control mice, regardless of formulation type, needle density, number of applications, or mouse gender ($p > 0.05$ in all cases). In addition, mice in all study and control groups demonstrated increased weight over the course of the study. Collectively, the authors were unable to detect infection or any variable indicative of an infection across all tested mice.

Aust et al. (2008) performed a retrospective analysis of 480 patients with fine wrinkles, lax skin, scarring, and striae gravidarum treated with percutaneous collagen induction using the Medical Roll-CIT with topical vitamin A and C cosmetic creams for a minimum of 4 weeks postoperatively. Two patients developed herpes simplex infection following a full-face needling that was successfully treated with acyclovir.

In a pilot split-face study comparing conventional methyl aminolevulinate-photodynamic therapy (PDT) with microneedling-assisted PDT on actinically damaged skin, 1 of 10 patients developed an infection on the MN-treated side 7 days posttreatment, determined by signs and symptoms of high local temperature, redness, pain, and crusts; however, the patient responded well to cephalosporin treatment (Torezan et al. 2013).

Cunha et al. (2017) document a case of tinea corporis that emerged in corresponding locations of Dermaroller (540 stainless steel microneedles of 0.5 mm length) use approximately 3 weeks after start of her home MN therapy for bilateral scarring of her arms and legs. Potassium hydroxide examination of the lesions was positive for fungus, with lesion culture growing *Microsporum canis.* While the patient confirmed skin cleaning prior to and sanitation of the MN device before and after therapy, inadequate sterilization of the patient's skin and MN device cannot be excluded. The patient experienced complete resolution after treatment with oral terbinafine and topical sertaconazol at 5-week follow-up.

Leatham et al. (2018) document facial autoinoculation of varicella via a home microneedling roller device. A healthy woman with a distant history of primary varicella zoster virus (VZV) infection and no prior shingles vaccination reported grouped lesions over her chest, which she presumed to be an acneiform eruption. The patient self-treated the area with an at-home microneedling roller device and used the device over her face to reduce appearance of rhytides. On presentation, the patient had "grouped, eroded papules and vesicles on the right T4 dermatome" and "eroded papules on the forehead, lateral cheeks, many located at spaced distances." Polymerase chain reaction (PCR) yielded positive results for VZV. The patient was started on oral valacyclovir and was free of lesions and experienced no postherpetic neuralgia at 6 weeks.

42.3.2 Irritant Dermatitis

Irritant dermatitis (ID) is an eczematous-like reaction occurring from contact with a chemical, biologic, or physical agent (Tan et al. 2014). Reaction severity depends upon the physicochemical property of the agent and the degree of activation of the innate immune system (Tan et al. 2014). Keratinocytes, comprising 95% of epidermal cells, are responsible for the production of the majority of cytokines likely responsible for the ensuing erythema and edema (Tan et al. 2014). In contact with any agent, there is the potential for ID; however, it is likely that disruption of the stratum corneum provides increased susceptibility to a particular irritant. MNs are most frequently manufactured from nonirritating metal, polymer, silicon, and glass, none of which are particularly common irritants (Nguyen and Park 2018). However, irritation following a procedure may result from the MNs themselves or any substance used in conjunction.

Cercal Fucci-da-Costa and Reich Camasmie (2018) document likely ID due to skin rejuvenation MN therapy over the patient's dorsal hands with 10 applications with a 0.5-mm Dermaroller. Following her MN therapy, the patient inadvertently applied arnica-based cream and developed yellowish papules compatible with MN perforation sites on an erythematous base 48 hours after arnica cream application. The authors attributed the lesions to ID from the arnica-based cream due to the sparing of MN-treated areas in which the cream was not applied and the patient's improvement 72 hours post–topical corticosteroid treatment.