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# A case of fractional microneedling radiofrequency induced rosacea

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## ABSTRACT

Fractional microneedling radiofrequency (FMR) has been reported to improve cutaneous wrinkles due to its effects of inducing ne elastogenesis and neocollagenesis. Furthermore, FMR has shown to be effective in acne scars, acne lesions, hyperhidrosis, acne-related postinflammatory erythema and recently in rosacea. FMR treatment has been suggested to improve rosacea by reducing inflammation and abnormal vessel proliferation. Here we present a 61-year-old female who developed rosacea symptoms after the treatment of FMR for cutaneous wrinkles. Since the case shows conflictory findings with the previous data, it was found worthy presentation.

## ARTICLE HISTORY

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## KEYWORDS

Face; microneedling  
radiofrequency; rosacea;  
wrinkle

## Introduction

Fractional microneedling radiofrequency (FMR) is a new treatment modality in dermatology which transmits bipolar radiofrequency energy directly to the dermis with an array of microneedles without damaging the epidermis. Bipolar radiofrequency has been used predominantly in cutaneous wrinkles, since it has been shown to induce ne elastogenesis and neocollagenesis. Moreover, it has been used in the treatment of atrophic scars, and hyperhidrosis, and recently, there have been few studies evaluating the effects of FMR in rosacea (1).

Rosacea is an inflammatory disease of sebaceous glands that affects primarily the cheeks, nose, chin, and forehead. Manifestations include; persistent facial erythema, papules, pustules, telangiectasia, recurrent flushing, phymatous changes and sometimes ocular involvement. Although the pathophysiology of rosacea remains uncertain there are shown to be some factors including; genetic factors, dysregulation of the immune system, vascular and neuronal dysfunction, and microorganisms such as *Demodex folliculorum* appear to be involved. Heat, stress, ultraviolet light, spicy food, hot beverages, smoking, and alcohol are thought to be the triggers of exacerbations in rosacea symptoms. The diagnosis of rosacea is based on clinical features and careful history taking (2). Although several treatment methods have been suggested, there is no standard protocol for the treatment of rosacea. In a recent study, FMR has been introduced to be effective in the treatment of rosacea by Park et al. (3). In the same study, it was suggested that FMR might improve rosacea due to its effects of reducing inflammation and angiogenesis in rosacea (3).

However, here we present a case which developed severe rosacea symptoms after the treatment of FMR.

## Case

A 61-year-old woman was referred to our clinic with the complaints of wrinkles. On dermatological examination, she had some age-related findings on her face including; wrinkles, fine lines, laxity (Figure 1). After discussing the treatment options with the patient, we decided to apply FMR treatment. She received 3 sessions of FMR treatment with four-week-intervals. In each session, topical anesthesia with lidocaine and prilocaine combination was applied 20 min before the treatment. After cleansing the skin, the FMR treatment was performed (Scarlet S, Viol Co. Ltd, South Korea). After the first 2 sessions, no side effects were seen. 5 days after the third treatment the patient developed severe erythema and multiple papulopustular lesions with the sensation of burning developed on her face, predominantly on the malar regions, edema was also noticed on the face (Figure 2). Two years prior she had the diagnosis of rosacea which resolved with medical treatment, and at the current time was not on any treatment. Based on the clinical findings, diagnosis of rosacea was made. Topical metronidazole combined with neodymium-doped yttrium aluminum garnet (Nd: YAG) laser treatment was started and rosacea lesions showed slight improvement. The patient is still receiving treatment of rosacea.

Written consent was obtained from the patient for publication of this case report and any accompanying images.

## Discussion

Although there is a lack of evidence in acting mechanism of FMR, there are studies suggesting that FMR might reduce inflammation and angiogenesis in rosacea (3).

It was assumed that the thermal effect of radiofrequency stimulated a decrease in sebaceous gland activity and remo-



**Figure 1.** Patient's appearance at the initial visit, no symptoms of rosacea.



**Figure 2.** After the third session of FMR treatment; erythema and papulopustuler lesions predominantly on the malar regions of the patient.

deling of dermal structure. It is known that in rosacea patients vascular endothelial growth factor (VEGF), Nuclear Factor kappa B (NF- $\kappa$ B) and interleukin (IL)-8 expression is elevated in the lesional skin. NF- $\kappa$ B, IL-8, and VEGF levels were found to be decreased after FMR treatment which would cause anti-inflammatory and antiangiogenesis effects. In rosacea patients, the elevation in Toll-like receptor (TLR)-2 levels cause increased expression of LL37 via kallikrein 5 increase. LL37 might induce leukocyte chemotaxis and angiogenesis. Demodex mites and Demodex associated bacterium *Bacillus oleronius* may be the causes of TLR-2 activation. Mast cells are also thought to contribute to inflammation and angiogenesis in rosacea patients. FMR has shown to be effective against rosacea, through the aforementioned pathways of rosacea pathogenesis. Although the exact mechanism is yet unknown, a decrease of markers related to the innate immune system

(TLR-2 and LL-37) and mast cell count was observed after FMR treatment. Moreover, it is suggested that heat produced by FMR treatment might destroy mites or bacteria, which leads to suppression of the overactivated innate immune system (3).

Park et al. (3) showed clinical improvement and reduction in the expression of markers related to inflammation, innate immunity, and angiogenesis after FMR treatment in rosacea patients. Ruiz-Esparza and colleagues (4) also reported a possible role of radiofrequency for the treatment of rosacea. Min et al. (5) showed the improvement in acne-related post-inflammatory erythema after FMR treatment. In the study, it was concluded that, FMR could improve PIE by modulating inflammatory and vascular components (5).

FMR is considered as a safe treatment modality. As far as we know, significant adverse effects of FMR procedure has

not been demonstrated. There are some reports of mild side effects seen after the FMR procedure, such as; transient bleeding, erythema, folliculitis, and swelling subsiding within 1 week and mild hyperpigmentation, resolving by 3 months after the treatment (1).

Our patient had rosacea symptoms after the third session of FMR treatment. At the initial visit, and after the first two treatments, she had no complaints related with rosacea. The patient denies of exposure to any other aggravation factors that could influence the development of the rosacea symptoms. There is no current data that possibly could explain the mechanism of how FMR could aggravate rosacea. Although the treatment of rosacea with radiofrequency devices and its mechanism have rarely been reported, existing data suggests that, FMR treatment provides clinical and histologic improvement of rosacea.

The case presented here, developed rosacea symptoms after FMR treatment which is controversial with the studies aforementioned. Yet, we are not sure of the mechanism which aggravated rosacea symptoms. Further studies and case series evaluating the efficacy of FMR treatment in rosacea is necessary for a conclusion.

#### Declaration of interest statement

The authors declare that they have no conflicts of interest

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