European Journal of Clinical Pharmacy
Print ISSN: 2385-409X **Online ISSN**: Applied Website:
https://farmclin.com/

The Effectiveness of Prp, Microneedling Followed By Glutathione for Effacement of Acne Scar and Pigmentation - A Case Series

Dr. Sunil Yesvanthu S V[1], *Dr Rubin S John[2], Dr. Murugesan Krishnan[3], Dr.Santhosh P.Kumar[4]

[1]Resident, Department of oral and maxillofacial surgery, Saveetha Dental College and hospitals
Saveetha Institute of Medical and Technical Sciences (SIMATS) Saveetha University, Chennai-600077, Tamil Nadu, India.
Email.id: 152304004.sdc@saveetha.com
[2]Senior Lecturer, Department of oral and maxillofacial surgery, Saveetha Dental College and hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University
Chennai-600077, Tamil Nadu, India
Email id: rubinjohn90@gmail.com
[3]Professor, Department of oral and maxillofacial surgery, Saveetha Dental College and hospitals
Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University
Chennai-600077, Tamil Nadu, India.
Email id: dr.mkm70@gmail.com
[4]Professor, Department of oral and maxillofacial surgery, Saveetha Dental College and hospitals
Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University
Chennai-600077, Tamil Nadu, India.
Email id: santhoshkumar@saveetha.com

Corresponding author *:
Dr Rubin S John
Email id: rubinjohn90@gmail.com

ABSTRACT

INTRODUCTION: Platelet-rich plasma (PRP) is a form of cosmetic injectable treatment on patients' own blood. When injected back into the skin, it accelerates the body's natural production of collagen and elastin to provide overall skin rejuvenation. PRP is popular in aesthetic interventions. PRP shows a high concentration of growth factors to target tissues. The PRP facial can be beneficial to people who have wrinkles, pigmentation or scars.

AIM: To assess the effectiveness of PRP, microneedling followed by glutathione for effacement of acne scar.

MATERIALS AND METHODS: For this case study, 5 patients have been selected with chief complaints of acne and pigmentation in the right and left facial region in Saveetha dental college. Thorough history of each patient was taken including demographic history, disease history – age of onset, frequency, duration, and presence of post inflammatory hyperpigmentation

RESULTS AND DISCUSSION: Results show good responses on the right and left side of the face. From our study, it shows acne scar and pigmentation of PRP and glutathione has significant reduction in the acne and pigmentation.

CONCLUSION: PRP micro- needling with glutathione is an effective modality for the treatment of acne scars and pigmentation. Microneedling combined with PRP is markedly effective in the treatment of all types of scars (rolling, boxcar, and ice pick) while PRP alone is markedly effective only for the treatment of rolling scars.

KEYWORDS: Platelet rich plasma, Microneedling, Glutathione, Acne scar, Pigmentations

How to Cite: Dr. Sunil Yesvanthu S V, Dr Rubin S John, Dr. Murugesan Krishnan, Dr.Santhosh P.Kumar, (2026) The Effectiveness of Prp, Microneedling Followed By Glutathione for Effacement of Acne Scar and Pigmentation - A Case Series, European Journal of Clinical Pharmacy, Vol.8, No.1, pp. 1720-1726

INTRODUCTION

Platelet-rich plasma (PRP) is a type of restorative injectable treatment that utilizes the patient's own platelet rich plasma. The plasma part contains undeveloped cells and development rich platelets(1). At the point when infused into the skin, it speeds up the body's regular creation of collagen and elastin to generally give skin restoration. PRP is a well known item utilized in clinical and stylish mediations. PRP can possibly show a high grouping of development variables to target tissues(2). The PRP facial can be used to heal acne scars, rejuvenate your face, reduce the appearance of stretch marks, restore hair loss, heal wounds faster, and repair sun-damaged skin(3). By setting PRP back into the skin, cell multiplication is empowered. This prompts an expansion in elastin and collagen creation(4). Accordingly, the skin will look more tight, more full, and smoother. Dermatological signs including wound healing, pigmentation, alopecia, scar the board along with soft-tissue volume decrease(5). Their beneficial potential rests on the ability to deliver a high concentration of growth factors to the target tissues.

PRP is concentrated blood plasma that contains around 3 to multiple times the quantity of platelets tracked down in ordinary

circling blood(6). Moreover, it contains platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), transforming growth factor (TGF) and other bioactive proteins that assist in the revival of skin. PRP invigorates collagen creation and cell migration, considering the elimination of lines, folds, and wrinkles(7). Results from PRP treatment are normal looking and inconspicuous, and they can keep going for up to two years(8). In addition, PRP is minimally invasive, has no risk of hypersensitive response, and can be utilized to treat almost any region of the body without dangers of side effects(9). The body cells which help the tissue in recuperating and delivering new cells are called Platelets. PRP is infused into targeted regions of the skin and afterward shapes an environment which helps in developing collagen, and recovers the tissues(10). PRP relaxes wrinkles and makes skin surface and tone that is smoother, more youthful and better. PRP empowers the collagen developed by the body and stimulates it to design complete facial restoration(6). It is additionally used to balance out the appearances which look tired, supports topping off hollowed cheeks, complexion extemporization, making the skin tight and smooth, and fill in the skin regions(11).

Microneedling is a negligibly intrusive corrective strategy that is utilized to treat skin scars, acne by invigorating collagen creation(12). It causes mechanical expulsion of the shallow epidermis and invigorates the development of new cells which further develop skin break out scars, and mottled pigmentation. Otherwise called collagen induction therapy, this treatment makes miniature cuts in the skin utilizing smaller than expected, sanitized needles(13). Microneedling, or collagen induction therapy (CIT), is the cycle by which your esthetician or dermatologist utilizes a gadget to control injury to your skin. By controlling the injury to your skin, your dermatologist can actuate development calculations that help make new collagen and elastin(14). At the point when patients ask, does microneedling forever eliminate skin break out scars, the response is yes! Because of its capacity to launch collagen creation in the skin, microneedling treatment is very compelling at forever lessening or disposing of the presence of atrophic skin break out scars(15).

Glutathione restrains melanin development, these infusions can be surrendered to the patches of pigmentation or in mix with different strategies like Mesotherapy, Dermaroller(16). Glutathione is a viable cell antioxidant that can give you a lighter and more white complexion, eliminating all skin inconsistencies(17). The infusions likewise assist with treating your scars, dark spots, and wounds - reestablish your natural radiance by giving your skin a glowy and new surface(18). Glutathione settles a few skin issues that incorporate Hyperpigmentation, uneven skin complexion, Melasma, Skin break out, wrinkles, scarring, age spots, sunspots, dark spots and signs of aging(19). The sterile, chemically unadulterated microneedle serum with glutathione is applied before the treatment and afterward worked straightforwardly into the skin with a dermaroller or dermapen(20). The subsequent miniature hole boosts productivity dramatically. Glutathione can ease up the skin by changing melanin over completely to a lighter tone by deactivating the catalyst tyrosinase(21). Glutathione assists with easing up and light up the skin by eradicating hyper-pigmentation and hindering melanin creation in cells. It also possesses high anti-aging properties(22).

There is no such study conducted previously in which the combinational treatment of PRP, glutathione and microneedling has not been done for treating the acne scar and pigmentation. Hence the aim of the study is to assess the PRP, microneedling followed by glutathione for effacement of acne scar and pigmentation.

MATERIALS AND METHODS

For this case study, 5 patients have been selected with chief complaints of acne and pigmentation in the right and left facial region in Saveetha dental college. Complete history of each patient was taken including demographic history, disease history – age of onset, frequency, duration, and presence of post inflammatory hyperpigmentation – treatment history, family history, and personal history. Patients were explained in detail about the procedure, time required, and prognosis of the treatment. Pre operative image shows that the patient has atrophic acne scar associated with pigmentation. Visual analog scale responses have been recorded before starting the treatment. Treatment consent was taken. 10ml of blood is withdrawn from the patients and collected in a tube. PRP was obtained manually by a two-step procedure using a centrifuge machine. First spin was performed at 2400 RPM for 10 mins at room temperature. It was done to separate plasma with platelets and white blood cells from red blood cells (RBCs). RBCs being heavy settled down at the bottom. The plasma was gently aspirated from each tube and was transferred to a second tube. Second spin was performed at room temperature at the rate of 3600 RPM for 15 min, thus obtaining a two-part plasma. Upper two thirds, being poor in platelets, was platelet-poor plasma (PPP) and the lower one third, being rich in platelets, was PRP. PPP was first gently aspirated to avoid its mixing with PRP and was then discarded.

Just before injecting, we applied a topical anaesthetic cream to the face and left it for 30 min. PRP was then injected intradermally through a 30G needle (insulin syringe) deep to each scar going through normal skin, on both the cheeks. The technique used for injecting PRP was “linear threading and fanning.” The amount injected was sufficient to elevate the scar, and the end point was taken as blanching and elevation of the scar. The mesotherapy begins with PRP and glutathione, 0.15ml/cm2 is injected in the superior and inferior malar region and forehead which is done in OT. Micro-needling was done using a dermaroller. The depth of the dermaroller is 1mm. After injecting, the site was gently massaged and compressed for a few seconds to control the bleeding. Topical antibiotic cream (fusidic acid 2% cream) was applied to the treated area. All the patients were recalled up monthly for 3 months.

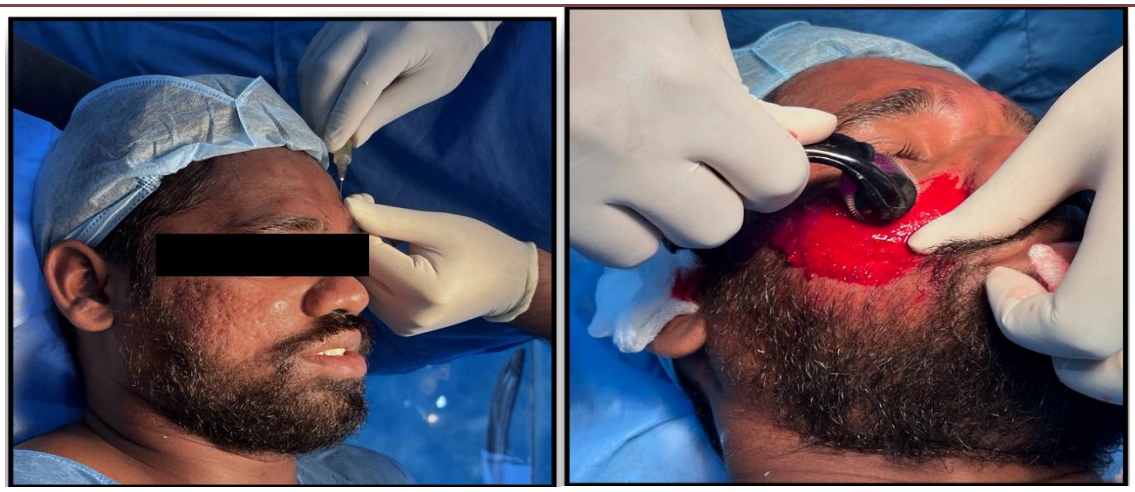


Fig 2 and Fig 3

Fig 2 shows injection of PRP in patients face which was done in OT. Fig 3 shows microneedling was done using a dermaroller.

RESULTS

This study included 5 patients with facial acne scar. Results show good responses on the right and left side of the face. There is a decrease in acne scar and pigmentation in the superior and inferior malar region. From our study, it shows acne scar and pigmentation of PRP and glutathione has significant reduction in the acne and pigmentation. There is a reduction in the acne when compared to pre operative.

Fig 4 and Fig 5

Fig 4 shows the Preoperative image of the left malar region and Fig 5 shows the review image of the left malar region, which shows significant reduction of the acne scar and pigmentation in the malar region.

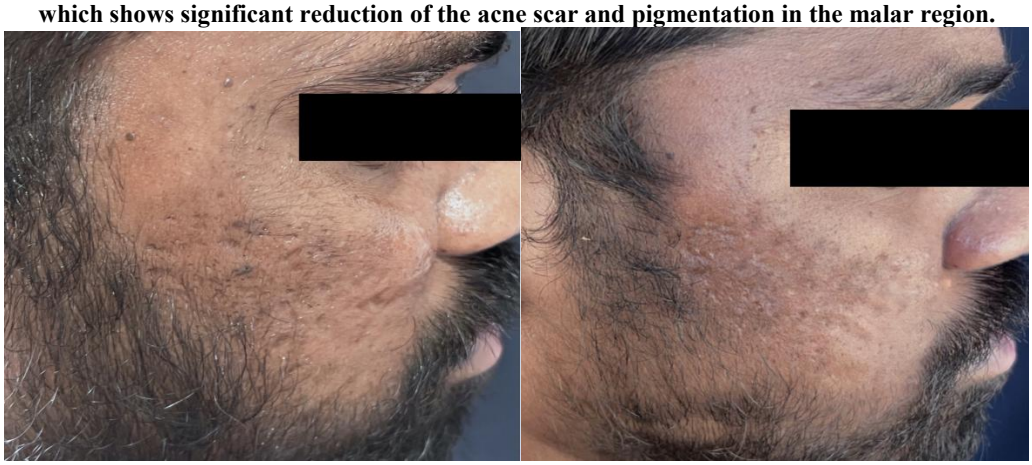


Fig 6 and Fig 7

Fig 6 shows the Preoperative image of the right malar region and Fig 7 shows the review image of the right malar region, which shows significant reduction of the acne scar and pigmentation in the malar region.

Results show good responses on the right and left side of the face. There is a decrease in acne scar and pigmentation in the superior and inferior malar region. From our study, it shows acne scar and pigmentation of PRP and glutathione has significant reduction in the acne and pigmentation. There is a reduction in the acne when compared to pre operative.

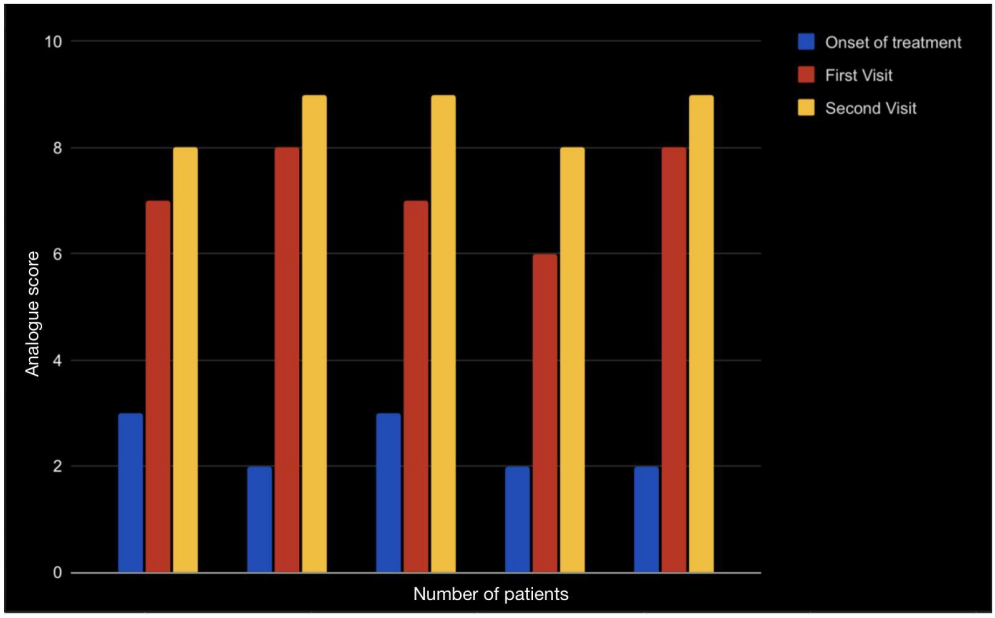
Patients Satisfaction score through visual analogue scale

On asking the patients to score their satisfaction level from 0 to 10. Out of 5 patients, 3 patients gave a score of 9 and 2 patients gave a score of 8 on the second visit of the treatment.

Onset of treatment	First Visit	Second Visit
3	7	8
2	8	9
3	7	9
2	6	8
2	8	9

Table1

Table1 shows average value of visual analog scale during onset of the treatment 2.4, during the first visit average value is 7.2 and during the second visit is 8.6



Graph shows correlation between analogue scale and number of patients. In each patient, the analogue score increases on each visit, this shows there is effect in PRP with microneedling followed by glutathione.

DISCUSSION:

By investigating the results of 14 non-randomized trials and randomized clinical trials, we noticed that a consolidated treatment with microneedling and PRP was related with better improvement of atrophic skin inflammation scars than microneedling without PRP(23). The efficiency of a combination treatment was proven by the higher pace of critical improvement. Growth factors contained in PRP have positive effects on the skin break out, aging process(24). The quality of this treatment can be made sense of by the stimulation of fibroblasts, expanded secretion of collagen and endogenous hyaluronic acid and recovery of tendon flexibility(25). Taken together, the results of our meta-investigation showed that joint treatment with microneedling with PRP is more viable than microneedling without PRP for patients with skin break out scars, without further increasing the risk of adverse events. These discoveries support PRP as an adjuvant treatment for patients with skin break out scars getting microneedling treatment(26).

All these positive consequences of it being a strong treatment provoked us to concentrate on its job as an essential treatment choice in skin break out scars(27).

Heterogeneity of the examinations and broadly factor result measures, correlation between platelet-rich plasma medicines and subsequent statistical analysis could not be performed. Although these examinations utilise different subjective and objective assessment techniques, the expansion of platelet-rich plasma gives upgrades in skin break out scarring, higher patient fulfilment,

and diminished post-procedure margin time(28). PRP can work on the nature of atrophic skin inflammation scars treated with ablative fractional CO2 laser and reduce the length of laser-related secondary effects including oedema and erythema(29). As to scars, PRP might further develop wound healing and early scar quality; moreover, consolidation of PRP in fat-grafting methodology embraced related to non-ablative, partial laser can add to all the more likely injury mending as well as a significant improvement in surface, variety and shape in horrible scar resurfacing(30). There are no high level examinations at present to help the joining of autologous platelet-based concentrates in the administration of scars(31).

PRP is a promising assistant in scar management practice. Further exploration with long term follow-up is justified to depict the worth of this methodology in various subtypes of scars. PRP heals skin, breaks out scars and encounters facial restoration(32). This healing system permits the skin all over to feel hydrated, plumper and more youthful. Plasma and platelets should be visible as the groundwork of incredible skin(4). By expanding the quantity of platelets in the space of your face that have been harmed by the sun, scarred by skin break out, or losing versatility, you can add a lift to your skin cells so these regions will normally recuperate on their own(33). Since PRP treatment utilizes your own plasma and platelets that are made normally in your body, the potential confusions are radically different from other skincare treatment techniques(34).

In our review, we found that all kinds of scars having differing spans showed reaction to PRP infusions with regards to decrease in size. This is the first to incorporate glutathione in PRP followed by microneedling. And it shows good results. On a visual analog scale, there is a good response on each visit with PRP and microneedling. Pain after completion of treatment of the strategy was not huge in the greater part. No patient revealed critical bleeding. None created dynamic skin inflammation during the treatment(35).

CONCLUSION

The use of autologous plasma derived adjuncts has a number of potential advantages by virtue of the ability to deliver a high concentration of growth factors to target tissues and potentially improve wound healing and scarring parameters. PRP micro-needling with glutathione is an effective modality for the treatment of acne scars and pigmentation. Microneedling combined with PRP is markedly effective in the treatment of all types of scars (rolling, boxcar, and ice pick) while PRP alone is markedly effective only for the treatment of rolling scars, without further increasing the risk of adverse effects. PRP as an adjuvant therapy for patients with acne scars receiving microneedling therapy.

Conflicts Of Interest

The authors declare no conflict of interest.

Acknowledgement

The authors of this study titled “PRP microneedling followed by glutathione for effacement of acne scar and pigmentation. A case series”would like to thank the editors and the authors of the journal for the source of scientific compilation of this article.

Ethical Approval Number

Study entitled "PRP, MICRONEEDLING FOLLOWED BY GLUTATHIONE FOR EFFACEMENT OF ACNE SCAR AND PIGMENTATION. A CASE SERIES" is IHEC/SDC-1839/22/OMFS/565

REFERENCE

1. Oppenheim JJ, Rossio J, Rossio JL, Gearing AJH. Clinical Applications of Cytokines: Role in Pathogenesis, Diagnosis, and Therapy [Internet]. Oxford University Press, USA; 1993. 406 p. Available from: https://books.google.com/books/about/Clinical_Applications_of_Cytokines.html?hl=&id=kl3SOpI9NLMC
2. Clark RAF. The Molecular and Cellular Biology of Wound Repair [Internet]. Springer Science & Business Media; 2013. 612 p. Available from: https://play.google.com/store/books/details?id=HOzcBwAAQBAJ
3. Aldecoa EA, Ortiz IA. A New Approach to Bone Regeneration: Plasma Rich in Growth Factors(P.R.G.F.) [Internet]. 2001. 277 p. Available from: https://books.google.com/books/about/A_New_Approach_to_Bone_Regeneration.html?hl=&id=liF1GQAACAAJ
4. Tosti A, De Padova MP, Fabbrocini G, Beer KR. Acne Scars: Classification and Treatment, Second Edition [Internet]. CRC Press; 2018. 179 p. Available from: https://play.google.com/store/books/details?id=K_p0DwAAQBAJ
5. Micali G, Lacarrubba F. Dermatoscopy in Clinical Practice: Beyond Pigmented Lesions [Internet]. CRC Press; 2016. 208 p. Available from: https://play.google.com/store/books/details?id=oArYCwAAQBAJ
6. Lee JW, Kim BJ, Kim MN, Mun SK. The efficacy of autologous platelet rich plasma combined with ablative carbon dioxide fractional resurfacing for acne scars: a simultaneous split-face trial. Dermatol Surg [Internet]. 2011 Jul;37(7):931–8. Available from: http://dx.doi.org/10.1111/j.1524-4725.2011.01999.x
7. Chawla S. Split Face Comparative Study of Microneedling with PRP Versus Microneedling with Vitamin C in Treating Atrophic Post Acne Scars. J Cutan Aesthet Surg [Internet]. 2014 Oct;7(4):209–12. Available from: http://dx.doi.org/10.4103/0974-2077.150742
8. Sánchez AR, Sheridan PJ, Kupp LI. Is platelet-rich plasma the perfect enhancement factor? A current review. Int J Oral Maxillofac Implants [Internet]. 2003 Jan;18(1):93–103. Available from: https://www.ncbi.nlm.nih.gov/pubmed/12608674
9. Dohan Ehrenfest DM, Andia I, Zumstein MA, Zhang CQ, Pinto NR, Bielecki T. Classification of platelet concentrates (Platelet-Rich Plasma-PRP, Platelet-Rich Fibrin-PRF) for topical and infiltrative use in orthopedic and sports

medicine: current consensus, clinical implications and perspectives. Muscles Ligaments Tendons J [Internet]. 2014 Jan;4(1):3–9. Available from: https://www.ncbi.nlm.nih.gov/pubmed/24932440
10. Kadunc BV, Trindade de Almeida AR. Surgical treatment of facial acne scars based on morphologic classification: a Brazilian experience. Dermatol Surg [Internet]. 2003 Dec;29(12):1200–9. Available from: http://dx.doi.org/10.1111/j.1524-4725.2003.29388.x
11. Oh IY, Kim BJ, Kim MN. Depressed Facial Scars Successfully Treated with Autologous Platelet-Rich Plasma and Light-Emitting Diode Phototherapy at 830 nm. Ann Dermatol [Internet]. 2014 Jun;26(3):417–8. Available from: http://dx.doi.org/10.5021/ad.2014.26.3.417
12. Jacob CI, Dover JS, Kaminer MS. Acne scarring: a classification system and review of treatment options. J Am Acad Dermatol [Internet]. 2001 Jul;45(1):109–17. Available from: http://dx.doi.org/10.1067/mjd.2001.113451
13. Sadick NS. Platelet-Rich Plasma in Dermatologic Practice [Internet]. Springer Nature; 2021. 120 p. Available from: https://play.google.com/store/books/details?id=OnggEAAAQBAJ
14. Pai GS. Complications in Cosmetic Dermatology: Crafting Cures [Internet]. JP Medical Ltd; 2016. 480 p. Available from: https://books.google.com/books/about/Complications_in_Cosmetic_Dermatology.html?hl=&id=HXOJDAAAQBAJ
15. Fife D. Practical evaluation and management of atrophic acne scars: tips for the general dermatologist. J Clin Aesthet Dermatol [Internet]. 2011 Aug;4(8):50–7. Available from: https://www.ncbi.nlm.nih.gov/pubmed/21909457
16. 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 [Internet]. 2008 Apr;121(4):1421–9. Available from: http://dx.doi.org/10.1097/01.prs.0000304612.72899.02
17. Chasseaud LF. The Role of Glutathione and Glutathione S'transferases in the Metabolism of Chemical Carcinogens and Other Electrophilic Agents [Internet]. 1979. 99 p. Available from: https://books.google.com/books/about/The_Role_of_Glutathione_and_Glutathione.html?hl=&id=BoigPgAACAAJ
18. Benathan M, Virador V, Furumura M, Kobayashi N, Panizzon RG, Hearing VJ. Co-regulation of melanin precursors and tyrosinase in human pigment cells: roles of cysteine and glutathione. Cell Mol Biol [Internet]. 1999 Nov;45(7):981–90. Available from: https://www.ncbi.nlm.nih.gov/pubmed/10644002
19. Villarama CD, Maibach HI. Glutathione as a depigmenting agent: an overview. Int J Cosmet Sci [Internet]. 2005 Jun;27(3):147–53. Available from: http://dx.doi.org/10.1111/j.1467-2494.2005.00235.x
20. Watanabe F, Hashizume E, Chan GP, Kamimura A. Skin-whitening and skin-condition-improving effects of topical oxidized glutathione: a double-blind and placebo-controlled clinical trial in healthy women. Clin Cosmet Investig Dermatol [Internet]. 2014 Oct 17;7:267–74. Available from: http://dx.doi.org/10.2147/CCID.S68424
21. Handog EB, Datuin MSL, Singzon IA. An open-label, single-arm trial of the safety and efficacy of a novel preparation of glutathione as a skin-lightening agent in Filipino women. Int J Dermatol [Internet]. 2016 Feb;55(2):153–7. Available from: http://dx.doi.org/10.1111/ijd.12999
22. Galván I, Alonso-Alvarez C, Negro JJ. Relationships between hair melanization, glutathione levels, and senescence in wild boars. Physiol Biochem Zool [Internet]. 2012 Jul;85(4):332–47. Available from: http://dx.doi.org/10.1086/666606
23. Goodman GJ. Management of post-acne scarring. What are the options for treatment? Am J Clin Dermatol [Internet]. 2000 Jan;1(1):3–17. Available from: http://dx.doi.org/10.2165/00128071-200001010-00001
24. Habbema L, Verhagen R, Van Hal R, Liu Y, Varghese B. Minimally invasive non-thermal laser technology using laser-induced optical breakdown for skin rejuvenation. J Biophotonics [Internet]. 2012 Feb;5(2):194–9. Available from: http://dx.doi.org/10.1002/jbio.201100083
25. Orentreich DS, Orentreich N. Subcutaneous incisionless (subcision) surgery for the correction of depressed scars and wrinkles. Dermatol Surg [Internet]. 1995 Jun;21(6):543–9. Available from: http://dx.doi.org/10.1111/j.1524-4725.1995.tb00259.x
26. Birchall JC, Clemo R, Anstey A, John DN. Microneedles in clinical practice--an exploratory study into the opinions of healthcare professionals and the public. Pharm Res [Internet]. 2011 Jan;28(1):95–106. Available from: http://dx.doi.org/10.1007/s11095-010-0101-2
27. Sharad J, Vedamurthy M. Aesthetic Dermatology: Current Perspectives [Internet]. Jaypee Brothers Medical Publishers; 2018. 386 p. Available from: https://books.google.com/books/about/Aesthetic_Dermatology.html?hl=&id=83KSDwAAQBAJ
28. Lima E, Lima M. Percutaneous Collagen Induction With Microneedling: A Step-by-Step Clinical Guide [Internet]. Springer Nature; 2020. 347 p. Available from: https://play.google.com/store/books/details?id=fygGEAAAQBAJ
29. Goodman GJ, Baron JA. Postacne scarring--a quantitative global scarring grading system. J Cosmet Dermatol [Internet]. 2006 Mar;5(1):48–52. Available from: http://dx.doi.org/10.1111/j.1473-2165.2006.00222.x
30. Chung HJ, Uitto J. Type VII collagen: the anchoring fibril protein at fault in dystrophic epidermolysis bullosa. Dermatol Clin [Internet]. 2010 Jan;28(1):93–105. Available from: http://dx.doi.org/10.1016/j.det.2009.10.011
31. Doddaballapur S. Microneedling with dermaroller. J Cutan Aesthet Surg [Internet]. 2009 Jul;2(2):110–1. Available from: http://dx.doi.org/10.4103/0974-2077.58529
32. Leheta T, El Tawdy A, Abdel Hay R, Farid S. Percutaneous collagen induction versus full-concentration trichloroacetic acid in the treatment of atrophic acne scars. Dermatol Surg [Internet]. 2011 Feb;37(2):207–16. Available from: http://dx.doi.org/10.1111/j.1524-4725.2010.01854.x
33. Gawdat HI, Hegazy RA, Fawzy MM, Fathy M. Autologous platelet rich plasma: topical versus intradermal after fractional ablative carbon dioxide laser treatment of atrophic acne scars. Dermatol Surg [Internet]. 2014 Feb;40(2):152–61. Available from: http://dx.doi.org/10.1111/dsu.12392

34. Khunger N. Step by Step: Treatment of Acne Scars [Internet]. JP Medical Ltd; 2014. 320 p. Available from: https://books.google.com/books/about/Step_by_Step_Treatment_of_Acne_Scars.html?hl=&id=1LGHAwAAQBAJ
35. Khetarpal S. Aesthetic Clinician's Guide to Platelet Rich Plasma [Internet]. Springer Nature; 2021. 131 p. Available from: https://books.google.com/books/about/Aesthetic_Clinician_s_Guide_to_Platelet.html?hl=&id=Z0dFEAAAQBAJ