Scar Treatment Using Energy Devices

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Laser treatment of scars was first reported in the 1980s. These treatments employed continuous wave carbon dioxide (CO2), argon, and neodymium:yttrium-aluminum-garnet (Nd:YAG) lasers and had limited efficacy: the results were operator-dependent and scar recurrence or worsening was often observed. A more recent laser approach is nonablative and ablative fractional photothermolysis. Thus, nonablative fractional photothermolysis generates a column of heated but not ablated tissue that extends down into the dermis. The same principle is used in ablative fractional resurfacing, which employs the carbon dioxide wavelength of 10,600 nm and heats the tissue much more intensely; this causes vaporization of tissue while significantly heating adjacent dermal collagen. The immense volume of collateral heating induces thermal alterations of the helical structure of collagen molecules and results in tissue tightening. The depth of the heated tissue is determined by the pulse energy. However, the risk of complications is higher than in nonablative fractional resurfacing. To address this issue, the fractional radiofrequency technique was developed. This technique employs an array of electrodes that create zones of thermal wounds. It causes less epidermal destruction than fractional ablative laser systems and thus associates with minimal risk of bleeding and dyspigmentation.