

# Topical tranexamic acid, kojic acid, and niacinamide containing regimen plus antioxidants vitamin C and E with single session of Q-switched(QS) laser: *Integrated skincare program of melasma in Asians*

**KEYWORDS** melasma, integrated skincare, topical tranexamic acid, antioxidants, Q-switched laser



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## INTRODUCTION

**Management** of melasma in Asians are complex and challenging. It needs integrated modalities, long term maintenance with consistent lifestyle modification and compliance[1]. Controversies exist on how to combine the existing modes of treatment, like the role of QS/Picosecond(QS/PS) lasers.

Energy-based devices were greatly utilized in current aesthetic practice for various indications through selective photothermolysis and other mechanisms [2]. However, its role in melasma by using QS/PS lasers are limited by inconsistent treatment results, frequent relapses and side-effects of rebound hyperpigmentation as well as permanent hypopigmentation upon repeated challenge[3].

The pathogenesis of melasma is complex and extends beyond melanocytes and recent literature points to interactions between keratinocytes, mast cells, gene regulation abnormalities, neovascularization, and disruption of basement membrane[4].

This complex pathogenesis makes melasma difficult to target and likely to recur by involving multiple pathologies like solar elastosis, ongoing inflammation, hormones, barrier disruption, oxidative stress, ultraviolet as well as visible light [5].

Managing melasma in the real world particularly in South Asian ethnic groups poses a real challenge by the prevalent number, severity of the disease and the abundance of sunshine[6]. Together with the availability of numerous ineffective and sometimes dangerous over-the-counter remedies and myths that deter a proper care for patients suffering from melasma[7].

Vitamin C & E are potent antioxidants that can salvage the damage from free radicals and ageing effects due to impaired cutaneous scavenging system. These antioxidants protect fibroblasts (via protection of bFGF) and that could be essential in the underlying mechanism of action responsible for recovery. Combination of L-ascorbic acid, alpha tocopherol, and ferulic acid formulation has resulted in decreased edema, reduce erythema and inflammation and promote recovery after laser treatment[8].

One of the great advancement in treatment of melasma is by the use of tranexamic acid. Topical mixture of tranexamic acid, niacinamide, and kojic acid has confirmed the benefit for post-laser treated melasma lesions. On the other hand, the role of laser is yet to be defined, the current data favours low fluences and limited sessions [9].

A structured skincare program, involving coaching and integrating the current arena based on current scientific evidence is yet to be defined.

## OBJECTIVES

We sought to determine a structured skincare program involving single laser treatment with maintenance skin care by a multi-modal regimen on improving treatment outcomes in melasma patients.

## MATERIALS AND METHOD

Twenty-five patients ethnic Hong Kong Chinese (22 female, age 38-64) were recruited in a specialist centre in Central Hong Kong during 2022-2023. The following patients were not included: those who had undergone previous laser or light treatments within half year, those on photosensitizing medications, those who had undergone exfoliating procedures within the last 3 months.

All subjects are provided with instructions of proper cleansing, sunprotection and regular use of skin moisturizer together with a structured skincare protocol containing topical 3% Tranexamic acid(TXA), 1% kojic acid, 5% niacinamide, and 5% hydroxyethylpiperazine ethane sulfonic acid (HEPES) and topical antioxidant (15% L-ascorbic acid, 1% Alpha-tocopherol, 0.5% Ferulic Acid).

An induction period of two weeks was arranged for each subject using the home care protocol. Phone and social media communication was established for each subject for proper use of the home care remedies each week and reminding to follow up in due course.

Energy based device( QS 755 laser, 4mm 3J, one to two passes, mild erythema as end point) treatment for once. Immediate cooling and epidermal repair started after procedure. Patients then resumed the same regimen for another eight weeks. Serial photos, Melasma Area and Severity Index (MASI) from baseline and on each follow-up were documented.

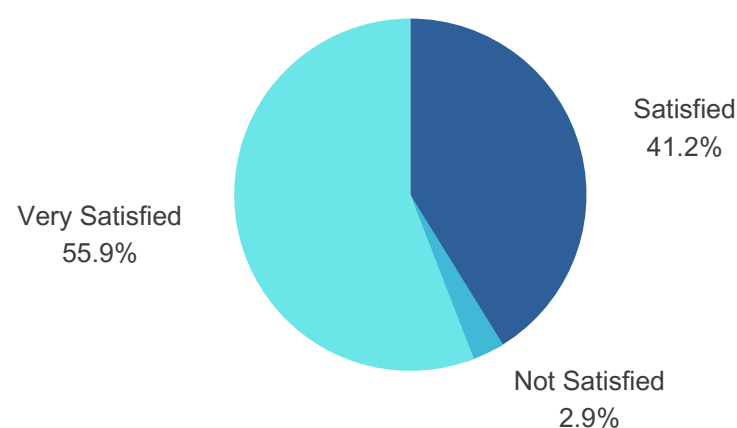
The patients were given structured standard counseling, clarifying myths related to proper skin care and advice on product use in each consultation and follow-up by phone or social messaging apps with standard questionnaire every two weeks.

## RESULTS

All patients completed the treatment protocol. They reported a good compliance to the protocol (96%, Figure 1 & 2). The median time to resolve procedure related desquamation, erythema and swelling is 1.5 (2-4) days. (Figure 3)

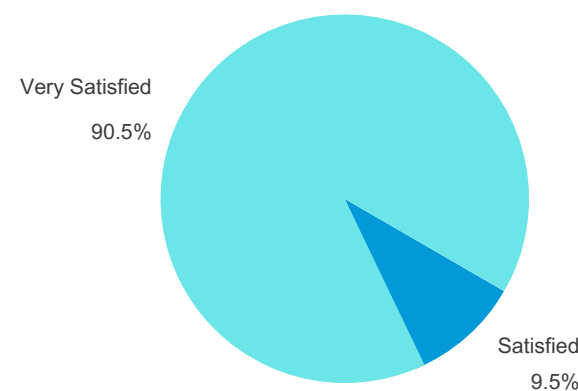
How satisfied are you with the effect of this Integrated Skincare Program?

(Figure 1)



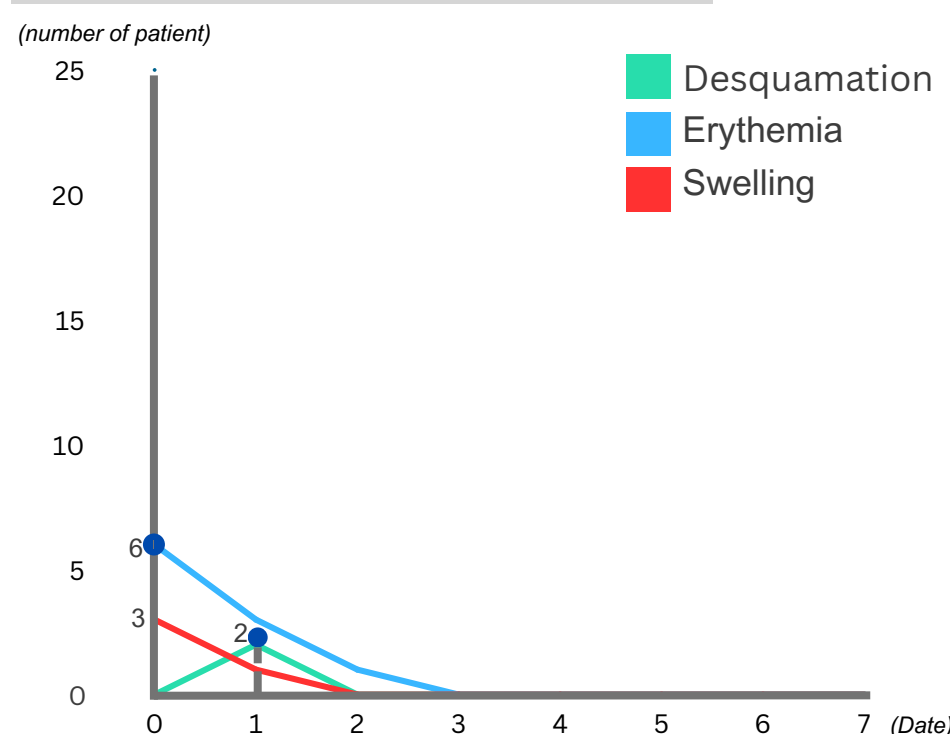
With this Integrated Skincare Program, my stubborn brown patch is faded.

(Figure 2)



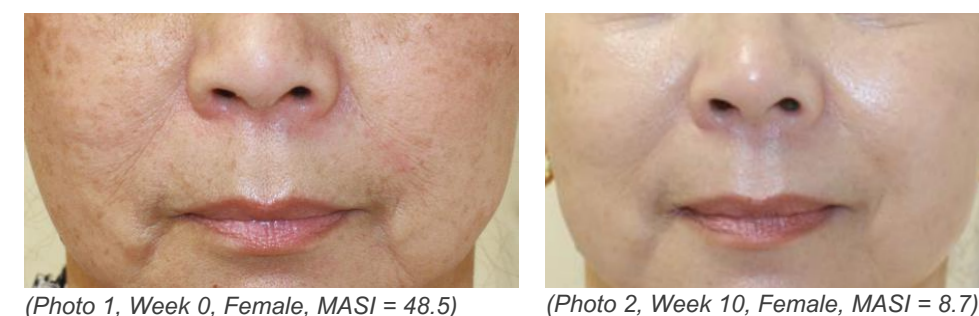
Number (Patient) of post-treatment events

(Figure 3)



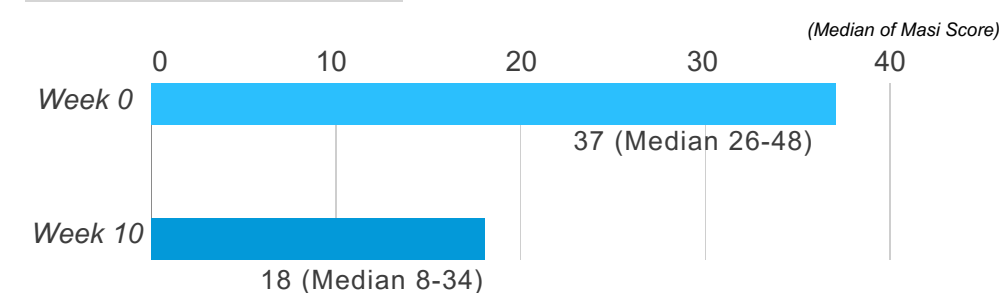
MASI score improved (26-48 at day 0 to 8-34 at week 10) in all patients without rebound and relapse. (Photo 1 & 2) Median MASI improvement for individual patient was 18. (Figure 4) One case got post procedure hyperpigmentation after laser but improves at week 10.

Illustration of MASI improvements



The photo 1 and photo 2 illustrates the changes between week 0 to week 10

Median of MASI score (Figure 4)



## DISCUSSION

We implemented a structured skincare program for melasma care. The purpose is to promote maximum compliance for long term use. It integrates into clients' daily activities without resorting to other systems that may interfere or deter the clinical benefits.

Sunscreen provided contains iron for broad spectrum protection against UV as well as visible lights. It can even out skin tone by masking existing pigmentation; the cleanser contains proprietary ceramide complex which helps maintain healthy skin barrier, while panthenol and glycerin retain moisture to maintain proper hydration level of the skin.

It can thoroughly cleanse skin while maintaining moisture and remove long-wear face makeup; the patient maintains hydration through a moisturizer combining ceramides, fatty acids and cholesterol, it is formulated to restore the skin barrier, and improves tolerance to challenges of various topical agents as well as laser treatments.

Topical Vitamin C and E in ferulic Acid as well as tranexamic acid, kojic acid, niacinamide in HEPES work synergistically in stabilizing skin barrier, promote post-procedure recovery and improving melasma control by deactivates inflammatory mediators, inhibits tyrosinase, disrupts melanin transfer, and enhances gentle desquamation.

## CONCLUSION

Structured integrated skincare regimen containing topical Vitamin C and E in ferulic Acid and tranexamic acid, kojic acid, niacinamide in HEPES with single session of Q-switched laser are effective in controlling melasma and for maintenance.

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