

CASE STUDY

A post-procedural hydrogel mask (Maskād™) improves the clinical outcome of microdermabrasion, or micro-needling coupled to platelet-rich plasma

Nicholas J. Sadgrove, PhD., and Gordon Sasaki, MD,

Abstract

Background: Regenerative therapies that promote micro-injury that concomitantly administer growth factors, to trigger dermal restructuring and rejuvenation, continue to be the most effective in the arsenal of tools against the signs of dermal aging. Microdermabrasion, platelet-rich plasma, and micro-needling are popular choices because of the accelerated rate of change to the dermis achieved with minimal to no scarring or fibrosis development. However, both cosmetic procedures create temporary discolouration and microinflammation that compel candidates to refrain from social activities or visiting their workplaces. It is considered dangerous to use make-up to cover these disagreeable effects, potentially leading to infection, granuloma, or antagonism of the clinical objective. Hence, candidates seek a solution to reduce 'down-time' and optimise the aesthetic outcome from these procedures.

Methods: Part A: One male and five female candidates received microdermabrasion and then a post procedural hydrogel mask (Maskād™ Professional Post Procedure Mask), covering only the right side of the face (split-face study) for 15 mins, leaving the left side unmasked. Part B: A second group, one male and two females, received a micro-needling procedure, following by a post procedural hydrogel mask (Maskād™ Professional Post Procedure Mask) over the entire face, saturated with platelet-rich plasma, which was applied for 15 minutes. A 5-point Likert scale was used to assess erythema, irritation, swelling, warmth, and pain.

Results: In part A, the split face study, the candidate demonstrated less inflammation and discolouration on the right side of the face, corresponding to the area covered by the mask. These reduced negative effects were evident at all stages of post procedure and were, on average, reduced by 50%. In part B, stronger protective effects were observed, by comparison with part A.

Conclusion: The post procedural masks accelerated recovery from both microdermabrasion and micro-needling (with platelet-rich plasma). Positive effects included reduced erythema, irritation, swelling, warmth, and pain.

TL21-3

Introduction

Over the last few decades, new technology to enact dermal rejuvenation has been developed, making it possible to achieve noticeable cosmetic changes without the use of expensive and unnatural looking surgical procedures. Age-defying procedures have arrived at an opportune point in time. The nutritional challenges associated with the modern lifestyle are antagonistic to a successful ageing process. Consequently, people in mid-life are perceiving that their external age is not consistent with the projected truth. Considering this, amelioration of the long-term effects of extrinsic insult to the dermis is considered a significant milestone in achieving both physical and psychological health¹, because both are listed as objectives of 'successful ageing'.

Some of the less accepted interventions to dermal age reversal involve the use of surgery to tighten the skin, and the use of retinoids that may create rashes, redness or soreness, putting a bottleneck in the timeline toward efficacy. Furthermore, concern for the negative effects of synthetics or retinoids has persuaded candidates to experiment with treatments that are considered more natural^{1,2}. Hence, procedures that create micro-injury and stimulate the secretion of growth factors, or administer growth factors, in the form of platelet rich plasma from the same candidate, are more accepted.

Micro-needling mimics skin injury without significant rupturing of the dermis. The extracellular matrix of the dermis remains intact, which prevents cellular proliferation and scar formation, yet the metalloproteinases are expressed in response, causing a rise in signalling peptides that are derived from enzymatically sliced proteins². The outcome is a dermal restructuring episode that rejuvenates collagen and maintains the high collagen-1 to collagen-3 ratio of normal skin, but this outcome is dependent on post procedural initiatives³. Micro-needling also stimulates the secretion of growth factors, however, the use of platelet-rich plasma, donated from the same

candidate, is a method commonly used to increase the amount of growth factors present at the site of dermal micro-injury. The combination of micro-needling with platelet-rich plasma has been recognised as safe and effective in a previous study⁴. Furthermore, it was realized that the aesthetic outcome was significantly enhanced by the combination of platelet-rich plasma and micro-needling⁵.

There is a risk that post procedural infections and scars can form if candidates fail to adequately care for the treated tissues. Post procedural topicals should aim first to hydrate as efficiently as possible to streamline biochemical processes involved in tissue recovery and repair, and also to optimise skin penetrating effects of post- or mid-procedural ingredients, such as platelet-rich plasma⁶.

Unfortunately, microinflammation occurs in most candidates post procedure, due to the release of inflammatory mediators from micro injury. The outcome includes vasodilatation, erythema, edema and discomfort or pain. Topical ingredients that are adequately delivered by enhancing the barrier water content of the dermis, can significantly attenuate the inflammatory effects and neutralise the reactive oxygen species generated, streamlining the rejuvenation process of aesthetic procedures⁷.

In the current case study, a hydrating mask was used to accelerate post procedural recovery from microdermabrasion and micro-needling. The significance of pure hydration cannot be underestimated, since studies have demonstrated that these slightly invasive techniques are associated with significant trans-epidermal water loss, and it is conceded that prevention of water loss will significantly improve the aesthetic outcome of a micro-needling or microdermabrasion procedure⁸.



Figure 1. Patient wearing Maskād following micro-needling & PRP

Method

Microdermabrasion and micro-needling focused on areas between the hairline and jaw line, avoiding the eyes, nostrils and lips.

Part A: Following microdermabrasion, the skin was gently cleansed with cool water and the hydrogel mask (Maskād™ Professional Post Procedure Mask) was applied to the right side of the face only (treated side). The untreated side was exposed to air and no further treatment was applied. After 15 minutes, the mask was removed, and the erythema, irritation, swelling, warmth, and pain of the treated side

verses the untreated side were assessed and classified according to a 10-point Likert scale, with 1 being very minor, and 10 being extremely severe.

Part B: Following micro-needling the active side of the hydrogel mask (Maskād™ Professional Post Procedure Mask) was coated in platelet-rich plasma and applied to the whole face of the candidate for 15 mins. The candidates were assessed using the same 10-point Likert scale.

Results

Subjective and objective evaluation immediately after treatment, following the first application of the hydrating mask demonstrated a pronounced positive aesthetic. When candidates were assessed according to the Likert scale (Table 1) all five post-procedural side effects were significantly attenuated, contrasting with the non-masked side of the face. This outcome is evident from the half-face mask procedure, which contrasts between mask and no mask. On average the negative effects were reduced to 31% for erythema, 45% for

irritation, 84% for swelling, 35% for warmth and 52% for pain (Figure 1). The average overall is a reduction to 49.8% of side-effects from the procedure. A more pronounced outcome was achieved in Part B of the study (Table 2), which is a full-face masking treatment, and although the procedures between part A and B were not identical, some idea of side effects without masking can be garnished from inspection of Table 1.

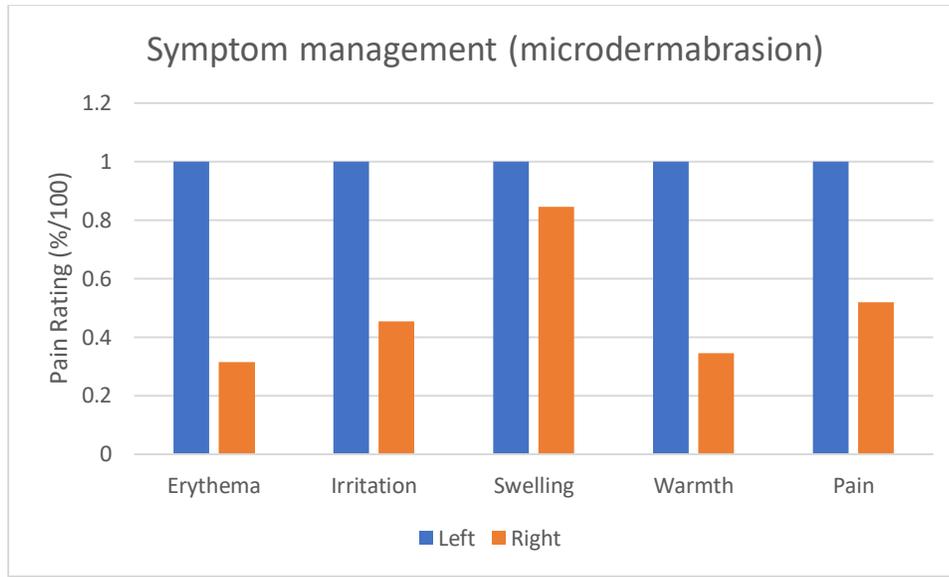


Figure 1 – Symptom management from microdermabrasion in a split face study

Table 1 - Half-face Mask (Medical SkinCare Treatment): Raw Data

Treatment	Erythema	Irritation	Swelling	Warmth	Pain
Female #1 (right-face mask vs left no mask) 15min of mask application	2/10 vs 7/10	3/10 vs 7/10	5/10 vs 6/10	2/10 vs 5/10	3/10 vs 5/10
Female #2 (right-face mask vs left no mask) 15min of mask application	3/10 vs 8/10	3/10 vs 7/10	4/10 vs 5/10	1/10 vs 6/10	3/10 vs 5/10
Female #3 (right-face mask vs left no mask) 15min of mask application	2/10 vs 5/10	3/10 vs 7/10	5/10 vs 5/10	2/10 vs 6/10	2/10 vs 5/10
Female #4 (right-face mask vs left no mask) 15min of mask application	2/10 vs 7/10	3/10 vs 6/10	4/10 vs 5/10	2/10 vs 4/10	2/10 vs 5/10
Female #5 (right-face mask vs left no mask) 15min of mask application	2/10 vs 8/10	3/10 vs 6/10	4/10 vs 5/10	2/10 vs 5/10	3/10 vs 5/10
	Avg 2.2 vs 7.0	Avg 3.0 vs 6.6	Avg 4.4 vs 5.2	Avg 1.8 vs 5.2	Avg 2.6 vs 5.0

Table 2 - Total-face Mask

Treatment	Erythema	Irritation	Swelling	Warmth	Pain
male #1 15min of mask application Microneedling RF + PRP for Acne Scars	2/10	2/10	3/10	3/10	1/10
Female #2 15min of mask application Microneedling RF + PRP Acne Scars	3/10	2/10	4/10	2/10	2/10
Female #3 15min of mask application Microneedling RF + PRP Rhytids and Skin Rejuvenation	2/10	2/10	6/10	3/10	2/10
	Avg 2.3/10	Avg 2.0/10	Avg 4.3/10	Avg 2.6/10	Avg 1.6/10

Discussion

An earlier study demonstrated that the clinical outcome of microdermabrasion and micro-needling is dependent upon post procedural steps^{3,6,7}. Because the first few hours following treatment are considered most critical in achieving a desirable long term aesthetic outcome, hydration with purified water, in the absence of extraneous ingredients that risk granuloma formation, is a recommended initiative.

Other forms of hydration masking have been used and reported in the published literature, such as the use of premium waters to reduce symptoms following facial laser procedures⁹. However, in the current study the hydrating mask is intended to be constituted of

ultra pure water, because the objective is to avoid introducing exogenous substances. Reducing symptomatic reactions to superficial dermal procedures confers a buffering effect against the oxidation by-products that accumulate from inflammatory processes. Furthermore, the changed gene expression profile, and keratinocyte-fibroblast crosstalk, is most fluent when reactive oxygen species are quenched, limited or circulated off-site. Reducing inflammation is therefore, critical to optimising the efficacy of treatments. Micro-injury generally stimulates the expression of transforming growth factor beta (TGF-beta) isotypes, which elicit different gene expression events in the presence of reactive oxygen

species that promote fibrosis development¹⁰, causing scars. Hence, the masking step optimises the gene expression events associated with TGF-beta.

In part B of the current study, the use of platelet-rich plasma as a moisturising layer on the contact surface of the post-procedural mask (Maskād™ Professional Post Procedure Mask), constitutes a highly unique approach to the use of platelet-rich plasma. By maintaining the moisture content of the platelet-rich plasma, its penetration into the micro-pores generated from micro-needling is

greatly enhanced. Furthermore, the secretion of growth factors is improved if the surface remains moist or hydrated.

Hence, by providing candidates with an improved post procedural experience, the use of moderately invasive procedures in aesthetic dermatology is likely to become more common. The perception that it is safe and convenient is a necessary milestone. Importantly, the clinical outcome of the procedure is likely to be better if secondary effects are minimised.

Conclusion

The post treatment 'in office' hydrating mask dramatically attenuated the discomfort and clinical manifestation of inflammation within a short timeframe (15 mins) for both part A and B procedures. It is expected that the positive effects derived from the mask initiative will reassure the patient of the procedure's success and furthermore, accommodate an improved long-term outcome. It is known that a post-procedural strategy, to reduce signs and symptoms of discomfort, influences the quality of life of the patient.

References

1. Sadgrove, N. J., Oblong, J. E., & Simmonds, M. S. J. (2021). Inspired by vitamin A for anti-ageing: Searching for plant-derived functional retinoid analogues. *Skin Health and Disease*, e36.
2. Sadgrove, N. J., & Simmonds, M. S. (2021). Topical and nutricosmetic products for healthy hair and dermal anti-aging using 'dual-acting' (2 for 1) plant-based peptides, hormones, and cannabinoids. *FASEB BioAdvances*, 3, 601-610.
3. Zeitter, S., Z. Sikora, S. Jahn, F. Stahl, S. Strauß, A. Lazaridis, K. Reimers, P. M. Vogt, and M. C. Aust. "Microneedling: matching the results of medical needling and repetitive treatments to maximize potential for skin regeneration." *Burns* 40, no. 5 (2014): 966-973.
4. Sasaki, G. H. (2016). Micro-needling depth penetration, presence of pigment particles, and fluorescein-stained platelets: clinical usage for aesthetic concerns. *Aesthetic surgery journal*, 37(1), 71 – 83.
5. Sasaki, G. H., & Linda, L. (2015). The effects of life line facial cream/periobitum serum and micro-needling of photodamaged skin: a split-face randomized study. *Open Access Library Journal*, 2(10), 1.
6. Sawyer, J., Febbraro, S., Masud, S., Ashburn, M. A., & Campbell, J. C. (2009). Heated lidocaine/tetracaine patch (Synera™, Ra pydan™) compared with lidocaine/prilocaine cream (EMLA®) for topical anaesthesia before vascular access. *British journal of anaesthesia*, 102(2), 210-215.
7. MacKay, Douglas J., and Alan L. Miller. "Nutritional support for wound healing." *Alternative Medicine Review* Nov. 2003: 359+. *Academic OneFile*. Web. 15 Feb. 2016.
8. Sasaki, G. H. (2019, September). The Significance of Trans-Epidermal Water Loss After Microneedling and Microneedling-Radiofrequency Procedures: Histological and IRB-Approved Safety Study. In *Aesthetic Surgery Journal Open Forum* (Vol. 1, No. 3, p. oJz017). US: Oxford University Press.
9. Torreao, P., Phua, E., Clark, R., Fernandes, E., Pontes, T., Fonseca, A.P., Singh, N., Seesurn, B., Nielsen, M., Valois, A. and Kerob, D., 2021. Evaluation of the efficacy and tolerance of a cosmetic mask containing 89% of vichy volcanic mineralizing water and hyaluronic acid after facial laser procedures. *Journal of Cosmetic Dermatology*.
10. Liu, R. M., & Desai, L. P. (2015). Reciprocal regulation of TGF-β and reactive oxygen species: A perverse cycle for fibrosis. *Redox biology*, 6, 565-577.