Clinical, Cosmetic and Investigational Dermatology

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CASE SERIES

Clinical Evaluation of a Novel Dual-Mode Radiofrequency Device for Facial Laxity: A Case Series

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Purpose: Facial aging, characterized by skin laxity and the formation of wrinkles, is primarily attributed to collagen degradation and dermal thinning. Although ablative laser therapies have demonstrated efficacy in addressing these concerns, their application is often limited by prolonged downtime and the risk of pigmentary alterations, particularly in individuals with darker skin types. Radiofrequency (RF) technology offers a non-invasive, chromophore-independent alternative for skin tightening and rejuvenation. This case series aims to assess the clinical efficacy, safety profile, and patient-reported satisfaction associated with the use of a novel dual-mode RF device in the management of facial skin laxity.

Patients and Methods: Five adult patients with Fitzpatrick Skin Type IV and clinically evident signs of facial photoaging underwent a single treatment session using the DENSITY RF platform, which integrates monopolar and bipolar energy delivery through High F-tip. Each procedure involved 10 to 12 uniform passes over the entire face, utilizing continuous contact cooling. No topical or systemic anesthesia was administered.

Results: All patients demonstrated measurable improvements in skin firmness, textural smoothness, and facial contouring. Marked reductions in wrinkle surface area and pore visibility were observed. Aesthetic enhancement scores ranged from 3 to 5 (on a 5-point scale), with high levels of patient satisfaction and minimal procedural discomfort (VAS score: 2–3/10). Three patients reported visible brow-lifting effects. No adverse effects or pigmentary changes were reported.

Conclusion: The DENSITY dual-mode RF system is a safe, well-tolerated, and effective non-invasive option for treating facial skin laxity in individuals with darker skin tones. It offers a compelling alternative for single-session rejuvenation with minimal recovery time and high patient satisfaction.

Keywords: facial skin laxity, radiofrequency treatment, non-invasive rejuvenation, DENSITY RF system, Fitzpatrick skin type, aesthetic outcomes

Introduction

Facial aging is a noticeable and early indicator of skin aging, marked by increasing looseness and the development of wrinkles as collagen breaks down and the dermis becomes thinner.[1] Ablative lasers (such as CO_2 and Er:YAG) are effective at significantly enhancing the appearance of sun-damaged skin, yet their application is frequently associated with considerable discomfort, extended redness, heightened risk of infection, scarring, and alterations in skin pigmentation.[2] The desire for treatments with less recovery time and fewer complications has led to increased interest in non-invasive treatment options. Radiofrequency (RF) devices deliver precise heat to the dermis using electrical currents, which results in the immediate tightening of collagen fibers and promotes the production of new collagen.[3–5]

Unlike many laser treatments that work by targeting specific skin pigments like melanin or hemoglobin, RF energy produces its effects independently of these chromophores.[6] Instead, RF devices generate heat by passing electrical currents based on the tissue's electrical properties, mainly water content, making the process independent of skin pigment. This ensures the safety and efficacy of RF treatments, which remain consistent regardless of the amount of

Received: 27 August 2025
Accepted: 4 November 2025
Published: 13 November 2025

melanin present in the epidermis.[6,7] As a result, RF procedures can be safely performed on individuals with darker skin tones (Fitzpatrick skin types III–VI) without increasing the risks of hyperpigmentation or other pigment-related complications that are sometimes associated with light-based therapies.[8]

RF energy can be delivered through monopolar, bipolar, unipolar, or multipolar configurations, each differing in electrode arrangement and depth of thermal penetration. Sequential monopolar-bipolar RF systems have shown enhanced collagen and elastin remodeling compared with single-mode RF approaches. Building on this evidence, a sequential combination of monopolar and bipolar systems addresses the need for deeper yet controlled dermal heating without microneedling or invasive components.[9]

Recent studies and reviews support RF's broad suitability and highlight its minimal risk profile across diverse skin types.[8,10] This case series describes the use of a cutting-edge RF system, DENSITY (Jeisys Med Inc, South Korea). Recent developments in facial contouring procedures have also explored RF-assisted liposuction combined with surgical techniques, such as buccal fat pad excision, to enhance definition and skin tightening.[11] These approaches share a common biological principle, controlled thermal induction of collagen remodeling and soft-tissue contraction, which parallels the mechanism of the non-invasive dual-mode RF system evaluated in this study. Unlike conventional RF devices, DENSITY incorporates both monopolar (Classic Tip) and monopolar + bipolar (High Tip) energy delivery methods. This innovative technology results in significantly reduced treatment durations and increased patient comfort, making it a better alternative in aesthetic medicine. This case series describes the treatment of five patients with facial skin laxity using the DENSITY RF platform, with a primary focus on evaluating objective clinical improvements, patient-reported satisfaction, and safety parameters. The patient characteristics and treatment outcomes are summarized in Table 1.

Case Presentation

All patients were treated under standardized settings (energy level 4.5–5, 10–12 passes per zone), with minor titration based on patient tolerance and anatomical region. Improvements in wrinkle appearance and skin firmness were qualitatively assessed by clinical examination and standardized photographs. No objective imaging (3D or ultrasound) was performed due to the exploratory nature of this case series. Standardized digital photographs were obtained at baseline, 1 month, and 3 months post-treatment using identical camera settings, lighting conditions, and patient positioning to ensure consistency. No evaluator blinding was performed, and the assessments were based on investigator evaluation and patient self-reports. Given the small sample size, results were analyzed descriptively without formal statistical testing. Improvements were based on clinical observation and patient feedback.

Case 1

A 42-year-old Asian female patient presented with concerns of facial skin laxity primarily in the upper (frontal and periorbital), midface (malar and nasolabial), and lower face (perioral, mandibular border, and submental) areas. On clinical examination, features of mild dermal laxity and irregular skin texture were observed. No active lesions were present. The patient presented with Fitzpatrick skin type IV and had no relevant medical history or prior cosmetic or dermatologic treatments. Clinical examination revealed facial photoaging with skin laxity. The patient underwent a single treatment

Table 1 Patient Characteristics and Outcomes

Case	Age/Sex	Origin	Fitzpatrick Skin Type	RF Settings	Wrinkle Change	Pain (VAS)
1	42/Female	Asian	IV	10-12 passes (face); level 4.5 to 5	Fair reduction	3
2	54/Female	Asian	IV	10-12 passes (face); level 3.5 titrated to 6.5	Notable reduction	2
3	40/Female	Asian	IV	10-12 passes (face); level 4.5 titrated to 6	Fair reduction	3
4	61/Male	Asian	IV	10-12 passes (face); level 4.5 titrated to 6	Fair reduction	2
5	45/Female	Asian	IV	10-12 passes (face); level 4.5 to 5	Visible reduction	3

Abbreviations: RF, radiofrequency; VAS, visual analogue scale.

session using the DENSITY High F-Tip, delivering 10–12 uniform passes over the treated area for 40 minutes. Continuous contact cooling was used throughout, and no anesthesia was required. At 3 months post-treatment, a marked improvement (score = 5/5) in skin firmness and texture was noted, accompanied by visible tightening, enhanced facial definition, and a noticeable slimming effect in the lower face. A fair reduction in the wrinkle surface area was observed. No changes in pigmentation or spot formation were observed (Figure 1). The patient reported minimal discomfort (VAS score = 3/5) and expressed high satisfaction (score = 5/5) with the result. No adverse events and no downtime were reported.

Case 2

A 54-year-old Asian female patient presented with signs of facial photoaging, primarily in the form of skin laxity and wrinkles. Her main concerns included sagging and loss of definition in the lower face and brow area. Clinical examination revealed visible forehead wrinkles and jowling, as well as early signs of dermal thinning, with no active lesions or contraindications. The patient had Fitzpatrick Skin Type IV and no significant medical or aesthetic history. She underwent DENSITY RF treatment with High F-tip, delivering 10–12 uniform passes across the treatment area for 40 minutes. The session was completed without topical anesthesia, and continuous contact cooling was used to ensure patient comfort. At the 3-month follow-up, the patient demonstrated visible improvement in forehead wrinkles, with significant enhancement in skin firmness, particularly in the lower face and brow region. Notable refinement in skin texture and reduced pore visibility over the cheeks were also observed. These changes became evident around 1-month post-treatment and continued to improve through the 3-month period. By three months, the patient showed a very good brow-lifting effect, brighter eyes, and significantly enhanced double eyelids, despite no direct treatment of the eyelids. The case is noteworthy as the patient had thinner skin with finer wrinkles, which appeared to respond particularly well to the bipolar RF component of the DENSITY treatment (Figure 2). Overall, the patient reported improvement

Figure 1 Patient (42-year-old female) with facial aging and skin laxity in upper face (frontal and periorbital), midface (malar and nasolabial), and lower face before treatment. Marked improvement in 3-month follow-up. (**A**) front view of the face; (**B**) lateral view of the face.

Figure 2 Patient (54-year-old female) with facial aging and skin laxity in the lower face and brow area before treatment. Marked improvement seen on follow-up after 3 months. (**A**) lateral view of the face; (**B**) front view of the face.

https://doi.org/10.2147/CCID.S563513

(score = 4/5), minimal discomfort (VAS score = 2/10), and high satisfaction (score = 4/5) over the 3-month period. No adverse events and no downtime were reported.

Case 3

A 40-year-old Asian female patient with Fitzpatrick Skin Type IV presented with concerns of diminished facial definition and age-related skin laxity. The patient had no medical history and had not undergone any previous aesthetic interventions. Clinical examination revealed generalized soft-tissue laxity, particularly in the lower and lateral facial compartments, with mild dermal thinning and no active dermatological lesions. This patient had thicker skin with fibrotic acne scars and thicker subcutaneous fat features generally associated with a lower response to RF. She was treated with a single session of DENSITY RF with High F-tip to target the entire facial region, with a total of 10–12 uniform passes delivered over each zone. No anesthesia or topical analgesics were needed, and epidermal cooling was consistently used during the session to ensure patient comfort. The total procedure time was 40 minutes. Objective post-treatment assessments revealed a visible improvement in skin texture, consistent with the expected limitations for this skin type. However, there was an unexpected improvement in skin tightening, especially in the submental area and the lateral cheeks, resulting in a marked slimming effect and a more elongated facial contour. There was moderate improvement in pore visibility, with a fair reduction of wrinkles. Brow lifting, with improvement in the upper eyelid fold, became evident at 1 month post-treatment and progressively improved through the 3-month follow-up (Figure 3). The patient experienced minimal discomfort during the procedure (VAS: 3/10) and rated both her satisfaction and aesthetic improvement as 4 out of 5. No adverse events or downtime were reported during or after the treatment.

Case 4

A 61-year-old Asian male patient presented with concerns of facial ageing, primarily in the frontal, malar, and submental regions. On clinical examination, generalized skin laxity was noted in these areas. The patient had Fitzpatrick skin type IV and had no medical history. The diagnosis of facial photoaging with skin laxity was made. This case was remarkable for the patient's older age, with more pronounced skin laxity and greater submental fat descent. He was treated with the DENSITY High F-tip to target the entire facial region, with a total of 10–12 uniform passes delivered over each zone for 40 minutes. Continuous contact cooling was used throughout, and no aesthetic was required. At 1-month post-treatment follow-up, a fair reduction in wrinkle surface area was noted compared to baseline. Although facial improvements were less striking overall, there was a good improvement in the submental area, along with more observable enhancement in skin texture and pore visibility in the lower face (Figure 4). No changes in the pigmentation were observed. The patient reported minimal discomfort (VAS score = 2/10) and rated his satisfaction and aesthetic improvement as 3 out of 5. No adverse events or downtime were reported during or after the treatment.

(A) (B)

Figure 3 Patient (40-year-old female) with facial aging and skin laxity in the lower and lateral facial compartments before treatment. Satisfactory improvement in 3-month follow-up. (**A**) front view of the face; (**B**) lateral view of the face.

Figure 4 Patient (61-year-old male) with facial aging and skin laxity in the frontal, malar, and submental regions before treatment. Marked improvement in 3-month follow-up (lateral view of the face).

Case 5

A 45-year-old Asian female patient presented with concerns of facial ageing, primarily in the frontal, periorbital, and malar regions, and along the mandibular border. On clinical examination, skin laxity and superficial wrinkles were noted. The patient had Fitzpatrick skin type IV. She had no prior medical or aesthetic history. The diagnosis of facial photoaging with skin laxity was made. The patient underwent a single treatment session using the DENSITY High F-tip to deliver 10–12 uniform passes, at level 4.5 to 5, over the treated area for 40 minutes. Consistent contact cooling was maintained throughout the procedure, eliminating the need for anesthesia. After 2 months post-treatment, a visible improvement in skin texture and firmness was observed, along with a significant decrease in wrinkle reduction over the forehead, and a clinically appreciable skin-tightening effect. The patient showed a very good skin-tightening outcome, with improved facial contour, as well as noticeable enhancement in skin quality, most notably in the frontal area, evidenced by visible improvement in skin tone (Figure 5). The patient reported minimal discomfort (VAS score = 3) and expressed good satisfaction with the outcome (satisfaction score = 4), along with a perceived improvement score of 3. No adverse events or downtime were reported during or after the treatment.

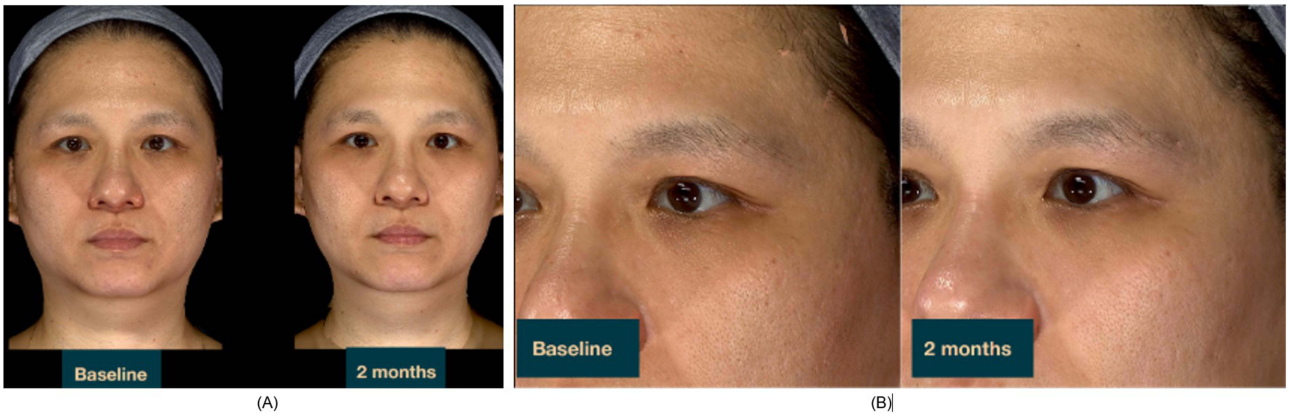

Figure 5 Patient (45-year-old female) with facial aging and skin laxity in frontal, periorbital, malar regions, and mandibular border areas before treatment. Good improvement in 3-month follow-up. (**A**) front view of the face; (**B**) lateral view of the face.

https://doi.org/10.2147/CCID.S563513

Discussion

The pursuit of non-invasive facial rejuvenation continues to evolve with the introduction of advanced energy-based devices designed to meet growing expectations for visible results without downtime.[12] The present case series evaluates clinical efficacy, safety, and patient satisfaction associated with the use of a novel dual-mode RF device, DENSITY, for the non-invasive treatment of facial skin laxity. Across five diverse patients with Fitzpatrick Skin Type IV, the DENSITY device demonstrated consistent improvements in skin firmness, texture, and overall facial contour with high tolerability and patient satisfaction, and without adverse events.

Facial skin laxity is a visible hallmark of photoaging and intrinsic aging, typically managed with energy-based devices that stimulate collagen remodeling.[12] RF technology has emerged as a prominent non-invasive modality due to its ability to deliver controlled thermal energy into the dermis independent of chromophores.[13] This chromophore independence allows safe application in patients with higher Fitzpatrick skin types who are typically at increased risk of pigmentary complications with light-based treatments. Emerging literature also supports the synergistic application of invasive and non-invasive RF systems to optimize collagen contraction and facial definition.[11] The DENSITY system's non-invasive mechanism offers comparable benefits while reducing procedural morbidity. The outcomes from this series corroborate prior findings that RF-based interventions are safe and effective in darker skin types, with no incidences of post-inflammatory hyperpigmentation, burns, or scarring reported in any of the cases.[12]

The DENSITY system distinguishes itself from conventional RF devices by integrating both monopolar and bipolar energy delivery via a proprietary High F-tip, designed to induce instant dermal contraction. This hybrid delivery mechanism allows for deeper and more uniform heating while maintaining optimal epidermal protection through real-time contact cooling.[13] All five patients in this series underwent single treatment sessions lasting approximately 40 minutes, with no requirement for anesthesia, highlighting the device's favorable tolerability profile.

Clinical improvements became evident as early as one-month post-treatment and continued to progress over the 3-month follow-up period. Objective evaluations and patient-reported outcomes showed marked to moderate enhancements in dermal firmness, skin texture, and facial contouring, particularly in the lower and lateral facial compartments. Wrinkle surface area and pore visibility were also reduced to varying degrees. These findings are supported by previous research; for instance, a clinical study reported significant increases in collagen types I and III, along with visible wrinkle reduction and high levels of patient satisfaction, in individuals with Fitzpatrick skin types III–IV after undergoing multiple sessions of monopolar RF treatment.[14] Notably, three patients reported a visible brow-lifting effect, suggesting that the RF-induced tissue contraction may also provide subtle lifting benefits in the periorbital region.[15]

The use of consistent energy levels (4.5 to 5) and a standardized number of passes (10 to 12) across all patients may have contributed to the uniformity in outcomes. Importantly, all treatments were delivered without analgesia, and the VAS scores for discomfort remained low (2–3 out of 10), reflecting the device's tolerability. Patient satisfaction scores ranged from 3 to 5 out of 5, indicating high acceptance and perceived value of the treatment.

This case series also highlights the DENSITY system's potential role as a single-session treatment option, which may enhance its appeal in clinical practice by reducing procedural burden and improving cost-effectiveness. While the DENSITY system's dual-mode RF delivery represents a technical refinement of existing modalities, this case series was not designed to establish superiority over monopolar or bipolar RF systems. The present findings should therefore be viewed as preliminary observations that warrant confirmation through larger, controlled comparative trials.

While these preliminary findings are promising, limitations include the small sample size, lack of histopathological or imaging-based assessments, and the absence of long-term follow-up. Future prospective studies involving larger, more diverse populations and more extended observation periods may help validate the durability of results and compare efficacy against other established RF technologies. Significantly, this study contributes to the growing body of evidence supporting the safe use of energy-based skin-tightening technologies in individuals with darker skin phototypes, who remain underrepresented in published clinical research.

The lack of quantitative metrics such as wrinkle surface analysis or volumetric imaging represents a limitation of this study, and future controlled trials incorporating such tools are warranted. In addition, this case series is descriptive in nature and lacks statistical power to infer significance. The 3-month observation period reflects early collagen remodeling

but does not capture long-term durability. Future controlled studies with larger cohorts, objective imaging, and statistical validation are warranted.

Conclusion

The DENSITY dual-mode RF device is a safe and well-tolerated non-invasive approach for the treatment of facial laxity in individuals with Fitzpatrick Skin Type IV. This small descriptive series demonstrated encouraging early clinical improvements in skin firmness and texture with minimal discomfort or downtime. However, these findings should be interpreted as preliminary and hypothesis-generating, given the absence of a control group, objective measurements, statistical analysis, and long-term follow-up.

Data Sharing Statement

The original contributions presented in the study are included in the article.

Ethics Approval and Consent to Participate

Written informed consent for the publication of this case series, including photography and medical data, was obtained and signed by each patient. Institutional ethical approval was not required to publish this case report.

Acknowledgments

The authors would like to acknowledge Krystelis Ltd. for their medical writing support and anonymous reviewers whose feedback helped in improving the manuscript.

Funding

The author received no financial support for this report.

Disclosure

Narendra Kumar is a consultant to Jeisys Med Inc., Seoul, South Korea. The authors report no other conflicts of interest in this work.

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