The Chronicle of Aesthetic Medicine Devices

QUADESSY : Standardization and Clinical Application of the Platform

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Dr. Kim is a leading early adopter in Korea's aesthetic medicine field. His drive to stay at the forefront of innovation stems from a strong commitment to research and genuine curiosity about new devices. Rather than simply introducing the latest technologies, he has continuously sought ways to maximize patient satisfaction, building extensive experience across a wide range of aesthetic devices. Aesthetic medicine practitioners carefully consider each device before selecting and incorporating it into their practices, as device choice can substantially affect both clinical operations and patient satisfaction.
<The Chronicle of Aesthetic Medicine Devices> follows Dr. Kim's journey of adopting and integrating aesthetic devices into clinical practice. Through this series, he hopes to offer practical guidance to practitioners considering the introduction of new devices.

Microenvironment Based Treatment and the Role of QUADESSY

Over the past decade, energy based devices(EBD) have evolved around three key objectives: efficiency maximizing outcomes while minimizing downtime; reproducibility reducing variability associated with operators and patient skin characteristics; and safety preventing thermal injury and post inflammatory hyperpigmentations. Although enlarged pores, scars, pigmentation, erythema, and skin laxity may appear to be distinct clinical concerns, their therapeutic solutions ultimately converge on the modulation of dermal thermoelectric responses and the surrounding tissue microenvironment.
From this perspective, QUADESSY is not simply a next generation microneedling radiofrequency (MNRF) device. Rather, it can be understood as a platform designed to shift the treatment paradigm from 'target destruction' to 'microenvironment optimization' through a continuous treatment sequence comprising hybrid RF preconditioning, energy cruise control, double depth targeting, and drug delivery using Quad Fusion technology.
Preconditioning helps refine thermal distribution by homogenizing tissue conductivity, while energy cruise control limits both excessive and insufficient energy delivery resulting from impedance fluctuations.
Double depth targeting sequentially stimulates selected targets typically superficial and deeper layers within the same treatment area, supporting both immediate and sustained effects. In addition, pressure differential (⊿P) based drug delivery through stabilized microchannels enables the uniform deep distribution of regenerative agents, thereby broadening the therapeutic scope.
Building on the technical background presented in the September issue, this article introduces practical principles for clinical use and protocols that can be standardized in real world practice.

The Design Philosophy of QUADESSY

In clinical practice, QUADESSY's design philosophy can be understood through four core principles. ① Pigmentation and erythema: Modulates the chronic inflammatory milieu before directly targeting the lesion, with the aim of reducing recurrence and extending treatment intervals. ② Enlarged pores and scars: Simultaneously targets the infundibulum and sebaceous unit to support both immediate visible improvement and sustained results. ③ Skin booster treatment: Enhances bioavailability through uniform intradermal distribution based on pressure differential (⊿P) and microchannel persistence. ④ Skin laxity and texture: Uses preconditioning based uniform thermal coagulation to expand the practical treatment range for high output, low pain procedures.

Pigmentation and Erythema: Shifting from Target Reduction to Microenvironment Modulation

The central challenge in treating pigmentation and erythema is managing two competing concerns simultaneously: recurrence and the risk of post inflammatory hyperpigmentation(PIH). In QUADESSY's Hybrid mode, noninvasive RF is used before needle RF to uniformly precondition the upper dermis, helping stabilize vascular dynamics and the inflammatory response. This thermal preconditioning provides a more consistent treatment pathway for needle RF at deeper tissue levels while reducing surface reactions by minimizing hot spots. Rather than simply reducing pigment or vascular targets, this approach aims to meaningfully extend the interval between recurrences by modulating the surrounding microenvironment, including vasodilation, inflammatory cytokine release, and extracellular matrix(ECM) status.
The author generally uses the following approach. One to two weeks after laser treatment for pigmentation or erythema, a supplementary QUADESSY Hybrid session is performed. Following 30minutes of topical anesthetic application, treatment

is delivered at a depth of 0.8–1.2 mm and an output of 10–20%, with approximately 100–150 shots administered to both cheeks. Because the objective is microenvironmental recalibration rather than inducing additional tissue injury, a more conservative approach is used as output increases. In repeated cases, a tendency toward reduced excessive post treatment erythema and prolonged maintenance effects has been observed, along with greater patient satisfaction regarding pain and recovery.

Enlarged Pores and Scars: Achieving Both Immediate Superficial Effects and Sustained Deep Remodeling

The key challenge in pore treatment is achieving two objectives within a single session: an effect that patients ca perceive immediately and a result that is sustained over time. The double depth approach first stimulates the superficial layer (approximately 200 – 500 μm) at the same treatment coordinate to immediately constrict the pore opening, followed by treatment of the deeper layer (approximately 600 – 1,000 μm) to induce remodeling of the ECM surrounding the sebaceous glands. Changes at the superficial level provide the basis for immediate visible improvement, whereas deeper remodeling delays recurrence and supports longer lasting results.
In scar treatment, superficial treatment softens the scar margins, while deeper treatment promotes elevation of the scar base, leading to progressive surface leveling over time.
Before adopting the double depth approach, the author typically treated the entire face using more than 1,000 shots. With double depth treatment, however, the author generally uses an initial setting of 10 W with a 0.5 mm plus 0.8 – 1.0 mm depth combination, delivering treatment in fewer than 500 shots. In areas with high sebaceous activity, such as the T–zone, the relative proportion of deeper treatment may be slightly increased. In contoured areas, the treatment depth may be reduced or single depth treatment may be used. For patients with acne scars, alternating sessions with a fractional laser at 4 week intervals can be planned to progressively improve texture and volume. With repeated treatment, patients often report satisfaction with both the immediate perceptible effect of pore tightening and maintenance of improvement over 8 – 12 weeks.

Drug Delivery (QuadFusion) : Uniform Dermal Distribution Through Pressure Differentials

Regardless of the quality of a skin booster formulation, limited delivery pathways can compromise both immediate patient perceived benefits and the durability of results. QuadFusion enables pressure differential (⊿P) based delivery through four sequential steps: channel formation through needle insertion, channel stabilization through RF coagulation, negative pressure uptake during needle withdrawal, and positive pressure infusion during re insertion.
Thermally stabilized channels provide a diffusion pathway, while the sequential negative and positive pressure actions help prevent the formulation from remaining at the epidermal surface, enabling more uniform and deeper intradermal distribution. This may reduce bruising, pain, and uneven distribution, while improving patient perceived outcomes and treatment durability.
The author commonly uses PN · PDO PLLA PDRN, HA based skin booster formulations at a depth of 0.5 – 0.8 mm and an output of 8 – 12%, delivering 200 – 300 shots per treatment area. In areas with limited subcutaneous fat, such as the periorbital and perioral regions, the output is reduced by one level to minimize the risk of adverse effects. During the first 30 minutes after treatment, various methods primarily ultrasound based procedures are also used to enhance absorption and optimize the overall treatment outcome.

Hybrid Thermal Coagulation: Expanding the Safety Window for High Output, Low Pain Treatment

Although increasing output can enhance treatment effects, it has traditionally come at the cost of greater risks of epidermal overheating, crusting, erythema, and, albeit rarely, burns. Given the temperature dependence of tissue conductivity, preconditioning can homogenize current distribution, reduce hot spots, and suppress surface reactions. When needle RF is applied after Hybrid preconditioning, the skin surface remains relatively quiet while deep thermal coagulation is enhanced. In light of the thermal denaturation threshold of collagen approximately 57–65℃ and the temperature range required for remodeling, sequential preconditioning and coagulation may represent a rational approach for simultaneously minimizing downtime and inducing structural tissue changes. For a full face tightening routine, the author generally uses a depth of 0.8–1.5 mm, an output of 20–30%, and a total of approximately 500 shots. When double depth treatment, skin booster delivery, and noninvasive handpiece treatment are additionally combined according to anatomical lines of laxity, a single session can provide highly satisfactory results. Of course, even when practical constraints limit treatment to repeated use of a single modality, patient satisfaction remains high.

Energy Cruise Control (ECC): Real Time Compensation for Impedance Fluctuations and Improved Reproducibility

Skin impedance varies between patients, across treatment areas, and over time even within the same patients. With constant current control, an increase in impedance can cause voltage and instantaneous power to rise sharply, increasing the risk of hot spots and crusting. Conversely, in areas of lower resistance, insufficient energy may be delivered, potentially compromising treatment efficacy. ECC maintains a consistent level of power (W) delivered to the tissue by continuously adjusting voltage and current in response to impedance changes, thereby keeping output variation within a defined tolerance range. As a result, surface reactions are stabilized, coagulation within the target layer becomes more consistent, and protocol reproducibility is improved.

Conclusion

QUADESSY represents an innovative advance in aesthetic medicine, designed to address a broad range of treatment objectives. By integrating Hybrid RF preconditioning, Energy Cruise Control, double depth targeting, and drug delivery, the platform aims to optimize both treatment efficiency and safety. This may enable patients to experience improved outcomes while allowing physicians to deliver more predictable treatment.
Through continued research and development, QUADESSY is expected to help establish new standards in aesthetic medicine. By leveraging its innovative technologies, physicians may be able to provide more refined clinical outcomes and help a broader range of patients achieve satisfactory results.

(To be continued in the next issue)