granulomatous inflammation encompasses presentations ranging from a well-organized granuloma to loose aggregates of epithelioid cells mixed with other inflammatory cells (Shah et al. 2017).

Granulomas may develop with or without immunologic modulation in the case of granulomatous hypersensitivity and foreign-body granulomas, respectively (Epstein 1989). Dermal granulomatous hypersensitivity has been associated with intradermal tattooing of red dyes with metallic elements and injection of dermal fillers such as hyaluronic acid and poly-L-lactic acid (PLA).

Pratsou and Gach (2013) report two females who underwent a facial microneedling procedure with a trained practitioner using a CE-marked, FDA-registered device (192 stainless steel MNs 1.5 mm long and 0.25 mm wide) coupled with skin cleansing and topical anesthetic cream. Within 24 hours, both developed significant lymphadenopathy, and the older sister developed pinpoint erythema, malaise, and headache. Systemic antibiotics were unhelpful, as the older sister's condition worsened with a "florid erythematous papular rash over her face" that spread to her trunk and limbs. The patient gradually improved over 2 weeks with systemic and topical corticosteroid treatment. Biopsy of lesions showed a nonspecific, chronic inflammatory infiltrate. Patch testing yielded a positive reaction to nickel sulphate (D4++), which was a known allergy to the patient. The authors were unable to attribute the reaction to her allergy, as the MN device contained up to 0.006% sulfur and 8% nickel bound to surgical-grade stainless steel (per the manufacturer)—an amount thought to pose little or no risk in short-term contact with nickel-sensitive individuals.

Soltani-Arabshahi et al. (2014) document three cases of granulomatous MN therapy reactions. The first two presented after Dermapen MN therapy followed by a high dose of lipophilic vitamin C (Vita C Serum; Sanítas Skincare) applied to the skin at the same medical spa. The Dermapen fraction microneedling device (Dermapen, LLC) is estimated to penetrate the skin anywhere from 0.25 to 2.00 mm. Both patients developed a progressive erythematous rash over the face in addition to systemic reactions, including arthralgias of varying intensity. In both cases, biopsy of indurated papules showed foreign body–type granulomatous reaction with focal, polarizable material present in giant cell cytoplasm. Patch testing both patients showed +1 reaction to Vita C Serum, while patch testing with Vita C Serum in five healthy volunteers yielded negative reactions. Both patients had persistent, mildly indurated, erythematous papules and plaques at nine months follow-up. The last of three patients presented following three microneedling procedures, two in which a gel product (Boske Hydra-Boost Gel; Boske Dermaceuticals) and one in which Vital Pigment Stabilizer (Dermapen, LLC) were applied before microneedling. While the patient did not have systemic symptoms, she did present with a progressively worsening erythematous rash that developed papular features, with a biopsy showing a similar granulomatous reaction. The last patient declined patch testing and demonstrated resolution at 3 weeks.

To limit chances of granuloma formation, patients should use only those products that are approved for intradermal use and prescribed by the physician in the immediate postprocedural time period. Alster and Graham (2018) typically allow patients to resume makeup application 2 days postprocedure and active skin care products 5 to 7 days after therapy.

42.3.5 Irregular Scarring

Pahwa et al. (2012) reported "tram tracking," or multiple discrete papular scars in a linear pattern in the horizontal and vertical directions, in a 25-year-old woman one month after treatment with a dermal rolling device (192 needles, 2 mm long) for management of acne scarring. Scarring was predominantly located over the temporal area, zygomatic arch, and forehead of the patient, who slightly improved with topical silicone gel at six months follow-up. They were unable to attribute the atypical scarring to an allergen or irritant.

Dogra et al. (2014) reported 2/36 patients undergoing MN therapy using a Dermaroller (192 fine microneedles, 1.5 mm in length and 0.1 mm in diameter) for atrophic acne scars to have a similar "tram trek" adverse effect. One patient developed severe tram-trek scarring over the malar