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Case Report

Long-Term Prejuvenation Using UniPolar Radiofrequency: A 17-Year Case Report

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Introduction

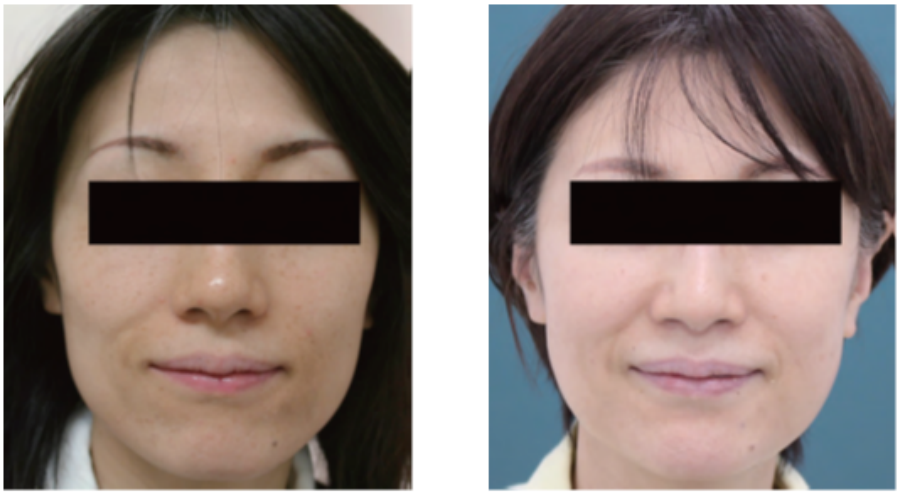
Aging of the skin occurs due to a multifactoral process that eventually alters the structures and functions in the epidermis and dermis. These structual and functional changes result from both intrinsic factors, such as genetic predisposition and hormonal influences, and extrinsic factors including ultraviolet radiation, pollution, smoking, and lifestyle habits. Collectively, these mechanisms contribute to the degradation of collagen and elastin fibers, reduced dermal thickness, impaired barrier function, and the development of visible clinical signs such as wrinkles, laxity, and dyspigmentation [1,2].

Traditionally, aesthetic dermatology focused on corrective interventions to reverse the signs of aging. In recent years, there has been a growing easing shift toward preventive strategies commonly referred to as "*prejuvenation*". This approach aims to delay or prevent visible aging onset before they become clinically evident and preserve skin quality and structural integrity. For this purpose, early implementation of anti-aging skincare and minimally invasive aesthetic technologies are proposed to patients [3]. Prejuvenation counteracts the biological process of the gradual decline in collagen within the dermis, which begins in early adulthood, with an estimated reduction of approximately 1% per year after the age of 20-25 [4]. The skin collagen degrades further until reaching as low as 43% to 57% in the papillary and reticular dermis by the age of 90 [5]. In addition, cumulative ultraviolet exposure accelerates collagen degradation through increased activity of matrix metalloproteinases and oxidative stress pathways, further contributing to photoaging [6]. Preventive strategies, such as photoprotection, topical retinoids, antioxidants and minimal invasive procedures such as neuromodulators, energy-based devices, and microneedling, may help to mitigate these age related processes and preserve dermal architecture over time [1]. A growing interest in prejuvenation has been observed among younger patient populations particularly those in their twenties and thirties, by a rising demand for minimal invasive procedures, reflecting a broader shift toward preventive dermatologic care [7]. Despite this trend, clinical evidence demonstrating practical implementation and clinical outcomes of proposed prejuvenation strategies remains limited.

The present case report describes the long-term, regular use of unipolar radiofrequency (UniLarge, Alma Prime x, Alma Lasers, Israel) as a preventive strategy to delay the development of visible aging signs.

Case Report

A female patient skin type III of Asian descent underwent unipolar radiofrequency treatments four times yearly with an average of 3-month intervals in between treatment sessions a total of 75 treatments. The total treatment period of 17.5 years was completed, with treatment initiated at the age of 35 years and continued until over 52 years for the patient (Figure 1). At baseline, the patient presented with minimal skin aging signs primarily involving mild laxity and fine rhytids in the face and submental area. Treatment was performed using the UniLarge applicator (Accent XL, Accent Ultra and Accent XLi, Alma Lasers, Israel) at an energy setting of 80-90 W, with a total energy delivery of 35-40 kJ. The treatment duration was 7-8 minutes per treatment area (each half of face and submental). Treatment settings remained relatively consistent throughout the 17.5 years of treatments.



Before treatment in 2006 | After treatment in 2024

Figure 1: 52-year-old patient treated for 17.5 years (2006 to 2024) twice a year with UniLarge (Accent XL, Alma Lasers Ltd). Over the observation period, minimal aging signs.

Standardized clinical photographs were obtained prior to treatment initiation (2006) and after the latest session (2024) (Figure 1).

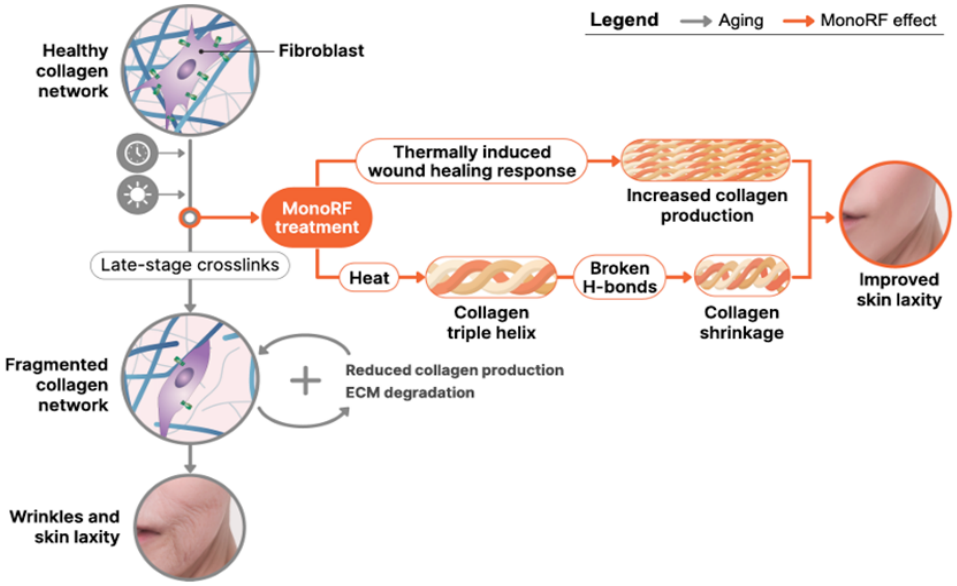


Figure 2: Proposed mechanism of prejuvenation (Kilmer at el.) through radiofrequency induced collagen remodeling [14].

The pre and post treatment standardized photographs were evaluated by five independent blinded evaluators who were unaware of treatment methods nor image sequence. The evaluators rated the wrinkle severity using the Modified Fitzpatrick Wrinkle Scale (MFWS), and skin laxity by using the Global Aesthetic Improvement Scale (GAIS: 0-worse than baseline, 1-no improvement, 2-mild improvement, 3-moderate improvement, 4-great improvement). Three of the five evaluators were unable to correctly distinguish baseline from follow-up images. The MFWS score showed minimal change (1.2 ± 0.8 at baseline vs. 0.9 ± 0.2 at follow-up). GAIS assessment indicated mild improvement (score = 2). Overall, evaluators reported no substantial visual differences between baseline and follow-up images.

No adverse events or safety concerns were reported at any procedure or following procedures. The treatment was well tolerated without any reported downtime.

Discussion

The use of radiofrequency for prejuvenation represents an emerging approach aimed at preserving skin quality before significant aging changes occur.

However, robust clinical data remains scarce due to the required long term follow-up. Currently, evidence on radiofrequency primarily reports outcomes up to one year following treatment [8].

To our knowledge, reports documenting continuous unipolar RF treatment over such an extended period are extremely limited. This case followed a patient for almost two decades. The results suggest a remarkable preservation of skin laxity/tightness, unchanged wrinkle progression and high patient satisfaction. Radiofrequency devices work by creating heat within the dermis and subdermal layers. This can be achieved through resistant heating or, as in the case of this study, dielectric heating [9]. Dielectric heating induces the rotation of water (dipole) molecules within the tissue in an alternating electromagnetic field, converting electrical energy into heat [10]. This process enables more uniform volumetric heating and stimulating fiber contraction and elastin remodeling, as well as the formation of new collagen. In contrast to other radiofrequency modalities, unipolar RF emits omnidirectional electromagnetic radiation (EMR) without the necessity of a grounding pad reaching penetration depths of about 15-20 mm. The emitted unipolar RF energy was found safe and effective for treating skin laxity, wrinkles and cellulite in previous studies [8,10-12]. The patient in this case report was treated with a unipolar RF applicator with a high radiofrequency of 40.68 MHz which allows a deep, homogenous heating generating uniform clinical treatment outcomes.

Other RF technologies have also demonstrated data potential in supporting the efficiency of prejuvenation. A small study using monopolar RF reported preservation of skin structures along with positive clinical outcome in eight patients. In this study, patients underwent three to seven sessions (mean four sessions) at intervals ranging from 4 to 45 months (mean 19 months). There was a general improvement as evaluated by blinded observers and high patient satisfaction suggesting that repeated RF treatments over time may contribute to maintaining a more youthful skin appearance [13].

Kilmer at el. proposed a mechanism of action for RF in prejuvenation, emphasizing its role in maintaining skin firmness through collagen neogenesis and remodeling. These processes counteract age related changes including reduced collagen production, increased collagen fragmentation and environmental induced skin damages (Figure 2). The applied RF induces thermal stimulation and promotes neocollagenesis, elastin production as well as structural reorganization of dermal fibers contributing to improved skin firmness [14].

Conclusion

This case suggests that long-term, repeated application of unipolar radiofrequency may contribute to the preservation of skin quality and structural integrity manifesting in patient's youthful appearance. However, controlled studies with larger cohorts are required to confirm these findings.

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