



International Journal of Dermatology, Venereology and Leprosy Sciences

E-ISSN: 2664-942X

P-ISSN: 2664-9411

www.dermatologypaper.com

Derma 2023; 6(2): 17-21

Received: 09-05-2023

Accepted: 16-06-2023

Samah Samir Ghanem

Dermatology & Venereology
Department, Faculty of
Medicine, Tanta University,
Tanta, Egypt

Nashwa Kamal Radwan

Dermatology Department,
Egyptian Atomic Energy
Authority, Egypt

Ghada Fawzy Hassan

Dermatology & Venereology
Department, Faculty of
Medicine, Tanta University,
Tanta, Egypt

Samia Osman Nassar

Dermatology & Venereology
Department, Faculty of
Medicine, Tanta University,
Tanta, Egypt

Corresponding Author:

Samah Samir Ghanem

Dermatology & Venereology
Department, Faculty of
Medicine, Tanta University,
Tanta, Egypt

Micro needling in treatment of stretch marks

**Samah Samir Ghanem, Nashwa Kamal Radwan, Ghada Fawzy Hassan
and Samia Osman Nassar**

DOI: <https://doi.org/10.33545/26649411.2023.v6.i2a.149>

Abstract

Striae distensae: Are scars on the skin that have an atrophic linear depression, produced by stretching of the skin. Causes include puberty, pregnancy, mechanical stress, hormonal, genetic role and cachectic states and medications. Treatment occurred by enhancing collagen production or by reducing vascularity. Micro needling (MN) is a modern therapeutic option in dermatology. MN instruments include automated micro needling device, micro fabricated microneedle, derma-stamp and microneedle derma roller. Applications of MN in dermatology include transdermal delivery of drugs, scar reduction, skin rejuvenation, androgenic alopecia and alopecia areata, post acne scars pigmentation-Melasma and periorbital hyper melanosis, actinic keratoses, post-surgical scars, vitiligo and miscellaneous conditions. The benefit of MN is that individuals don't have open wounds, necessitating only a brief recovery period. But it has some adverse events such as potential erythema and irritation. Patients on anticoagulant therapy, herpes labialis, active acne or any other local infections have contraindications of using micro-needling.

Keywords: Micro needling, Pregnancy, mechanical stress, hormonal, micro fabricated microneedle

Introduction

Striae distensae (SD): Are scars on the skin that have an atrophic linear depression, produced by stretching of the skin.

Causes: They include puberty, pregnancy, mechanical stress, hormonal, genetic role and cachectic states and medications ^[1]. The early striae (*striae rubrae*), which may be symptomatic and often disappear over months to years to wrinkled, atrophic, hypo-pigmented scars (*striae albae*), have slight elevated violaceous or pink linear markings ^[2].

Dermoscopy: Four forms of SD were identified by high-resolution epiluminescence colorimetric analysis: Striae rubrae (red), albae (white), caeruleae (blue), and nigrae (black). The different colours of SD appears to be significantly influenced by the indirect as well as direct effects of melanocyte mechanobiology ^[3].

Histopathology: Is same as the scar, due to the connection between the formation of SD and scarring and healing of wounds, and so histopathology varies according to the duration of SD ^[4].

Pathophysiology

A dense network of internal keratin filaments joined by epithelia-specific junctions gives the epidermis its toughness. The extracellular matrix (ECM) is necessary for the strength of tensile force and flexibility of the dermis ^[5, 6].

Fibroblasts: Fibroblasts can contract in addition to their main function in the creation of ECM, particularly in the granulation tissues of scars ^[7].

Elastic fibers: comprised of two main parts: An amorphous core of elastin, a specific polymeric protein and a framework of 10-12 nm microfibrils ^[8].

Prevention

- **General measures:** Avoidance of brisk weight gain or loss.
- **Topical agents:** Centella asiatica extract creams, hyaluronic acid creams and almond oil.

Treatment

The major aims of SD treatment are to improve pigmentation, promote collagen synthesis, or decrease erythema [9].

1. Enhancing production of collagen

A Topical treatments: Tretinoin (trans-retinoic acid), Centella asiatica extract creams [10].

- **Centella asiatica extract creams:** Is thought to stimulate fibroblasts, increasing the production of collagen and elastic fibres [11].
- **Hyaluronic acid creams:** Stimulate fibroblast activity and collagen production [12].

B. Fractional lasers: Deliver microscopic beams leading to stimulated dermal collagen production [13].

C. Mechanical techniques

- **Microdermabrasion:** Is a skin resurfacing technique, that causes mechanical skin abrasion employing a stream of abrasive particles that is pressured [14].

D. Chemical peeling: Is a skin resurfacing technique to induce keratolysis or kerato-coagulation, resulting in subsequent exfoliation of these layers [15].

- **Trichloroacetic acid:** TCA is less controllable compared to various peeling substances and has a propensity to leave scars [16].
- **Glycolic acid:** 50-70% has been used, showing mild improvement of SD. PIH is a probable side effect [17].

E. Others

- **Radiofrequency:** Delivers RF current to the skin, causing an increase in collagen production. Sobhi, *et al.* [18] demonstrated that better results with fractional micro-needle radiofrequency (FMR).
- **Intense pulsed light (IPL):** Applies Xenon flash lamp to emit a spectrum-spanning (515 to 1200 nm) high-intensity visual beam that is not coherent [19].
- **Platelet-rich plasma (PRP):** Containing high concentration of growth factors and cytokines [20].
- **Percutaneous collagen induction therapy (PCT):** Involves producing micro clefts affecting the papillary dermis and increasing collagen production [21].

2. Reducing vascularity

Vascular Lasers

- **Pulsed dye laser (PDL):** A 585nm PDL is a non-ablative laser which penetrates dermis causing photocoagulation of vessels [22].
- **Neodymium: Yttrium aluminum garnet laser:** Has a strong affinity for vascular chromophores, which is associated with an enhanced effect on dermal collagen [23].

Micro Needling (MN): Is an innovative treatment strategy for healing wounds in dermatology that causes the epidermis to sustain the least amount of harm possible [24].

Mechanism of action of MN: The dermis regenerates as a result of the damage caused by a needle's penetration into the skin. With little harm to the epidermis, the needles pierce the stratum corneum and form tiny pores which are called micro-conduits [25, 26].

Instruments

- 1. Automated micro needling device:** A mechanical MN tool that resembles a pen is called a derma pen. The tip includes (12 to 36) needles equipped with a spring that vibrates as a stamp in two modes using electricity: low speed (412 cycles per minute) and high speed (700 cycles per minute) [27]. Figure 1.



Fig 1: The Derma pen [27]

- 2. Micro fabricated microneedle**

- **Solid microneedles:** Are placed to the skin and subsequently withdrawn, causing the stratum corneum to develop temporary aqueous micro-channels [28].
- **Dissolving microneedles:** After the array is inserted into the skin, its tips dissolve when they come into touch with the fluid in the skin's interstices [29].
- **Hollow microneedles:** Allow the administration of a fluid formulation via implanted hollow needles to deliver a specific drug into the skin [30].

- 3. Derma-stamp:** Utilized for scars that are localized, as scars of varicella, it has more focused treatment of individual scars [27, 31]. Figure 2.



Fig 2: Derma-stamp [24]

4. Microneedle derma roller: Encompasses a 12 cm lengthy handle and a 2 cm diameter drum-shaped cylinder at one end that is covered in 192 tiny needles in 24 circular arrays and 8 rows ^[32, 33]. Figure 3.



Fig 3: Picture of derma roller ^[24]

Procedure of MN: To enhance dermal collagen synthesis, the skin ought to be preoperatively monitored using vitamin A and C preparations twice a day for a minimum of one month. The process lasts for 45 to 1 hour underneath topical anaesthetic made up of a eutectic combination of prilocaine/tetracaine and lignocaine ^[34].

Postoperative care: Avoid sun exposure, post procedure topical antibiotic and if there was post procedure inflammation put topical steroid ^[35].

The use of MN in dermatology

There are many reasons for the usage of micro-needling. It has been employed either on its own or in conjunction with other therapeutic techniques. It frequently works in combination with a topical formulation, which improves its efficacy and penetration ^[33].

- 1. Drug transdermal delivery:** The MN approach is being extensively used to improve medication penetration through the skin barrier ^[36].
- 2. Scar reduction:** MN has been demonstrated to initiate the creation of collagen and the development of healing agents, but without destroying the epidermis or causing hyper-pigmentation ^[37].
- 3. Skin rejuvenation:** MN makes microscopic breaks in the blood vessels, led to the release of blood platelets which release a multiple growth factors which promotes both elastin and collagen synthesis ^[37].
- 4. Alopecia areata and androgenic alopecia:** One of its most recent developments is the use of MN over the scalp for alopecia. Individuals who take minoxidil are given home-use derma rollers, and improved hair growth is seen as a result ^[38].
- 5. Post-acne scars:** Post acne facial atrophic scarring is among the most common indicators of MN ^[39].
- 6. Pigmentation-Melasma and periorbital hyper melanosis:** MN is frequently used in combination with several skin lightening therapies and chemical peels to treat periorbital hyper-melanosis and melisma ^[40, 41].
- 7. Actinic keratoses:** All assessed indicators, including photoaging and face erythema, improved more with MAL-PDT in combination with derma rolling

compared to MAL-PDT alone ^[42].

- 8. Scars following surgery:** Camirand, who utilized tattoo gun needles to minimize the scars, was the first to study them. Since then, practically all forms of surgical scars have been treated with MN, and it has proven to be effective ^[24].
- 9. Vitiligo:** Assists drug penetration and may become an effective therapeutic modality for refractory vitiligo. Also, Therapy of vitiligo using MN in combination with tacrolimus or 5-fluorouracil is efficient ^[43].
- 10. Miscellaneous conditions:** Other applications of micro-needling include vitiligo, stretch marks, lax skin and axillary hyperhidrosis. Fractional RF MN which had good benefits in rosacea and post-acne erythema sufferers ^[24].

Applications of MN in treatment of stretch mark

In dermatology, micro needling is mostly utilized for two things: first, collagen production treatment for scars, stretch marks, and anti-aging effects; and second, deep transdermal administration of chemical compounds via stratum corneum. In order to promote collagen synthesis and improve product penetration, the micro-channel creation is used to treat stretch marks and acne scars ^[44].

Advantages and disadvantages

Since the patients don't have any open wounds, the healing process will be quick ^[35].

The technique is additionally believed to have certain negative side effects. The most prevalent ones include possible erythema and irritation that normally go away within a few hours, post-inflammatory hyperpigmentation, and local infections after using a no sterile tool. It has also been reported that materials utilized by needles might cause allergic contact dermatitis ^[45].

Contraindications of micro-needling

Patients on anticoagulant therapy, herpes labial is, active acne, or any localized illness, including warts, tendency for keloid formation, skin malignancy, and solar keratosis as the needles may disseminate abnormal cells by implantation ^[33].

Conflict of Interest

Not available

Financial Support

Not available

References

1. Maari C, Powell J. Atrophies of connective tissue. In: Bologna J, Schaffer J, Cerroni L, editors. Bologna Dermatology. 4th Ed: Elsevier; c2018. p. 1727-28.
2. De Angelis F, Kolesnikova L, Renato F, Liguori G. Fractional nonablative 1540-nm laser treatment of striae distensae in Fitzpatrick skin types II to IV: Clinical and histological results. *Aesthet Surg J*. 2011;31(4):411-9.
3. Elsaie ML, Baumann LS, Elsaie LT. Striae distensae (stretch marks) and different modalities of therapy: An update. *Dermatol Surg*. 2009;35(4):563-73.
4. Atwal GS, Manku LK, Griffiths CE, Polson DW. Striae gravidarum in primiparae. *Br J Dermatol*. 2006;155(5):965-9.
5. Veiga DF, Bussolaro RA, Kobayashi EY, Medeiros VP, Martins JR, Garcia EB, *et al*. Glycosaminoglycans of

- abdominal skin after massive weight loss in post-bariatric female patients. *Obes Surg.* 2011;21(6):774-82.
6. Birch HL. Extracellular matrix and ageing. *Subcell Biochem.* 2018;9(5):169-90.
 7. Des Jardins-Park HE, Foster DS, Longaker MT. Fibroblasts and wound healing: An update. *Regen Med.* 2018;13(5):491-5.
 8. Kielty CM, Sherratt MJ, Shuttleworth CA. Elastic fibres. *J Cell Sci.* 2002;115(14):2817-28.
 9. Hague A, Bayat A. Therapeutic targets in the management of striae distensae: A systematic review. *J Am Acad Dermatol.* 2017;77(3):559-68.
 10. Gamil HD, Ibrahim SA, Ebrahim HM, Albalat W. Platelet-rich plasma versus tretinoin in treatment of striae distensae: A comparative study. *Dermatol Surg.* 2018;44(5):697-704.
 11. García Hernández J, Madera González D, Padilla Castillo M, Figueras Falcón T. Use of a specific anti-stretch mark cream for preventing or reducing the severity of striae gravidarum. Randomized, double-blind, controlled trial. *Int. J Cosmet Sci.* 2013;35(3):233-7.
 12. Korgavkar K, Wang F. Stretch marks during pregnancy: A review of topical prevention. *Br J Dermatol.* 2015;172(3):606-15.
 13. Aldahan AS, Shah VV, Mlacker S, Samarkandy S, Alsaidan M, Nouri K. Laser and Light Treatments for Striae Distensae: A Comprehensive Review of the Literature. *Am J Clin Dermatol.* 2016;17(3):239-56.
 14. Ibrahim ZA, El-Tatawy RA, El-Samony MA, Ali DA. Comparison between the efficacy and safety of platelet-rich plasma vs. microdermabrasion in the treatment of striae distensae: Clinical and histopathological study. *J Cosmet Dermatol.* 2015;14(4):336-46.
 15. O'Connor AA, Lowe PM, Shumack S, Lim AC. Chemical peels: A review of current practice. *Australas J Dermatol.* 2018;59(3):171-81.
 16. Sato M, Fukuda A, Da Silva L, Mulinari-Brenner F, Tung R. Clinical evaluation of the efficacy of trichloroacetic acid and subcision, combined or isolated, for abdominal striae. *Surg Cosmet Dermatology.* 2009;1(4):158-62.
 17. Okano Y, Abe Y, Masaki H, Santhanam U, Ichihashi M, Funasaka Y. Biological effects of glycolic acid on dermal matrix metabolism mediated by dermal fibroblasts and epidermal keratinocytes. *Exp. Dermatol.* 2003;12(3):57-63.
 18. Sobhi RM, Mohamed IS, El Sharkawy DA, El Wahab M. Comparative study between the efficacy of fractional micro-needle radiofrequency and fractional CO(2) laser in the treatment of striae distensae. *Lasers Med Sci.* 2019;34(7):1295-304.
 19. Li YH, Wu Y, Chen JZ, Gao XH, Liu M, Shu CM, *et al.* Application of a new intense pulsed light device in the treatment of photoaging skin in Asian patients. *Dermatol Surg.* 2008;34(11):1459-64.
 20. Hodeib AA, Hassan GF, Ragab MN, Hasby EA. Clinical and Immuno histochemical comparative study of the efficacy of carboxytherapy vs platelet-rich plasma in treatment of stretch marks. *Journal of Cosmetic Dermatology.* 2018;17(6):1008-15.
 21. Aust MC, Fernandes D, Kolokythas P, Kaplan HM, Vogt PM. Percutaneous collagen induction therapy: An alternative treatment for scars, wrinkles, and skin laxity. *Plast Reconstr Surg.* 2008;121(4):1421-9.
 22. Naeini FF, Nikyar Z, Mokhtari F, Bahrami A. Comparison of the fractional CO2 laser and the combined use of a pulsed dye laser with fractional CO2 laser in striae alba treatment. *Adv. Biomed Res.* 2014;3(5):184.
 23. Goldman A, Rossato F, Prati C. Stretch marks: treatment using the 1,064-nm Nd: YAG laser. *Dermatol Surg.* 2008;34(5):686-91.
 24. Singh A, Yadav S. Microneedling: Advances and widening horizons. *Indian Dermatol Online J.* 2016;7(4):244-54.
 25. Doddaballapur S. Microneedling with dermaroller. *J Cutan Aesthet Surg.* 2009;2(2):110-1.
 26. Lee JC, Daniels MA, Roth MZ. Mesotherapy, microneedling, and chemical peels. *Clin Plast Surg.* 2016;43(3):583-95.
 27. Bhatnagar S, Dave K, Venuganti VVK. Microneedles in the clinic. *J Control Release.* 2017;26(3):164-82.
 28. Li WZ, Huo MR, Zhou JP, Zhou YQ, Hao BH, Liu T, *et al.* Super-short solid silicon microneedles for transdermal drug delivery applications. *Int. J Pharm.* 2010;389(1-2):122-9.
 29. Larraneta E, Lutton RE, Woolfson AD, Donnelly RF. Microneedle arrays as transdermal and intradermal drug delivery systems: Materials science, manufacture and commercial development. *Mater Sci. Eng R Rep.* 2016;104(5):1-32.
 30. Roxhed N, Griss P, Stemme G. Membrane-sealed hollow microneedles and related administration schemes for transdermal drug delivery. *Biomed Micro devices.* 2008;10(2):271-9.
 31. McCrudden MT, McAlister E, Courtenay AJ, González-Vázquez P, Singh TR, Donnelly RF. Microneedle applications in improving skin appearance. *Exp. Dermatol.* 2015;24(8):561-6.
 32. Bhardwaj D. Collagen induction therapy with derma roller. *Community Based Medical Journal.* 2012;1(1):35-7.
 33. Nair PA, Arora TH. Microneedling using derma roller: A means of collagen induction therapy. *GMJ.* 2014;69(1):24-7.
 34. Atiyeh BS, Abou Ghanem O, Chahine F. Microneedling: Percutaneous collagen induction (PCI) therapy for management of scars and photoaged skin-scientific evidence and review of the literature. *Aesthetic Plast Surg.* 2021;45(1):296-308.
 35. Aust MC, Fernandes D, Kolokythas P, Kaplan HM, Vogt PM. Percutaneous Collagen Induction Therapy: An Alternative Treatment for Scars, Wrinkles, and Skin Laxity. *Plastic and Reconstructive Surgery.* 2008;121:4.
 36. Badran MM, Kuntsche J, Fahr A. Skin penetration enhancement by a microneedle device (Derma roller) in vitro: Dependency on needle size and applied formulation. *Eur J Pharm Sci.* 2009;36(4-5):511-23.
 37. Arora S, Gupta PB. Automated microneedling device-a new tool in dermatologist's kit-a review. *J Pakistan Assoc Dermatologists.* 2012;22(4):15-20.
 38. Chandrashekar B, Yepuri V, Mysore V. Alopecia areata-successful outcome with microneedling and triamcinolone acetonide. *J Cutan Aesthet Surg.* 2014;7(1):63-4.
 39. Rullan PP, Olson R, Lee KC. A combination approach

- to treating acne scars in all skin types: Carbolic chemical reconstruction of skin scars, blunt bi-level cannula subcision, and microneedling-a case series. *J Clin Aesthet Dermatol.* 2020;13(5):19-23.
40. Kontochristopoulos G, Kouris A, Platsidaki E, Markantoni V, Gerodimou M, Antoniou C. Combination of microneedling and 10% trichloroacetic acid peels in the management of infraorbital dark circles. *J Cosmet Laser Ther.* 2016;18(5):289-92.
 41. Sahni K, Kassir M. Dermafrac™: An innovative new treatment for periorbital melanosia in a dark-skinned male patient. *J Cutan Aesthet Surg.* 2013;6(3):158-60.
 42. Steeb T, Niesert AC, French LE, Berking C, Heppt MV. Microneedling-assisted photodynamic therapy for the treatment of actinic keratosis: Results from a systematic review and meta-analysis. *J Am Acad Dermatol.* 2020;82(2):515-9.
 43. Mina M, Elgarhy L, Al-Saeid H, Ibrahim Z. Comparison between the efficacies of microneedling combined with 5-fluorouracil vs microneedling with tacrolimus in the treatment of vitiligo. *J Cosmet Dermatol.* 2018;17(5):744-51.
 44. Arora S, Gupta PB. Automated microneedling device-a new tool in dermatologist's kit-a review. *Journal of Pakistan Association of Dermatologists.* 2012;22:4.
 45. Pahwa M, Pahwa P, Zaheer A. Tram track effect after treatment of acne scars using a microneedling device. *Dermatol Surg.* 2012;38(7):1107-8.

How to Cite This Article

Ghanem SS, Radwan NK, Hassan GF, Nassar SO. Micro needling in treatment of stretch marks. *International Journal of Dermatology, Venereology and Leprosy Sciences.* 2023;6(2):17-21.

Creative Commons (CC) License

This is an open-access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.