the reticular dermis is thought to contribute to the development of cellulite by promoting weakness and compression of microcirculation in the dermis, as well as herniation of subcutaneous fat into the dermal layer. The characteristic signs of cellulite are then believed to result from the congestion of fluid and proteins in the dermis, forming fibrotic bands between the subcutaneous tissue and the dermis. Physiologic changes in the dermis, rather than in the subcutaneous fat layer, are thought to be primary.

Modes of Treatment

Although no treatment approaches have been deemed entirely successful, given their typically mild and temporary effects, cellulite therapies have included the use of noninvasive devices such as massage machines, radiofrequency systems, and laser and other light instruments; invasive surgery such as liposuction, mesotherapy, and subcision; carboxy therapy; topical therapy; and even oral modalities (J. Drugs Dermatol. 2008;7:341-5; J. Drugs Dermatol. 2007;6:83-4).

Massage appears to be the most effective modality for low-grade cellulite, as it is conducive to enhancing blood and lymphatic circulation and draining waste products. The effects are temporary, however, as they are with even the most effective topical products, which contain caffeine and theophylline and dehydrate the fat cells, temporarily shrinking them. For the highest-grade cellulite lesions, minimally invasive procedures such as subcision can render improvement (Int. J. Dermatol. 2000;39:539-44).

Topical Treatments

Despite the slew of products touted for treating cellulite, few have been tested in clinical trials.

In 1999, a 12-week, randomized, controlled trial evaluated the effectiveness of two different cellulite creams, aminophylline and a placebo, as well as the Endermologie ES1 massage machine (LPG Systems S.A.). Sixty-nine women began the study, and 52 women completed it.

The treatments studied were twice-daily application of aminophylline cream and twice-weekly use of the Endermologie. Patients served as their own controls. In group 1 (double blind), aminophylline was applied to one thigh/buttock and a placebo cream to the other. In group 2 (single blind), the Endermologie was applied to one thigh/buttock. In group 3, the Endermologie was applied to both sides, and the same cream regimen as in group 1 was used.

Clinical examination and photographic assessment before and after the trial revealed no statistically significant measurement differences between legs in any of the groups. The appearance of cellulite was judged in subjective assessments to have improved in only 3 of 35 legs treated with aminophylline and in 10 of 35 legs treated with the Endermologie machine. The investigators concluded that neither of the tested modalities is effective for cellulite treatment (Plast. Reconstr. Surg. 1999;104:1110-4).

In 2000, investigators reported the effects of topical retinol for treating cellulite in a left-right randomized, 6-month trial comparing the retinol with a placebo. The subjects included 15 women aged 26-44 years who had requested liposuction to ameliorate mild to moderate cellulite.

Following the treatment period, the researchers recorded an 11% increase in skin elasticity and a 16% decrease in viscosity in the retinol-treated area. It is important to remember that there is no accepted device that everyone agrees accurately measures skin elasticity, so these results must be interpreted with caution (Am. J. Clin. Dermatol. 2000; 1:369-74).

In 2005, investigators conducted a double-blind, randomized study in which 40 women with moderate cellulite were instructed to apply an anticellulite cream nightly for 4 weeks. This cream contained caffeine, green tea, black pepper, orange, and cinnamon bark extract. The active cream was applied on the right or left leg, and the placebo cream to the other leg. Participants were instructed to wear bioceramic-coated neoprene shorts to promote penetration of the active agent. Five blinded, independent physicians evaluated photos taken before treatment and after 4 weeks for improvement. Subject questionnaires were completed to assess tolerability and efficacy. A total of 34 subjects completed the study, of whom 21 reported overall improvement in their cellulite; 13 of the 21 reported greater improvement in the thigh receiving the active agent. The physician evaluators found that thighs treated with the active formulation showed greater improvement in 68% of subjects. No adverse effects were reported (J. Cosmet. Dermatol. 2005;4:93-102).

The investigators in this study had previously performed a double-blind, randomized study of 20 women who applied an anticellulite cream to affected sites nightly for 4 weeks. In that trial, the efficacy of the topical agent when used alone was compared with its efficacy when used in combination with an occlusive bioceramic-coated neoprene garment. Seventeen women completed the trial.

Responses to questionnaires showed that 76% of the participants identified overall improvement, with 54% indicating that the thigh treated with the topical agent and garment occlusion exhibited greater improvement. Measurements indicated a slightly greater reduction in thigh circumference in the occlusion group (1.3 cm vs. 1.1 cm).

Dermatologists evaluating the subjects reported improvement in 65% of thighs treated with occlusion and 59% of thighs treated only with the topical cream. They also observed greater improvement in occluded thighs than nonoccluded thighs in 65% of the participants. The investigators concluded that the occlusion achieved with the bioceramic-coated neoprene garment potentiates the activity of anticellulite cream (J. Drugs Dermatol. 2004;3:417-25).

Recently, investigators conducted a double-blind, randomized, controlled study of nine healthy women with grade II-III cellulite to assess a new anticellulite gel combined with a light-emitting diode (LED) array. The volunteers were randomly treated twice daily with an active phosphatidylcholine-based, cosmeceutical gel on one thigh and a placebo gel on the control thigh for 3 months. Each thigh also was exposed, twice weekly for 15 minutes, to LED light at red (660 nm) and near-infrared (950 nm) wavelengths. Height, weight, and body mass were measured and digital photographic images were taken at 0, 6, and 12 weeks, and then 18 months after the first treatment.

At 3 months, investigators found that eight of nine thighs treated with combination therapy improved, warranting a downgrading of the cellulite level. At 18 months, five of the eight responsive thighs regressed to the cellulite grade noted at the beginning of the study (J. Cosmet. Laser Ther. 2007;9:87-96).

At the Store

A group of investigators recently conducted a literature review of the botanical extracts used as active ingredients for treating cellulite and, given the dearth of published findings, also contacted the manufacturers of such products for information on their efficacy. The authors suggested that a product's capacity to reduce fat deposits through frequent topical use relies on the concentration of the active ingredient and its availability at the treatment site (Dermatol. Surg. 2005;31:866-72).

Conclusions

Although cellulite is physically harmless, the pervasiveness of this unaesthetic condition has provided the impetus for much research and the development of numerous treatment options, some of which can be rather expensive. Despite the relatively poor track record of most treatment options, therapy approaches continue to proliferate. In some instances, weight control may improve the appearance of cellulite.

Topical formulations containing a range of ingredients, including botanicals, have shown some promise, particularly those containing caffeine and theophylline, but with fleeting benefits most often observed in combination with another treatment modality. Lasers are being developed to treat cellulite. At this point there is no mechanical, surgical, laser, light, or topical therapy that has proven to be consistently efficacious. There is much research going on that may lead to advances in this area in the future. ■

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