



Figure 1.5 Current rollers with fixed needle length; some current models are autoclavable. *Source:* marcinm111/Shutterstock.

DermaFrac

DermaFrac treatment is a newer modification of microneedling combining microdermabrasion, microneedling, simultaneous deep tissue serum infusion, and light emitting diode (LED) therapy. DermaFrac treatments target aging and sun damaged skin, acne, enlarged pores, uneven skin tone, wrinkles, fine lines, hyperpigmentation, and superficial scars. It takes approximately 45 minutes to complete a full face treatment when all four modalities are used. This noninvasive, cost-effective treatment carries the advantage of having no downtime, with individualized selection of serums for infusion (see Figure 1.6) [22].



Figure 1.6 DermaFrac™: Microneedling device combining simultaneous customized infusion followed by LED light therapy. *Source:* Genesis Biosystems, Inc.

Clinical considerations

Microneedling is not only used for rejuvenation of the skin. Its use in dermatology and aesthetic medicine has expanded to include the treatment of acne scars, alopecia, dyspigmentation, alopecia, striae, and for many other indications. It can be utilized alone or in combination with other treatment modalities, such as chemical

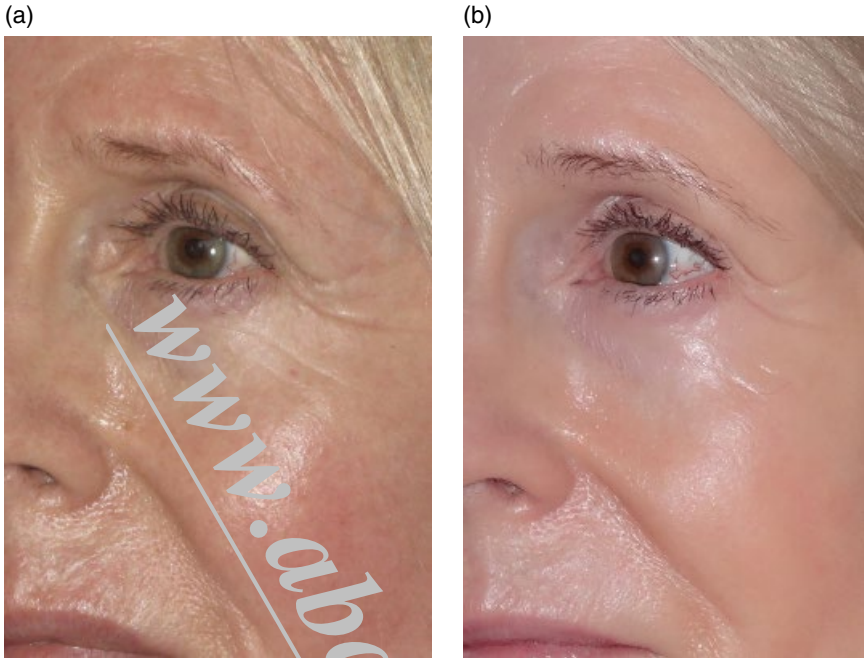


Figure 2.2 Long-term effects of skin needling with a 1.0 mm roller and using vitamins A and C and selected peptides. (a) Before: At 67 years of age the patient had a series of six needlings done in five weeks and concomitantly had facials to infuse vitamins A and C and peptides by using iontophoresis and low-frequency sonophoresis. (b) After: Four years after completing the treatment and maintaining her skincare, one can see the skin has been lifted, and is smoother and more youthful looking. Pigment marks have also faded. *Source:* Des Fernandes.

Conclusion

In the beginning doctors dismissed skin needling as a simple, ineffective medieval torture but, fortunately, through continuous research, skin needling has become a valuable, inexpensive tool that can be used around the world in the most primitive conditions for the most important rehabilitative work, or for rejuvenation. It will probably remain a valuable tool for many years in the future.

References

- 1 Orentreich DS, Orentreich N. Subcutaneous incisionless (subcision) surgery for the correction of depressed scars and wrinkles. *Dermatol Surg.* 1995;21(6):543–549.
- 2 Camirand A, Doucet J. Needle dermabrasion. *Aesthetic Plast Surg.* 1997;21(1):48–51.
- 3 O’Kane S, Ferguson MW. Transforming growth factor beta s and wound healing. *Int J Biochem Cell Biol.* 1997;29(1):63–78.

reduced to a minimum. Furthermore, it has been shown in the animal model that the thickness of the epidermis increases up to 140% after treatment versus untreated ones [22]. (See Figures 3.12 and 3.13.)

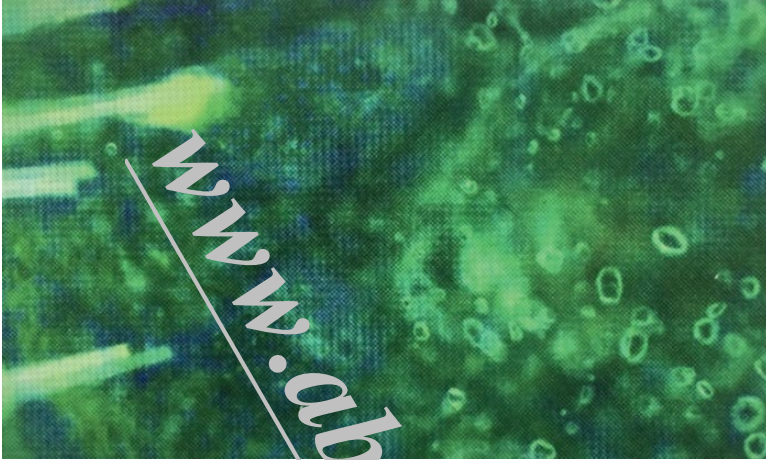


Figure 3.11 Immunohistochemical staining, anti-GAG. Needled animal with eight weeks of skincare stained without primary antibody. As observed in the PAS staining, a marked increase in the amount of GAGs was observed throughout the different needled groups in comparison to the un-needed groups. *Source:* Matthias Aust.

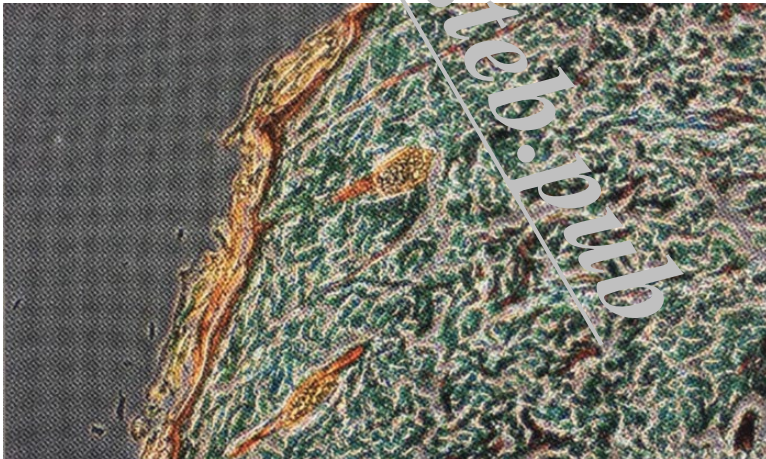


Figure 3.12 Masson's trichrome staining. Untreated animal (control). *Source:* Matthias Aust.



Figure 3.16 Result after a second deep needling one year after the second needling (two years post-initial trauma). *Source:* Matthias Aust.

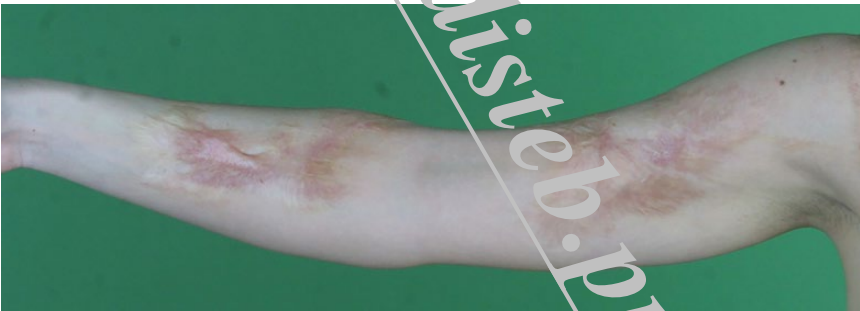


Figure 3.17 Hypertrophic burn scar, lower arm, 5 years post-trauma. *Source:* Matthias Aust.

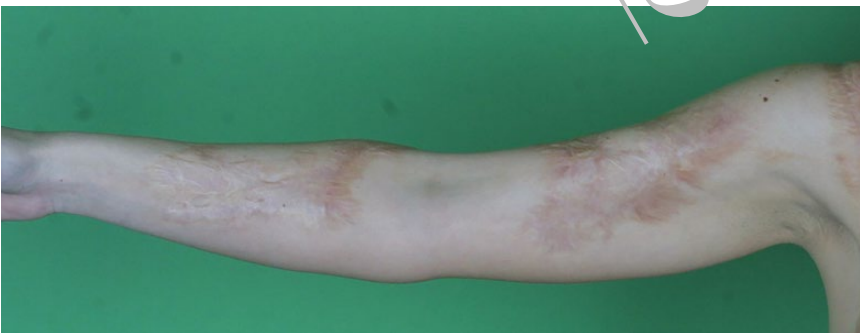


Figure 3.18 Improvement of the hypertrophic burn scar six months post-3mm needling. *Source:* Matthias Aust.



Figure 3.23 Hypopigmented scar after burn, lower back, 24 months post-trauma, before treatment. *Source:* Matthias Aust.



Figure 3.24 Improvement of the melanin level and thereby repigmentation of the scar one year post-treatment. *Source:* Matthias Aust.

(a)



(b)



Figure 3.25 A post-burn keloid (a) is not the same as a true keloid and skin needling is a convenient way to treat these scars. The result seen (b) is after one year after a single session of 3 mm needling. *Source:* Matthias Aust.

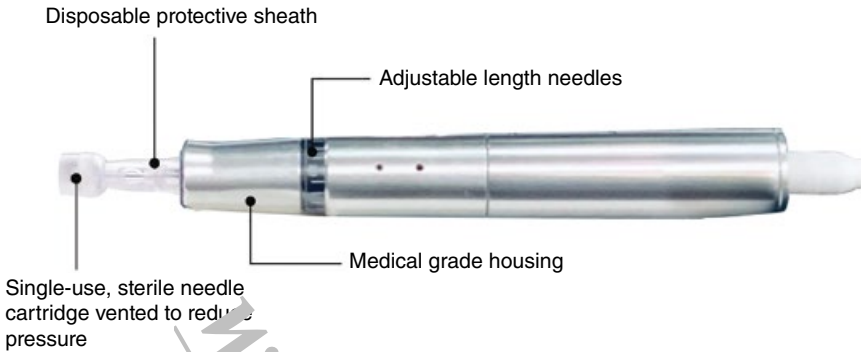


Figure 5.2 Automated microneedling pens. *Source:* CANDELA CORPORATION. <https://candelamedical.com/na/provider/product/exceed-microneedling>.



Figure 5.3 Needling roller (hydoroller) with a bottle connection to combine substance delivery during needling. *Source:* Atchima Suwanchinda.

the epidermis into the deep dermis, producing favorable results. The discomfort is much less at higher speeds versus lower speeds. There is less risk for needle stick or needles retracting when the needles are off the skin. With proper technique, it minimizes the risk of skin maceration or shearing. The sterility is ensured by single-use disposable cartridges. In addition, some devices have a special design of the safety membrane to prevent backflow of liquid, eliminating risk of contamination of the handpiece. Therefore, it is very important to choose only FDA-approved devices for MN treatment for reliable, safe, persistent, and effective results.

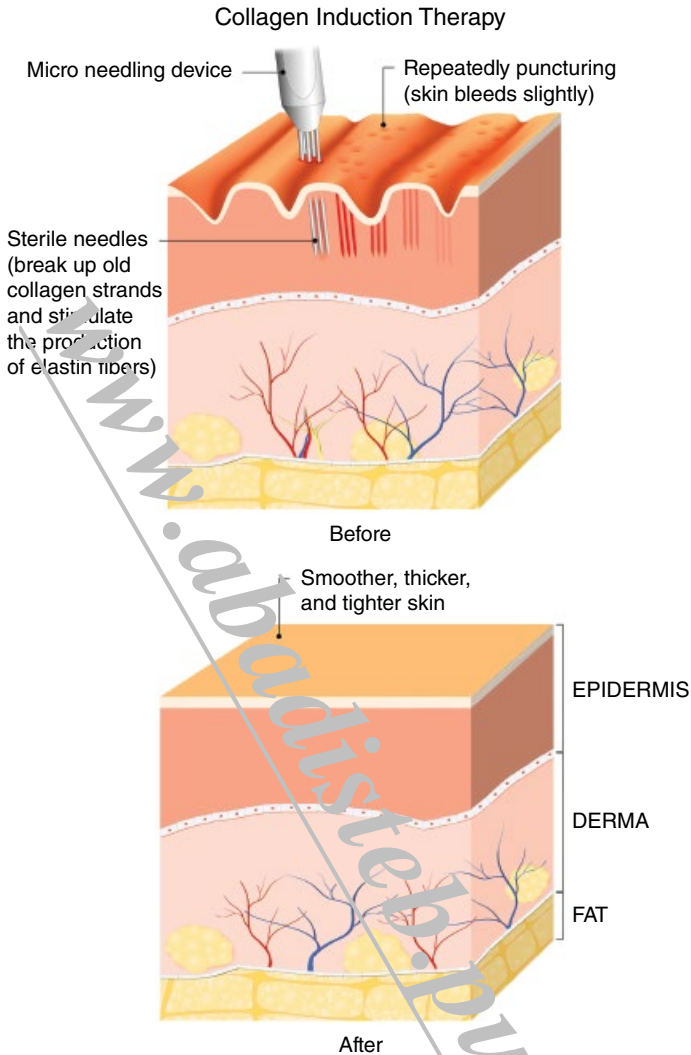


Figure 7.1 Collagen induction therapy: needling forms minute perforations of the skin. This results in both superficial capillary and dermal microinjuries, leading to growth factor release and fibroblast infiltration. *Source:* designua/123RF.

intended for skin and hair health and treatments may offer benefits in the form of reduced downtime and better efficacy. PRP applied to the skin post-microneedling with roller, stamp, or pen has a mechanically induced altered epidermal barrier. PRP has been applied topically or injected into the skin after microneedling to enhance the outcomes and decrease the downtime from these procedures.