Deleo

CRÉATEUR EN
ESTHÉTIQUE MÉDICALE

FOCUS DUAL

Redonnez à votre peau tout son éclat et sa fermeté avec le Focus Dual : la solution idéale pour un soin global et performant

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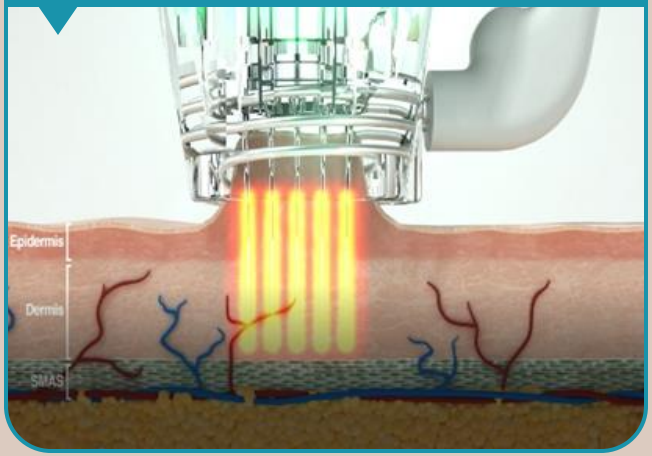
FOCUS DUAL

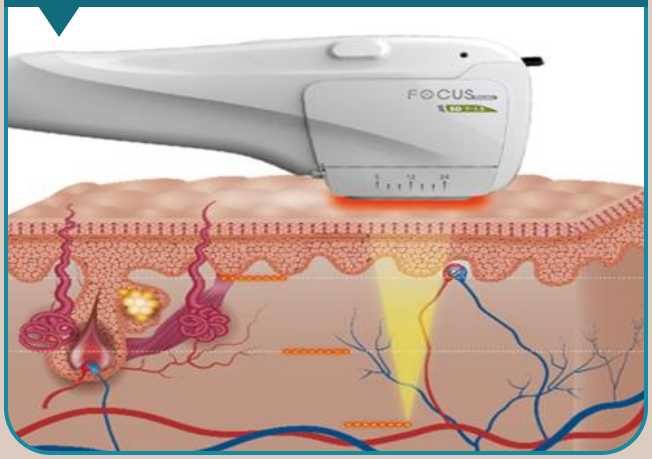
01 DÉCOUVREZ LE FOCUS DUAL

Technologie de radiofréquence fractionnée à micro-aiguilles



+

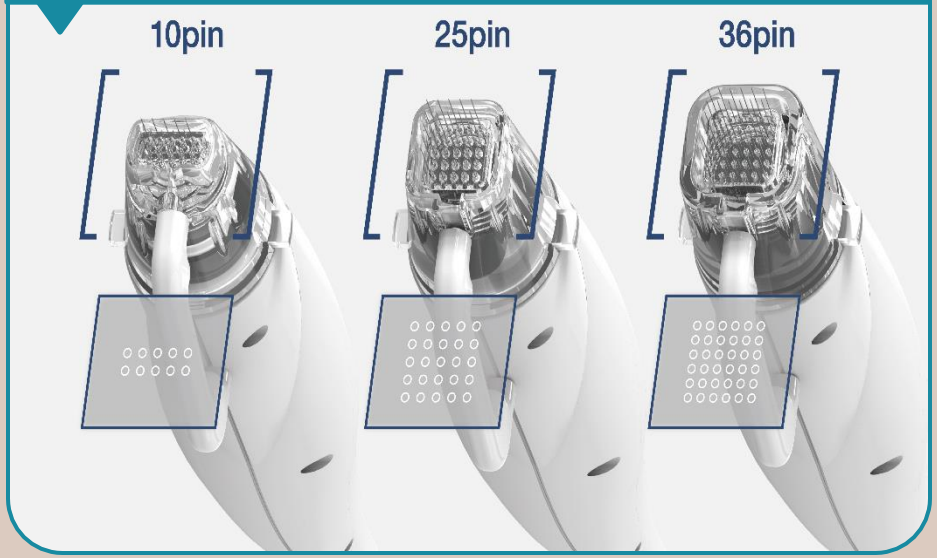
Technologie HIFU



RÉACTIVATION DU COLLAGÈNE - LIFTING - FERMETÉ

02 DEUX TECHNOLOGIES DANS UN SEUL APPAREIL

Technologie RF à micro-aiguilles



Optimisé pour rajeunir la peau grâce à l'application d'une radiofréquence de 2 MHz via une multi-aiguille de 0,25 mm de dia mètre.

Technologie HIFU

Conçu pour lifter la peau grâce à des ultrasons de 4 MHz et 7 MHz, générant de la chaleur en profondeur (SMAS, derme réticulaire et derme papillaire).

Deleo
CRÉATEUR EN ESTHÉTIQUE MÉDICALE

03 LES APPLICATIONS DU FOCUS DUAL

Technologie de RF à micro-aiguilles		Technologie HIFU
• Traitement de l'acné et des cicatrices d'acné • Réduction de tous types de cicatrices • Minimisation des pores • Amélioration du teint et de l'éclat de la peau • Atténuation des vergetures	▪ Lifting et fermeté ▪ Réduction visible des rides ▪ Rajeunissement de la peau ▪ Stimulation et régénération du collagène	▪ Redéfinition des sourcils ▪ Diminution du double menton ▪ Affinement des contours ▪ Amélioration de l'élasticité des joues

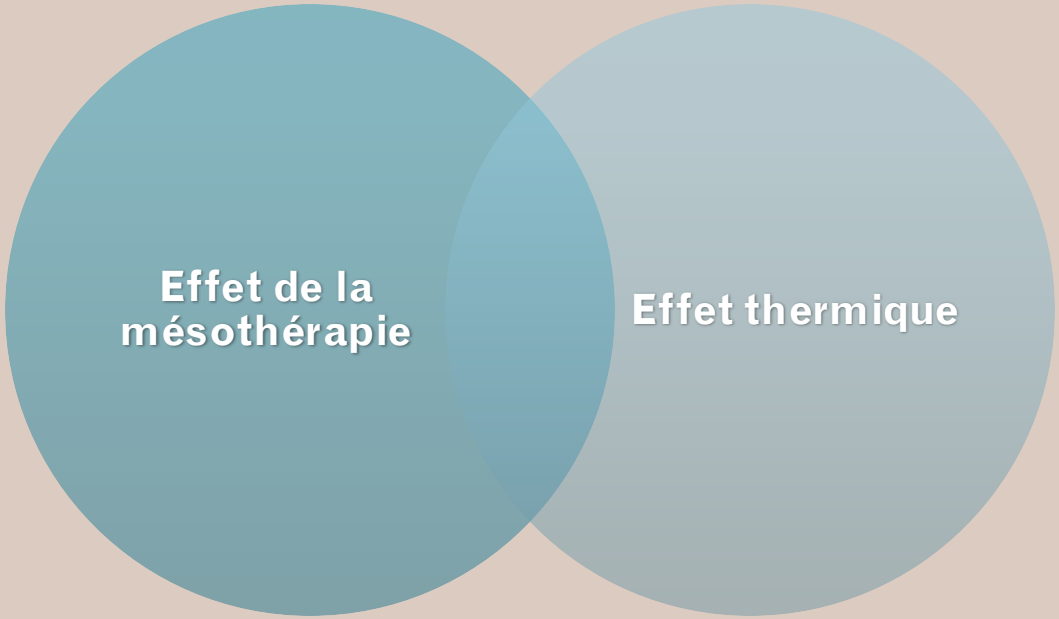
FOCUS DUAL

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Effets*

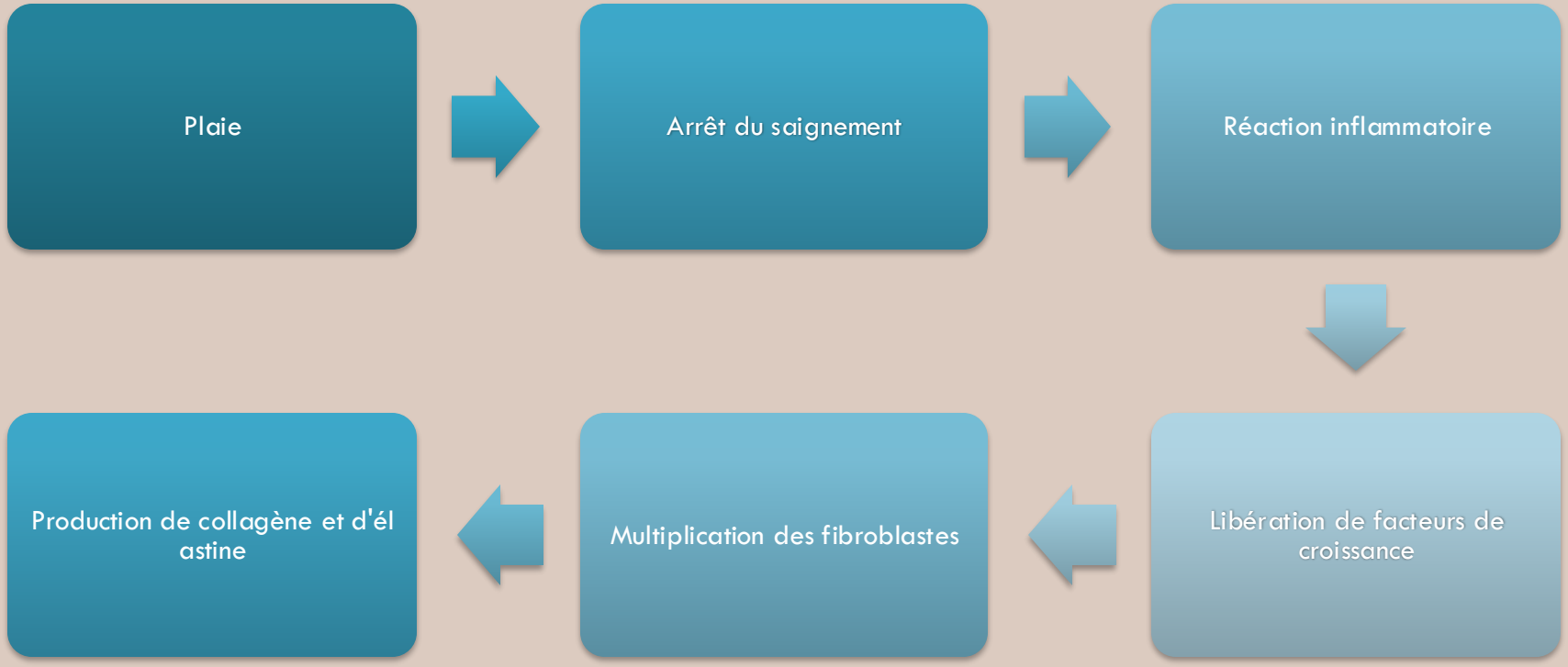


- **Microneedling** : La stimulation mécanique déclenche un processus de régénération cutanée.
- **Radiofréquence bipolaire (RF)** : La chaleur générée stimule la production de collagène pour un effet régénérateur.

04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Principe de fonctionnement de l'aiguille RF – processus de cicatrisation*

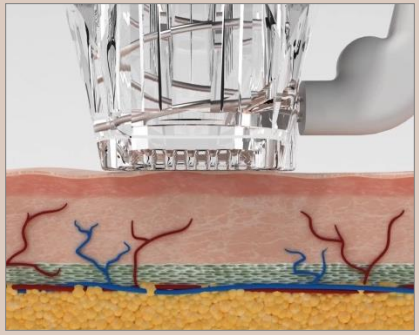


Journal of Dermatological Science 2018 903-12DOI: (10.1016/j.jdermsci.2017.12.009)

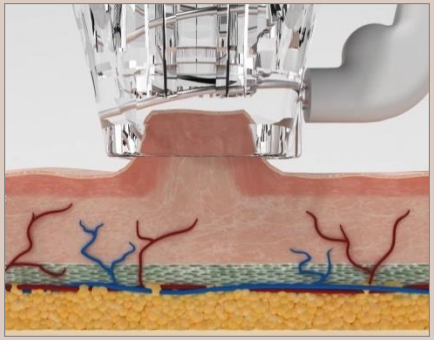
04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

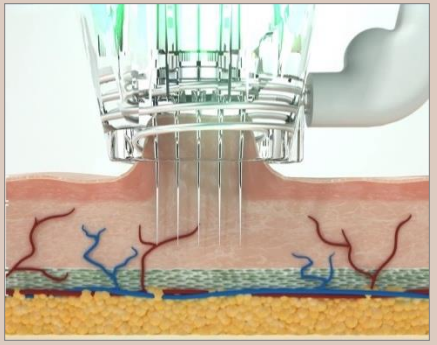
❖ *Étapes du mécanisme d'action de l'aiguille RF*



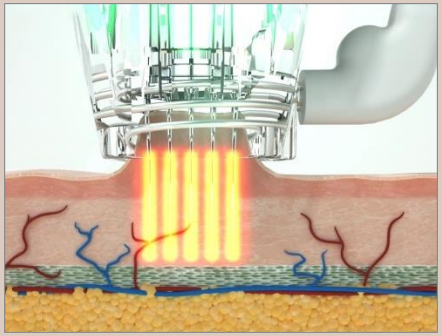
1. Contact de l'aiguille avec la peau



2. Phénomène d'aspiration



3. Micropuncture



4. Génération d'énergie RF

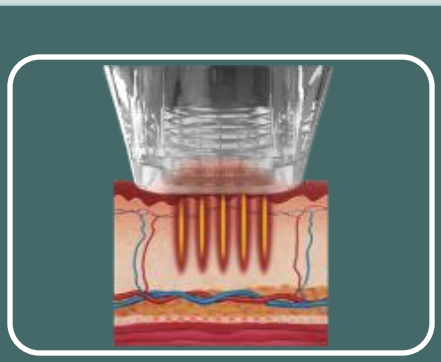
Multiplication des fibroblastes

Production de collagène et d'élastine

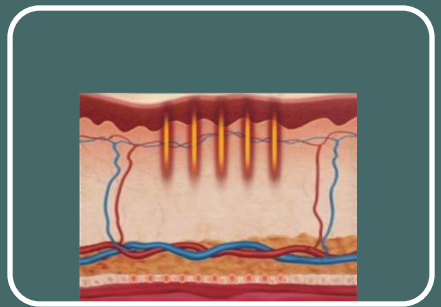
04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

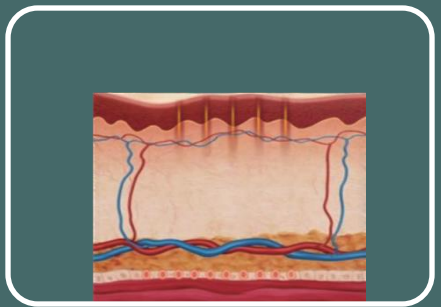
❖ *Processus de guérison*



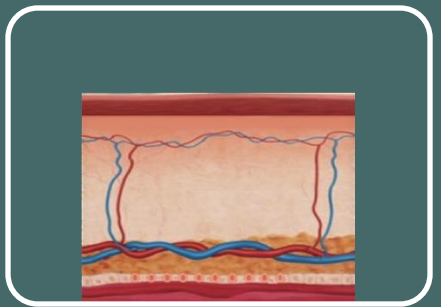
Les tissus sont stimulés pa r les aiguilles et l'énergie de la radio-fréquence dans la zone de profondeur souhaitée



Progression de la cicatrisation
Induction de la régénération
Multiplication des fibroblastes



Période de ré-génération de la cicatrisation – environ 3 se maines
Synthèse de collagène et d 'élastine



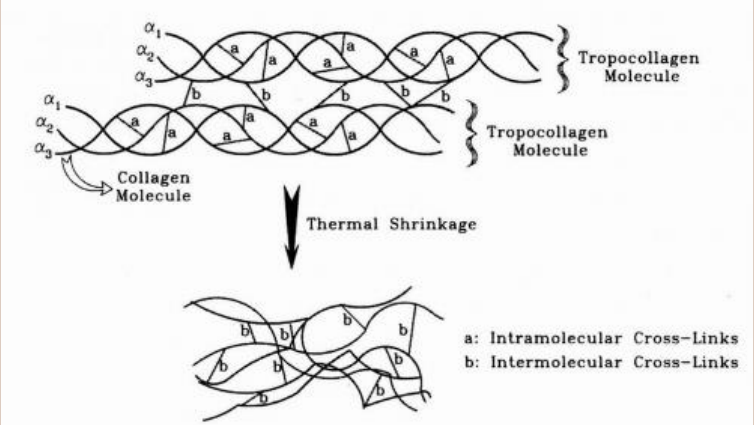
Remodelage du collagène

04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

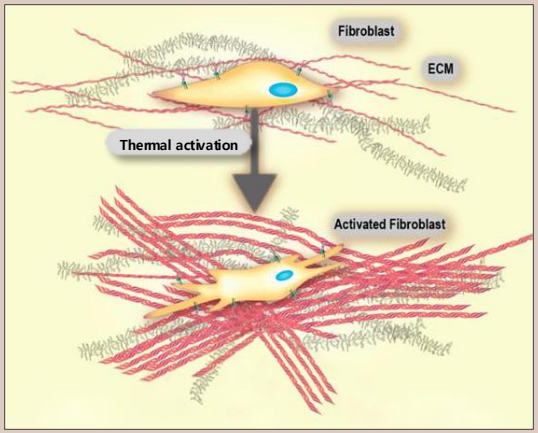
❖ *Effet thermique de la radiofréquence*

1. Effet initial : contraction instantanée du collagène



- Affaiblissement des liaisons d'hydrogène entre les molécules de collagène entraînant la dégradation des fibres sous l'effet de la chaleur.
- Détente de la structure des fibres de collagène, suivie de leur réorganisation par l'agrégation des molécules via les liaisons hydrogène.
- Contraction des fibres de collagène et renforcement de la matrice extracellulaire (ECM) grâce à un réarrangement optimal des fibres.

2. Effet secondaire : cicatrisation, remodelage du collagène, raffermissement au fil du temps

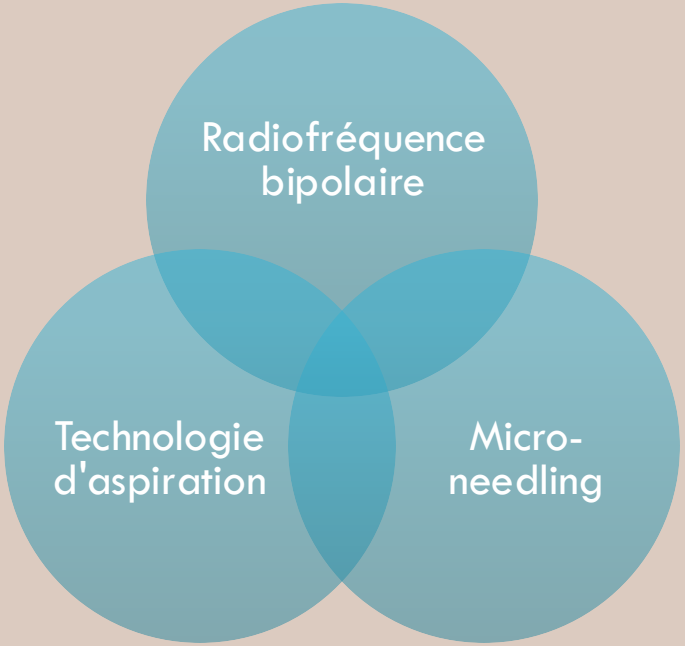


- Stimulation de la production de collagène pour protéger les fibroblastes des effets néfastes de la chaleur.
- Induction du remodelage de la matrice extracellulaire (MEC) par la synthèse de collagène et d'élastine.
- Amélioration de l'épaisseur de la couche dermique, des rides et de l'élasticité de la peau grâce à la synthèse de la matrice extracellulaire (MEC) sur une période de 3 à 6 mois.

04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Technologie des micro-aiguilles par radiofréquence fractionnée*

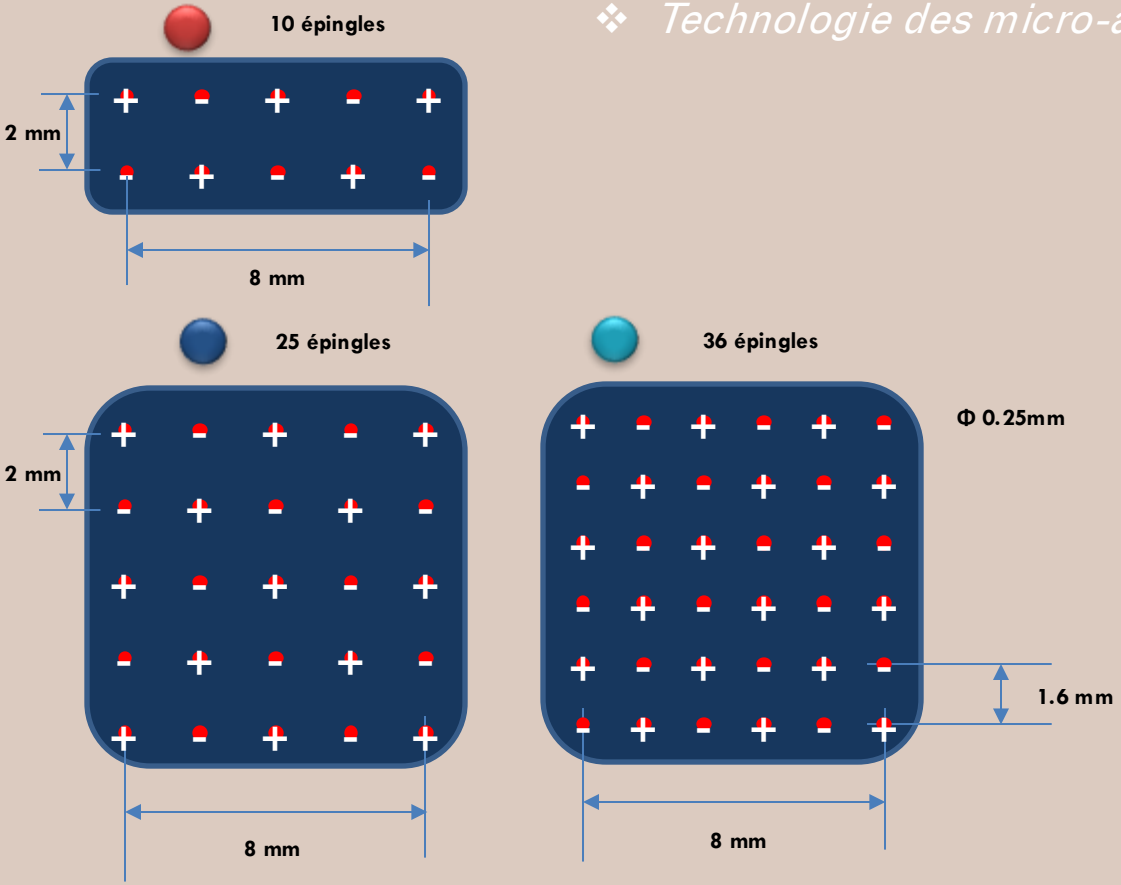


Appliquer une énergie de radiofréquence à la profondeur optimale pour des résultats spectaculaires, en combinant trois technologies innovantes et cliniquement validées.

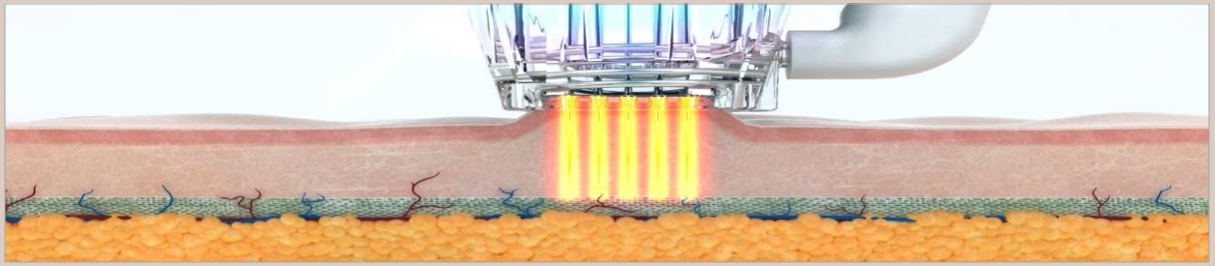
04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Technologie des micro-aiguilles par radiofréquence fractionnée*



- Distribution d'énergie stable et uniforme.
- Réduction des pertes d'énergie.
- Élimination des fluctuations dues aux variations d'impédance.

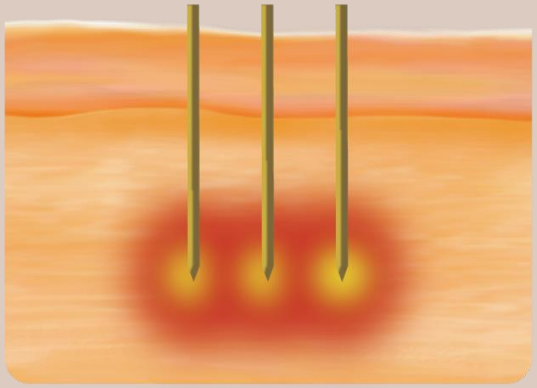


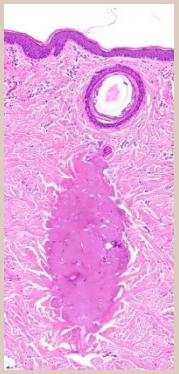
04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Technologie des micro-aiguilles*

AIGUILLE ISOLÉE





✓ Transmission intensive d'énergie par radiofréquence via une aiguille isolée

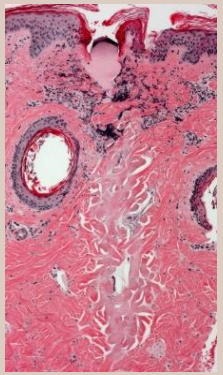
✓ Idéale pour traiter les lésions dermiques (par exemple, rides, élasticité, etc.)

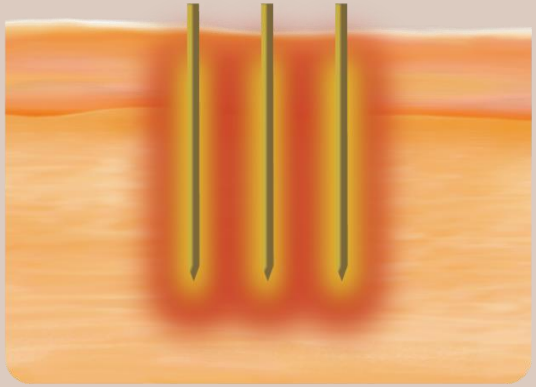
✓ Temps de récupération court

✓ Risque possible de rupture de l'isolation

✓ Légère hémorragie possible

AIGUILLE NON-ISOLÉE





✓ Transmission intensive et complète d'énergie par radiofréquence à l'aiguille non isolée

✓ Recommandée pour les lésions épidermiques et dermiques (par exemple, acné, cicatrices, pores, etc.)

✓ Zone de traitement étendue

✓ Nécessite un refroidissement de surface

✓ Formation de croûtes possible

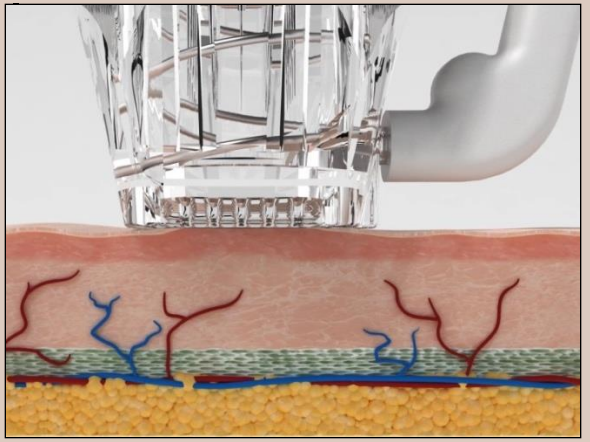
04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

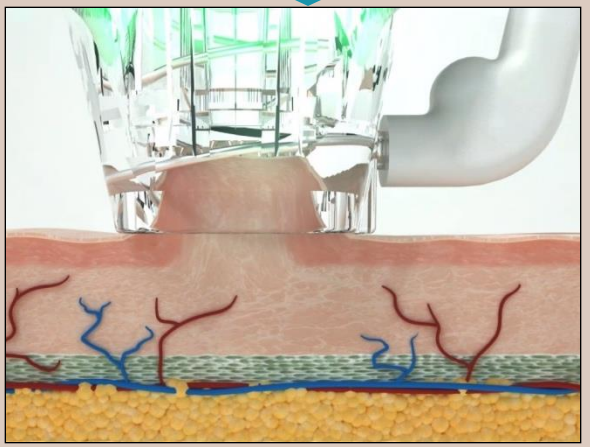
❖ *Technologie des aiguilles*

TECHNOLOGIE AVANCÉE

La technologie d'aspiration élève la zone cible pour un traitement sécurisé, particulièrement efficace sur les zones sensibles comme le contour des yeux et la zone T, offrant ainsi une meill eure précision et facilité d'intervention.



Phénomène d'aspiration



04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Avantages des micro-aiguilles fractionnelles*

Hygiène

Sécurité et hygiène assurées par la stérilisation au gaz EO

Diversité

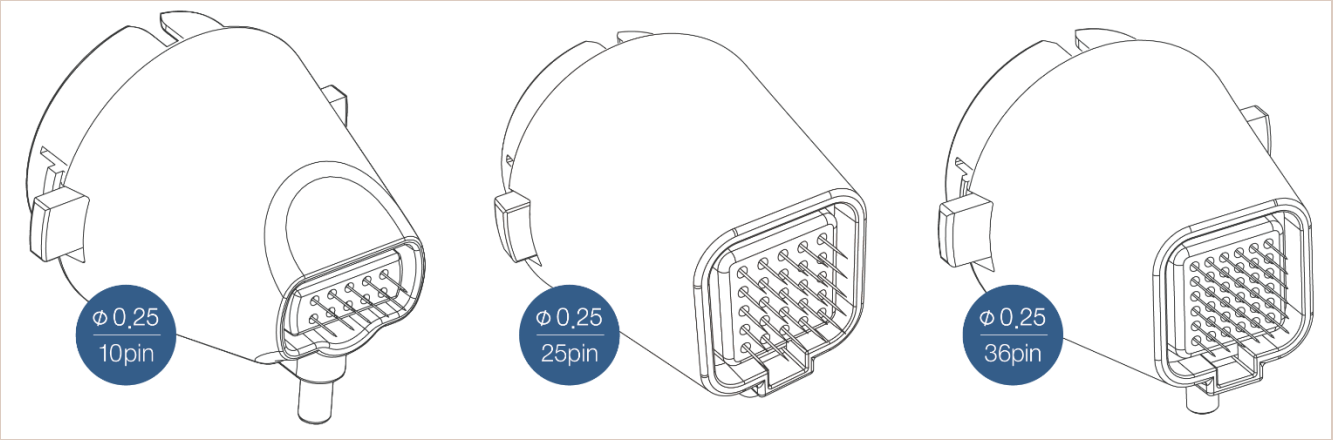
Disponible en 6 configurations d'aiguilles : 10, 25 o u 36 pointes

Technologie d'aspiration

La technologie d'aspiration prévient tout glissement cutané

Sécurité

Espacement précis des aig uilles, garantissant une distribution uniforme de l'énergie par radiofréquence sans c hevauchement



Boîte de micro-aiguilles (10 unités/1 boîte)

04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Précautions à prendre lors du traitement*

- Stériliser la zone avant la procédure pour éviter les infections secondaires
- Effectuer la procédure sans scarification.
- Surveiller la douleur du patient tout au long de la séance
- Utiliser la technologie de vide pour éviter le glissement cutané durant la procédure
- Les zones à forte élasticité, comme les joues, peuvent ne pas être aspirées ; dans ce cas, procéder sans la technologie de vide
- Pendant la procédure, adapter l'énergie et la profondeur en fonction des besoins spécifiques du patient
- Après une première passe, évaluer l'état du patient avant d'effectuer une seconde passe ou de traiter uniquement la zone concernée
- En cas de saignement, tamponner avec une gaze stérile et poursuivre la procédure
- Le lendemain, surveiller l'évolution du patient et intervenir en cas de signes d'inflammation

04

LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Contre-indications*

- Peau sujette aux chéloïdes
- Complications liées au diabète ou autres complications graves
- Infections cutanées ou troubles hémorragiques
- Port d'un stimulateur cardiaque
- Présence de marques de naissance anormales
- Grossesse
- Autres allergies

05

ÉTUDES SUR LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Amélioration des symptômes de la rosacée (rougeurs)*

Clinical and Histologic Effects of Fractional Microneedling Radiofrequency Treatment on Rosacea

Seon Yong Park, MD,*† Hyuck Hoon Kwon, MD, MS,*† Ji Young Yoon, MS,†
Seonguk Min, MD, MS,*† and Dae Hun Suh, MD, PhD*†

BACKGROUND Fractional microneedling radiofrequency (FMR) is an emerging treatment modality, but its effect on rosacea has not been studied yet.

OBJECTIVE To investigate the potential impact of FMR treatment on clinical improvement and histologic changes in rosacea patients.

MATERIALS AND METHODS A 12-week, prospective, randomized, split-face clinical trial was conducted. Two sessions of FMR were performed on one side of the cheeks with 4-week interval and the other side remained untreated. Erythema index from DermaSpectrometer and a* value from Spectrophotometer CM-2002 were measured at each visit for the objective measurement of erythema. Histologic analysis of skin samples was also carried out.

RESULTS Clinical evaluation and photometric measurement revealed the reduction of redness in the treated side compared with untreated side and baseline. Erythema index decreased 13.6% and a* value decreased 6.8% at Week 12 compared with baseline. Reduced expression of markers related to inflammation, innate immunity, and angiogenesis was observed in immunohistochemical staining of tissue obtained after FMR treatment.

CONCLUSION Fractional microneedling radiofrequency treatment showed modest clinical and histologic improvement of rosacea, and it might be used as an alternative or in combination with other treatment methods.

Supported by grant 04-2015-0350 from the SNUH Research Fund and National Research Foundation of Korea grant funded by the Korea government (MSIP) (No. 2014R1A2A1A11049397). The authors have indicated no significant interest with commercial supporters.

Journal des résultats cliniques du traitement par radio-fréquence fractionnée à micro-aiguilles

Figure 2. Clinical photographs showing improvement of rosacea. The treated side showed decreased erythema, while the lesion showed minimal improvement in the untreated side.

Conditions du traitement par radiofréquence fractionnée à micr o-aiguilles :

- Aiguille 49 pin
- Niveau 2 à 3 (5 à 7,5 W)
- Durée 50 à 70 ms

La réduction visible de la rosacée faciale a été confirmée après 12 sem aines de traitement par radiofréquence fractionnée à micro-aiguilles

05

ÉTUDES SUR LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Amélioration du relâchement du menton*

Lasers in Surgery and Medicine 48:461–470 (2016)

Fractional High Intensity Focused Radiofrequency in the Treatment of Mild to Moderate Laxity of the Lower Face and Neck: A Pilot Study

Matteo Tretti Clementoni, MD[1] and Girish S. Munavalli, MD[2,3]*
[1]*Skin House, Milan, Italy*
[2]*Dermatology, Laser, and Vein Specialists of the Carolinas, Charlotte, North Carolina*
[3]*Department of Dermatology, Wake Forest University, Winston Salem, North Carolina*

Background and Aims: The aging process is commonly associated with skin laxity in the lower face and neck. Conventional surgery can correct this at least to some extent, but is invasive. Fractional high-intensity focused radiofrequency delivered to the dermis with insulated microneedles has recently attracted attention in facial rejuvenation. The present pilot study was designed to assess the efficacy of HiFR for skin laxity of the lower face and neck.
Methods: Thirty-three patients (7 males, 26 females, age range 37–74 years) with mild to moderate skin laxity of the lower face/neck participated in the study. Three treatments were given at monthly intervals with protocols developed by the authors, three passes per session, at decreasing dermal depths for each pass. Histologic assessment of skin immediately after treatment was performed to identify the site and area of damage in the dermis. Clinical digital photography was taken at baseline and at 6 months after the final treatment session, based on which standardized computer measurement of improvement in the gnathion and cervicomental angles was the primary objective evaluation. A global assessment of improvement was graded by blinded assessors based on the photography. A telephone survey of patient satisfaction was performed at 12 months post-treatment.
Results: A significant post-treatment decrease in the cervicomental and gnathion angles was seen of 28.5° and 16.6°, respectively ($P < 0.0001$ for both). Histology immediately post-treatment showed a clear demarcated and roughly oval area of coagulation associated with the tip of the needle, confined to the dermis and not involving the epidermis. In the global assessment 81.8% of the patients achieved

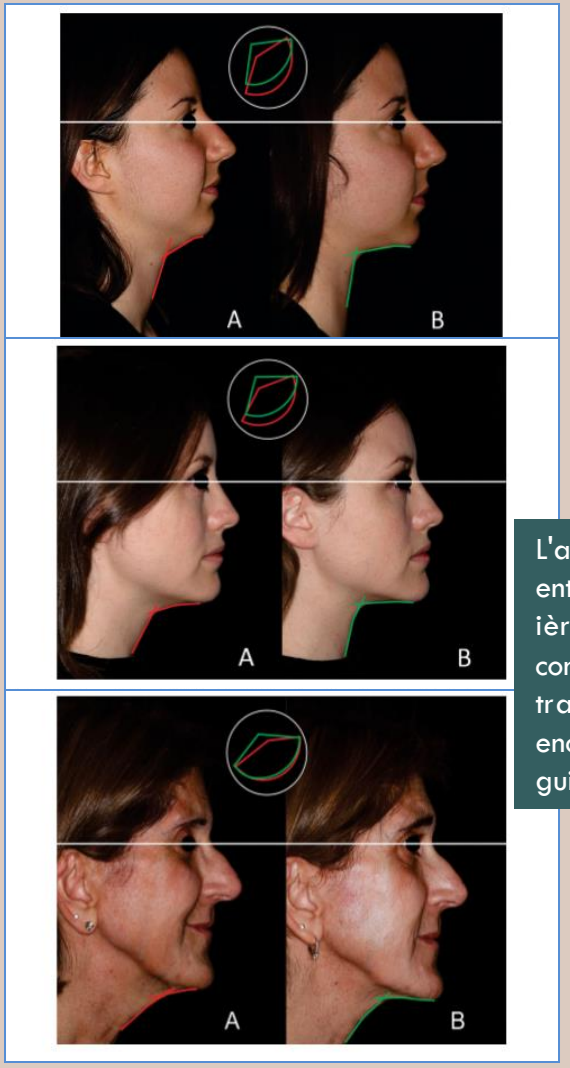
INTRODUCTION

As the facial skin ages, owing to both the photoaging and intrinsic aging processes, progressively deeper lines and wrinkles may appear as the extracellular matrix (ECM) fibrous components of collagen and elastin degrade and lose their resili
of ECM resilien
the face and ur
unsightly pend
neck, with d
Horizontal cres
by occupations
lap or reading
constant flexing
over long perio
Of all the visi
jowls and lax n
troublesome to
signs are also
Treatment of t
complete and
photo- and chro
of skin laxity, v
associated with
dermis, in part
scaffolding of t
fibroblasts ther
Traditional c
but at the cost of an extremely invasive procedure, and even then this approach may not completely address the

TABLE 2. HiFR Settings for Laxity of the Lower Third of the Face and Neck (Developed by MTC, Validated by GM).

Passes	Depth (mm)	Level	Exposure time (s)
	Neck		
1	1.5–2.0	8–9	220–230
2	1.0–1.5	6	160
3	0.75–1.0	6	160
	Lower third of face/submental region		
1	2.5	8–11	280–320
2	1.5	8–9	230–250
3	1	6	160

Higher end of ranges was used in thicker skin.



L'amélioration du relâchement de la zone sousmentonnière a été confirmée après 6 mois de traitement par radio-fréquence fractionnée à micro-aiguilles

Conditions du traitement par radiofréquence fractionnée à micro-aiguilles :
- 1MHz,
- 49 pin
- Lv. 1~20(2.5~50W),
- 10~1,000msec

05

ÉTUDES SUR LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Amélioration du relâchement du menton et des rides*

Lasers in Surgery and Medicine

Non-Insulated Smooth Motion, Micro-Needles RF Fractional Treatment for Wrinkle Reduction and Lifting of the Lower Face: International Study

Michael Gold, MD,[1]* Mark Taylor, MD,[2] Kenneth Rothaus, MD,[3] and Yohei Tanaka, MD, PhD[4]
[1]*Tennessee Clinical Research Center, Nashville, Tennessee*
[2]*Gateway Aesthetic Institute and Laser Center, Salt Lake City, Utah*
[3]*Rothaus Plastic Surgery, New York, New York*
[4]*Clinica Tanaka Plastic, Reconstructive Surgery and Anti Aging Center, Matsumoto, Nagano, Japan*

Introduction: Skin aging occurs through both intrinsic and extrinsic processes. Fractional radiofrequency (RF) with a microneedling array is the newest form of fractional therapy to be useful in treating aging skin. The current study utilized a noninsulated fractional RF microneedling system.
Methods: This multicenter clinical trial saw 49 patients complete 3 monthly treatments with the new fractional RF microneedling treatments and be followed for 3 months following their last treatment. Pain during treatment was recorded as well as overall improvement using a GAIS scale. Adverse events were also noted.
Results: Forty-nine patients completed all of the treatments and follow-ups. Mild to moderate erythema were reported immediately after treatment which lasted up to 12 hours after the treatment. Pain, as measured on a 1–10 VAS, was noted to 4, on average. The average Fitzpatrick's wrinkle scale score at baseline was 5.04 ± 1.22, 1 month after 3 treatments 3.829 ± 1.69 and 3 months after 3 treatments 3.5 ± 1.66. These results are statistically highly significant (correlated T-test, $P < 0.001$). Improvement was shown in 100% of patients while 65% of patients had significant improvement (GAIS levels 3–5). Significant skin tightening and skin lifting were also observed. No unusual adverse events were noted throughout the course of the study.
Conclusion: This multicenter study showed significant wrinkle reduction, skin tightening, and lifting of the mid and lower face with the noninsulated fractional RF microneedling system. Lasers Surg. Med. 2016 9999:1–7.

Key words: microneedling; wrinkle reduction; frequency; skin tightening; lifting; endymed; int 3deep

INTRODUCTION

Skin aging is mediated by the influences of both n aging process (intrinsic aging) and environmental f (extensive aging), mostly sun damage, on its cellula extra-cellular components [1,2]. Full face resurfacin

chemical peels and lasers have proven to be effective but can be usually associated with prolonged downtime and have been associated with multiple short- and long-term risks. Fractional CO_2 laser skin resurfacing ablates, or coagulates small "dots" of skin, leaving most of the skin surface intact reducing the downtime associated with full face resurfacing [3–5]. Nevertheless, reports show that fractional CO_2 laser resurfacing is still associated with postinflammatory hyperpigmentation or hypopigmentation in up to 55.5% of patients, especially in skin types III and IV [6–9].

Radiofrequency (RF) is a nonionizing electromagnetic radiation which has been used in medicine for nearly 100 years. In contrast to most lasers that target specific chromophores, RF is chromophore-independent with better penetration to the dermis and hypodermis as compared to light. RF with frequencies around 1 MHz were proven in the last decade to be safe and effective for both nonablative skin tightening of the face and body and fractional RF skin resurfacing for skin rejuvenation and acne scars. Multiple studies show improved safety profile compared to Fractional CO2 lasers with significantly less cases of postinflammatory hyper- or hypopigmentation [10–14].

Fractional RF skin resurfacing (FSR) can be performed using bipolar or multisource (3DEEP) RF technologies. These modalities use flat electrodes for simultaneous epidermal ablation and volumetric heating of the dermis. Bipolar fractional RF usually provides heat up to a depth of 300 microns while multisource FSR that simultaneously uses six RF generators has been shown to heat the dermis up to 2,800 microns. These devices have been proven to be

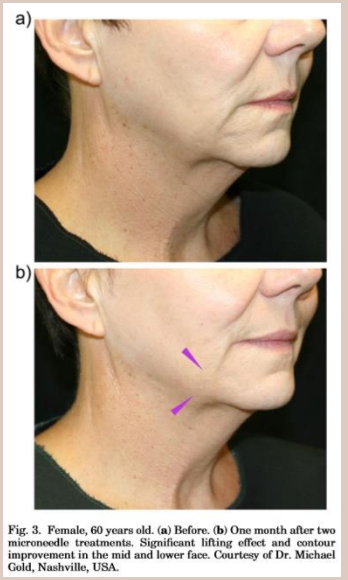
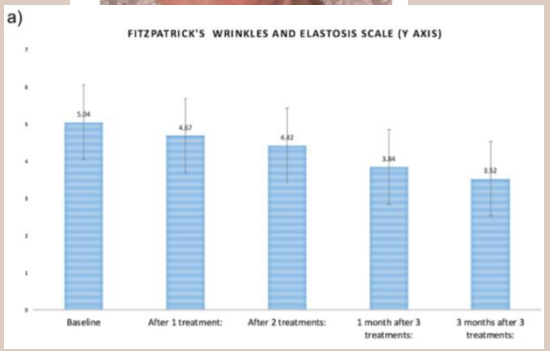


Fig. 3. Female, 60 years old. (a) Before. (b) One month after two microneedle treatments. Significant lifting effect and contour improvement in the mid and lower face. Courtesy of Dr. Michael Gold, Nashville, USA.



L'amélioration du relâchement du menton inférieur après 3 mois de traitement par radiofréquence fractionnée à micro-aiguilles est confirmée.

	Joues	Cou
Durée d'impulsion	110~140 ms	80~140 ms
Puissance	10~20 W	10~20 W
Profondeur	1.8~2.8 mm	1.3~2.5 mm

05

ÉTUDES SUR LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Soulagement de l'érythème acnéique*

Acta Derm Venereol 2016; 96: 87–91

CLINICAL REPORT

Fractional Microneedling Radiofrequency Treatment for Acne-related Post-inflammatory Erythema

Seonguk MIN[1,2*], Seon Yong PARK[1,2*], Ji Young YOON[2], Hyuck Hoon KWON[1,2] and Dae Hun SUH[1,2]
[1]Department of Dermatology, Seoul National University College of Medicine, [2]Acne and Rosacea Research Laboratory, Seoul National University Hospital, Seoul, South Korea
*These 2 authors contributed equally to this work.

Post-inflammatory erythema is a common result of acne inflammation and is cosmetically unacceptable without effective treatment. Fractional microneedling radiofrequency (FMR) has potential for treatment of post-inflammatory erythema. The aim of this study was to evaluate the efficacy and safety of this treatment. A retrospective chart review was undertaken of 25 patients treated with 2 sessions of radiofrequency at 4-week intervals and 27 patients treated with oral antibiotics and/or topical agents. Efficacy was assessed through an investigator's global assessment of photographs, and the analysis of erythema with image analysis software and photometric devices. Histological changes resulting from the treatment were evaluated by skin biopsy. FMR treatment resulted in significant improvements in erythema with no severe adverse effects. Histological study revealed a reduction in vascular markers and inflammation. FMR is a safe and effective treatment for post-inflammatory erythema, with potential anti-inflammatory and anti-angiogenetic properties. ***Key words: acne; post-inflammatory erythema; fractional microneedling radiofrequency.***

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Acta Derm Venereol 2016; 96: 87–91.

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Acne affects
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adverse effects and rapid recovery times, are becoming popular (5, 6). Fractional microneedling radiofrequency (FMR) delivers bipolar radiofrequency directly to the dermis using an array of microneedles (7). FMR has been reported to improve skin laxity and wrinkles (7–9). Bipolar radiofrequency has been reported to induce profound neoelastogenesis and neocollagenesis, which has been suggested as a potential mechanism of clinical efficacy (10). Moreover, FMR has been shown to have a therapeutic effect on inflammatory skin diseases, such as acne (11). We hypothesized that the dermal remodelling and anti-inflammatory effects of FMR may successfully treat PIE caused by persistent inflammation and destruction of the dermal matrix.

To date, no study has evaluated the efficacy of radiofrequency treatment in post-inflammatory erythema. The aim of this retrospective study was to evaluate the efficacy, safety and histological changes of FMR in post-inflammatory erythema. To the best of our knowledge, this is the first report of FMR for the treatment of PIE induced by acne inflammation.

MATERIALS AND METHODS

Study design and subjects

A retrospective chart review was undertaken of 52 patients who visited the Department of Dermatology, Seoul National University Hospital, South Korea, between August 2013 and February 2014.

Conditions de traitement par radiofréquence fractionnée à micro-aiguilles :
- 1MHz,
- 49 pin
- Lv. 2~3(5~7.5W),
- 50~70 msec

Fig. 2. Clinical photographs showing improvement in post-inflammatory erythema (PIE). The treated group showed improvement in redness 8 weeks after the second session of treatment (B) compared with baseline (A), whereas the control group showed no improvement (D) compared with baseline (C).

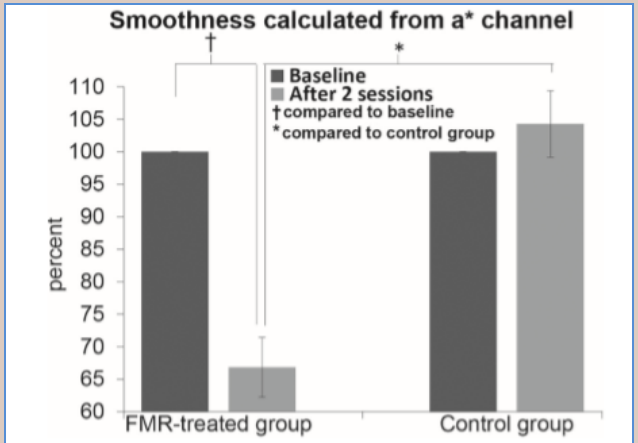


Fig. 3. Computer-aided erythema analysis. A variable "smoothness" showed reduction in post-inflammatory erythema (PIE) 8 weeks after the second session of treatment in the fractional microneedling radiofrequency (FMR)-treated group (*, † $p<0.05$).

L'amélioration de l'érythème par l'acné après 8 semaines de traitement par radiofréquence fractionnée à micro-aiguilles est confirmée.

05

ÉTUDES SUR LA RADIOFRÉQUENCE FRACTIONNÉE À MICRO-AIGUILLES

❖ *Amélioration des cicatrices d'acné*

Treatment of Acne Scars on Darker Skin Types Using a Noninsulated Smooth Motion, Electronically Controlled Radiofrequency Microneedles Treatment System

David Pudukadan, MBBS, MD

BACKGROUND Noninvasive technologies for treating acne scars use radiofrequency (RF)-emitting microneedles for both mechanical disruption of fibrotic strands and heat-mediated collagen remodeling.

OBJECTIVE Efficacy and safety evaluation of electronically controlled noninsulated RF microneedling system on acne scars in patients with dark skin.

METHODS Nineteen patients, 24 to 51 years old, skin types III to V, with acne scars were enrolled in the study. Each patient had 3 treatment sessions at monthly intervals using a multisource RF treatment platform with a microneedle RF applicator. Efficacy was evaluated by the Goodman and Barron's Global Qualitative Acne Scarring System.

RESULTS No bleeding points occurred during treatments. Post-treatment erythema was observed immediately after the treatment and lasted up to 10 hours after the treatment. Improvement of at least 1 acne scar grade was noted in 11 of 19 patients (57.9%) after 1 month and in 9 of 9 patients (100%) after 3 months.

CONCLUSION The tested noninsulated electronically controlled RF microneedles were found to be safe and efficient in the treatment of atrophic acne scars in skin types III to V with minimal pain or downtime.

The author has indicated no significant interest with commercial supporters.

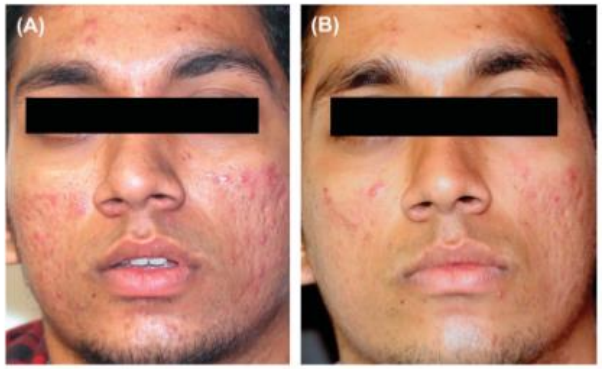


Figure 1. The 26-year-old man treated with 3 sessions of Intensif microneedling (pulse duration, 140 milliseconds; power, 19 to 20 W; and needle depth, 2.5 mm). Acne scar grading was decreased from Grade 4 to 3. (A) Before the treatment and (B) 1-month follow-up after 3 sessions.

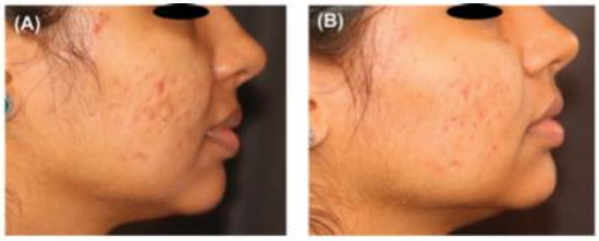
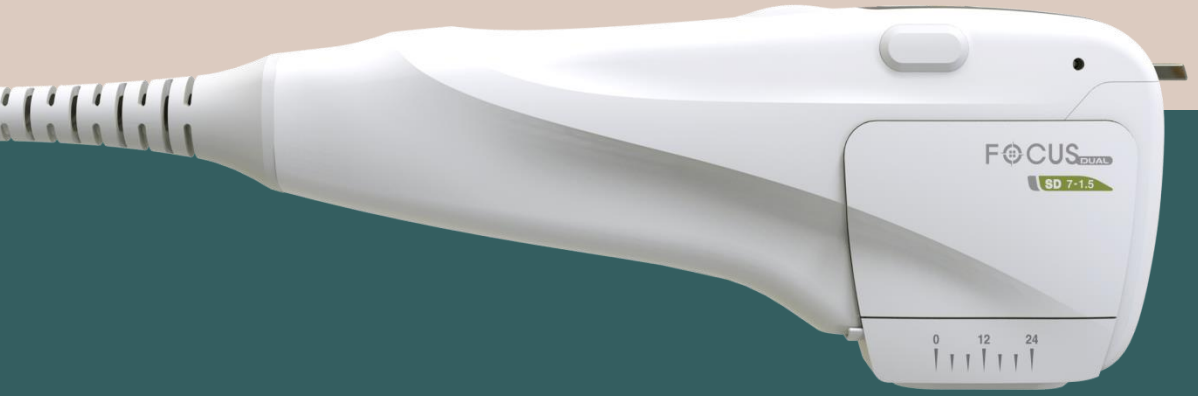


Figure 2. The 36-year-old woman treated with 3 sessions of Intensif microneedling (pulse duration, 140 milliseconds; power, 18 to 21 W; and needle depth, 2.5 mm). Acne scar grading was decreased from Grade 3 to 2. (A) Before the treatment and (B) 1-month follow-up after 3 sessions.

Conditions de traitement par radiofréquence fractionnée à micro-aiguilles :
- 2.0~3.0 mm de profondeur
- 15~25W,
- 110~140 msec

L'amélioration visible des cicatrices d'acné et des rougeurs a été confirmée après un mois de tra itement, suite à trois séances de radiofréquence fractionnée à micro-aiguilles.

HIFU : UNE TECHNOLOGIE INNOVANTE



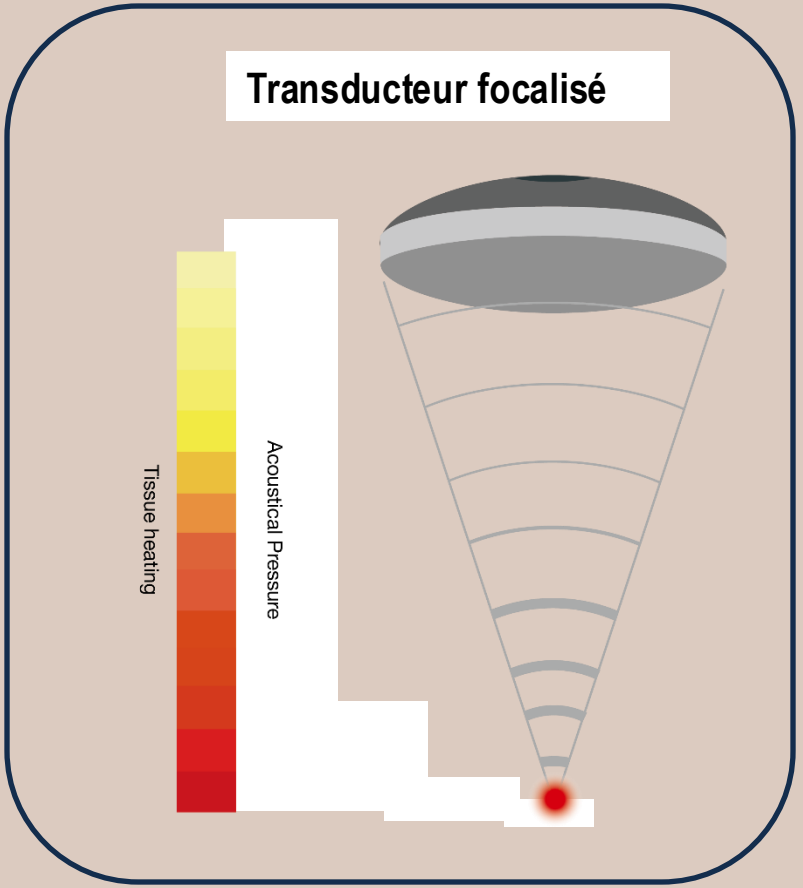
06

HIFU : UNE TECHNOLOGIE INNOVANTE

❖ *HIFU*

Le HIFU, c'est quoi?

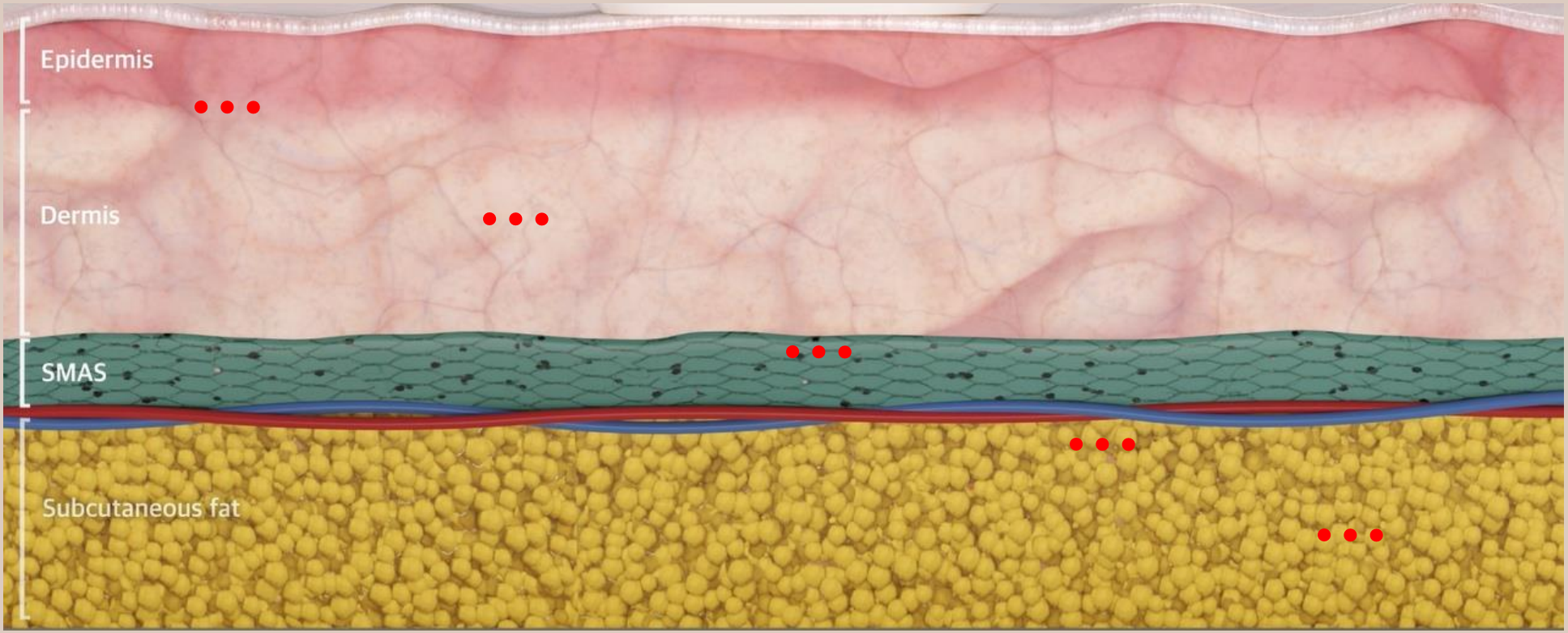
La procédure de lifting cutané agit en contractant immédiatement le SMAS (couche de fascia) grâce à la formation d'un point de coagulation à une température de 65 à 80°C, générée par une énergie ultrasonore de haute intensité à 4 MHz et 7 MHz.



06

HIFU : UNE TECHNOLOGIE INNOVANTE

❖ *Profondeur de mise au point de l'HIFU*



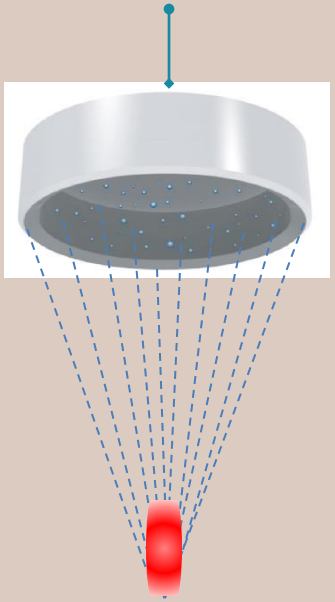
06

HIFU : UNE TECHNOLOGIE INNOVANTE

❖ *Transhole Technology*

Transducteurs normaux

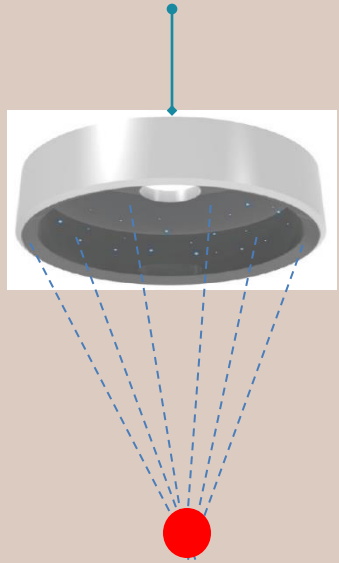
Une grande quantité de bulles d'air



- Le phénomène de cavitation dans la cartouche génère une grande quantité de microbulles.
- Ces bulles à la surface du transducteur perturbent le transfert de l'énergie ultrasonore.

Transducteurs transhole

Une petite quantité de bulles d'air



- Formation d'une petite quantité de bulles due au trou du transducteur
- Transfert stable de l'énergie des ultrasons

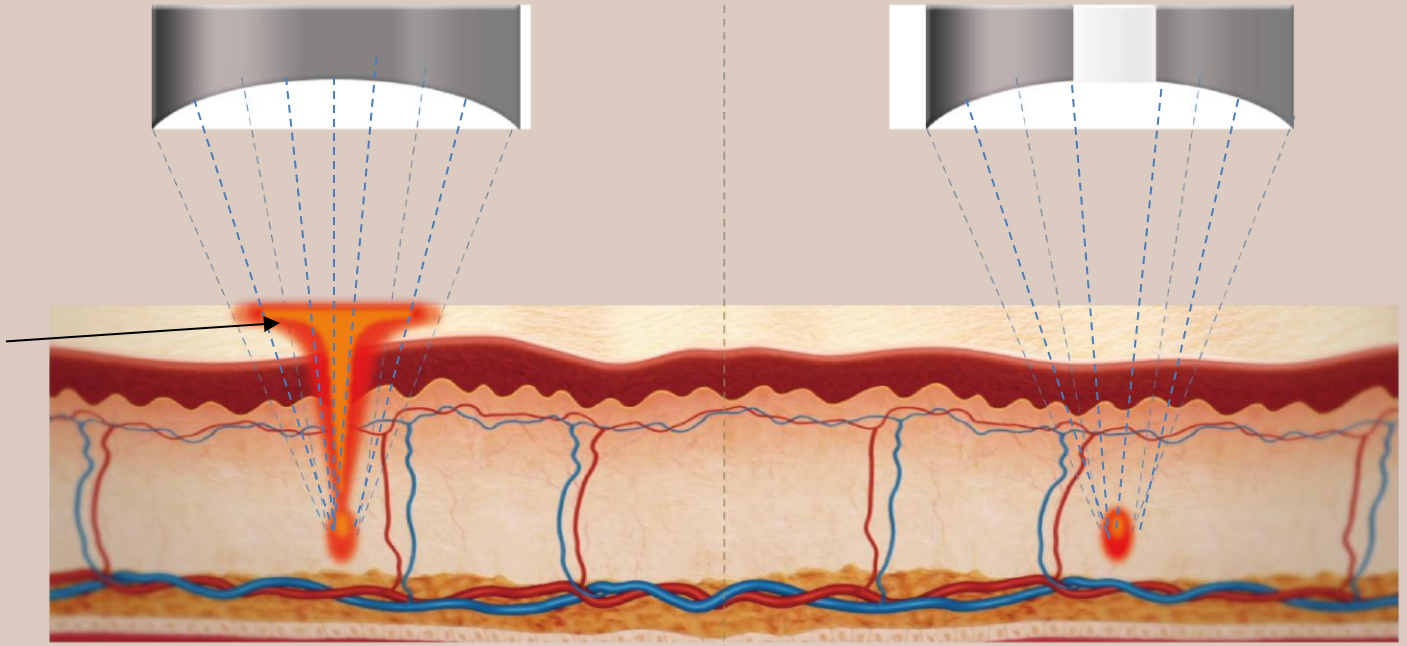
06

HIFU : UNE TECHNOLOGIE INNOVANTE

❖ *Transhole Technology*

Transducteurs normaux

Transducteurs transhole



- Provoque des lésions cutanées et des effets secondaires
- Production excessive de chaleur
- Augmentation de la douleur

- Diminution des lésions cutanées et des effets secondaires
- Génère un point de coagulation stable
- Diminution de la douleur

06

HIFU : UNE TECHNOLOGIE INNOVANTE

❖ *Transhole Technology*

Sécurité	Polyvalence	Trans Hole	Précision	Praticité
Non invasif Procédure sûre	Différentes cartouches disponibles	Minimiser les effets secondaires en appliquant un transducteur à trous	Coagulation précise du point cible	Une interface utilisateur conviviale qui prend en compte la commodité de l'utilisateur et une conception ergonomique de la pièce à main

[1.5mm] *[3.0mm]* *[4.5mm]* *[6.0mm]* *[13mm]*

06

HIFU : UNE TECHNOLOGIE INNOVANTE

❖ *Contre-indications*

- Les personnes souffrant d'une maladie susceptible de provoquer une infection au niveau de la zone d'intervention
- Les personnes ayant reçu une endoprothèse métallique sur la zone de traitement (autour du visage, du cou)
- Les personnes portant d'un stimulateur cardiaque
- Les personnes ayant un dispositif électrique dans le corps
- Les personnes souffrant d'une maladie systémique ou cutanée active susceptible d'affecter la régénération de la plaie

07

SYNTHÈSE BIBLIOGRAPHIQUE DES RECHERCHES SUR LE HIFU

❖ *Analyse de l'efficacité du traitement par HIFU*

Skin Research and Technology 2016; 0: 1–8
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doi: 10.1111/srt.12347

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Skin Research and Technology

High-intensity focused ultrasound treatment for skin: *ex vivo* evaluation

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[2]*Department of Pathology, Konkuk University Medical Center, Konkuk University School of Medicine, Seoul, Korea,*
[3]*Department of Medical Device Management & Research, SAIHST, Sungkyunkwan University, Seoul, Korea and* [4]*Jongno S&U Dermatologic Clinic, Seoul, Korea*

Background/Purpose: High-intensity focused ultrasound (HIFU) has been used for skin tightening. However, there is a rising concern of irreversible adverse effects. Our aim was to evaluate the depth of thermal injury zone after HIFU energy passes through different condition.

Materials and Methods: To analyze the consistency of the HIFU device, phantom tests were performed. Simulations were performed on *ex vivo* porcine tissues to estimate the area of the thermal coagulation point (TCP) according to the applied energy and skin condition. The experiment was designed in three orientations: normal direction (from epidermis to fascia), reverse direction (from fascia to epidermis), and normal direction without epidermis.

Results: The TCP was larger and wider depending on the applied fluence and handpieces (HPs). When we measured TCP in different directions, the measured area in the normal direction was more superficially located than that in the reverse direction. The depth of the TCP in the porcine skin without epidermis was detected at 130% deeper than in skin with an intact epidermis.

Conclusion: The affected area by HIFU is dependent on the skin condition and the characteristics of the HP and applied fluence. Considerations of these factors may be the key to minimize the unwanted adverse effects.

Key words: high-intensity focused ultrasound – treatment parameter – skin condition – porcine skin – *ex vivo* experiment

Accepted for publication 18 October 2016

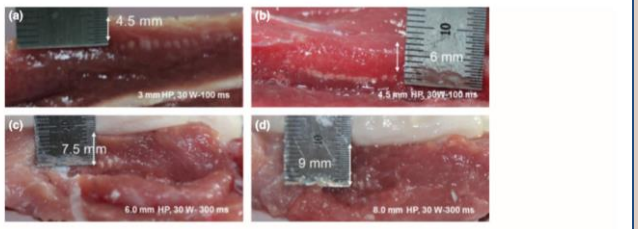

Fig. 2. TCP induced by HIFU in porcine muscle. In porcine muscle, TCP was measured at deeper area, compared with the preselected penetration depth of HIFU energy. Considering ultrasound attenuation in muscle is lower than that in skin, this experiment proved the excellent performances of HIFU device used in this study.

Résultats de l'essai non clinique pour l'analyse de l'efficacité des HIFU (fantôme, vérification du point de coagulation du sérum porcin et de la coloration des tissus).

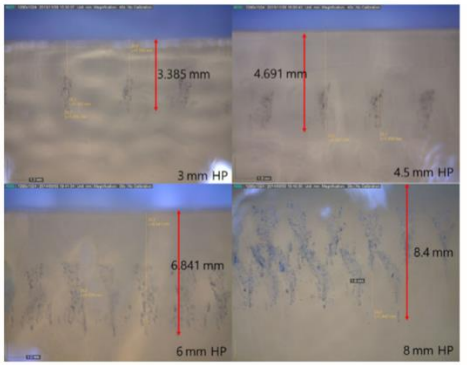

Fig. 1. At the same power (30 W-500 ms), the depth from the surface of the phantom gel to the bottom of the thermal coagulation point (TCP) was 3.385, 4.691, 6.841, and 8.4 mm using a 3.0, 4.5, 6.0, or 8.0 mm handpiece (HP), respectively (error margin = 12.8%, 4.24%, 14.01%, 5.0%).

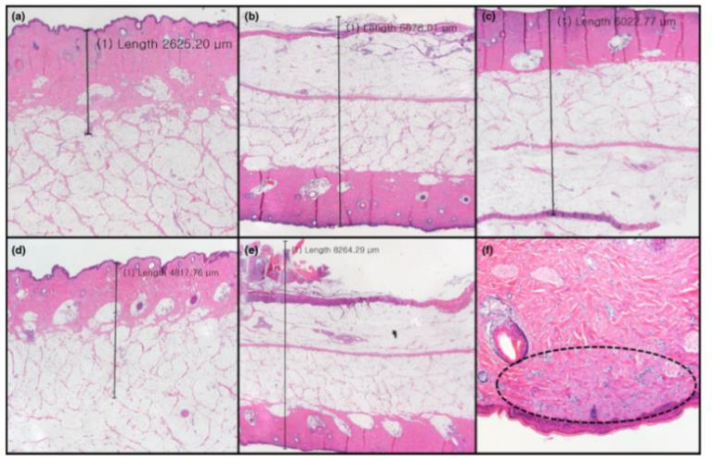

Fig. 5. The depth of TCP (from the surface to the bottom) was measured in each experiment (H&E). All experiments were performed at 35 W and 90 ms: (a) epidermis to fascia using a 4.5 mm HP (×40), (b) fascia to epidermis using a 4.5 mm HP (×40), (c) dermis to fascia after removing the epidermis and using a 4.5 mm HP (×40), (d) epidermis to fascia using a 6.0 mm HP (×40), (e) fascia to epidermis using a 6.0 mm HP (×40), (f) thermal coagulation point in the reverse direction (circle, ×100).

Image du résultat du test fantôme pour l'analyse de l'efficacité des HIFU

Image de vérification du point de coagulation du tissu porcin pour l'analyse de l'efficacité des HIFU

Image de la coloration des tissus pour l'analyse de l'efficacité des HIFU (en éliminant la couche épidermique, le taux de pénétration était supérieur de 130 % à une profondeur normale, selon l'essai).

07

SYNTHÈSE BIBLIOGRAPHIQUE DES RECHERCHES SUR LE HIFU

❖ *Analyse de l'efficacité du traitement par HIFU*

DERMATOLOGIC SURGERY

Ultrasound tightening of facial and neck skin: A rater-blinded prospective cohort study

Murad Alam, MD, MSCI,[a,b,c] Lucile E. White, MD,[a] Nicolle Martin, MD,[a] Joslyn Witherspoon, MD, MPH,[a] Simon Yoo, MD,[a,b,c] and Dennis P. West, PhD[a]
Chicago, Illinois

Background: Nonablative skin tightening technologies offer the prospect of reduction of wrinkles and skin sagging with minimal downtime, discomfort, and risk of adverse events. The excellent safety profile is mitigated by the limited efficacy of such procedures.

Objective: We sought to assess the efficacy of ultrasound skin tightening for brow-lift in the context of a procedure treating the full face and neck.

Methods: This was a rater-blinded, prospective cohort study at a dermatology clinic in an urban academic medical center. Subjects were medicated with topical anesthetic and then treated with an investigational focused intense ultrasound tightening device to the forehead, temples, cheeks, submental region, and side of neck using the following probes: 4 MHz, 4.5-mm focal depth; 7 MHz, 4.5-mm focal depth; and 7 MHz, 3.0-mm focal depth. Standardized photographs of front and side views were obtained at 2, 7, 28, 60, and 90 days; rating scales of pain, adverse events, physical findings, and patient satisfaction were also completed. Primary outcome measure was detection of improvement in paired comparison of pretreatment and posttreatment (day 90) photographs by 3 masked expert physician assessors, cosmetic and laser dermatologists, and plastic surgeons who were not authors. Second primary outcome measure was objective brow elevation as quantitated by a standard procedure using fixed landmarks. Secondary outcomes measure was patient satisfaction as measured by a questionnaire.

Results: A total of 36 subjects (34 female) were enrolled, one subject dropped out, and 35 subjects were evaluated. Median age was 44 years (range 32-62). On the first primary outcome measure, 30 of 35 subjects (86%) were judged by the 3 masked experienced clinician raters to show clinically significant brow-lift 90 days after treatment ($P = .00001$). On the second primary outcome measure, mean value of average change in eyebrow height as assessed by measurement of photographs at 90 days was 1.7 mm.

Limitations: Limitations of this study include the inability to quantitatively measure lower face tightening because of the lack of fixed anatomic landmarks in this area.

Conclusion: Ultrasound appears to be a safe and effective modality for facial skin tightening. A single ultrasound treatment of the forehead produced on average brow height elevation of slightly less than 2 mm. Most treated individuals responded, commonly with accompanying transitory mild erythema and edema. (J Am Acad Dermatol 2010;62:262-9.)

Key words: lifting; nonablative; tightening; ultrasound.

Résultats de l'essai clinique de l'analyse de l'efficacité des HIFU

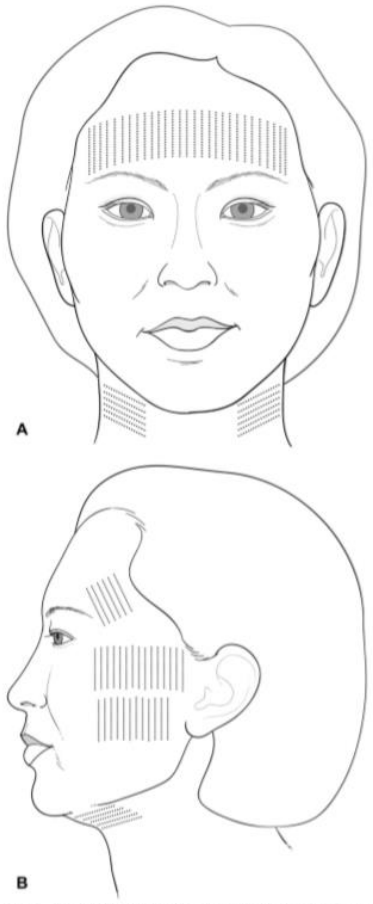

Fig 4. Placement of exposure lines on subject as seen in front view of forehead and neck (**A**), and side view of temple, cheeks, preauricular, and submental areas (**B**). All marked sites were treated in each patient.

Méthode de traitement

Fig 5. Frontal view of representative patient before (**A**) and 90 days after (**B**) treatment. Note superimposed lines and numbers that are used to objectively measure brow position. *AEH*, average eyebrow height; *MEH*, maximum eyebrow height.

La hauteur des sourcils a été augmentée en fonction de l'élévation de la peau après le traitement par HIFU

07

SYNTHÈSE BIBLIOGRAPHIQUE DES RECHERCHES SUR LE HIFU

❖ *Analyse de l'efficacité du traitement par HIFU*

Lasers in Surgery and Medicine 39:315–323 (2007)

Body Contouring by Non-Invasive Transdermal Focused Ultrasound

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Instituto Médico Laser, Madrid, Spain

Background and Objectives: The risks of currently available invasive procedures in body contouring motivate a need for safer, non-invasive technologies for improving the appearance of body silhouette. A new device has been developed that uses focused therapeutic ultrasound to reduce adipose tissue non-invasively. The aim of this study was to assess the efficacy and safety of a novel non-invasive focused ultrasound system (UltraShape Ltd, Tel Aviv, Israel) in reducing localized fat deposits to improve body contours.

Study Design/Patients and Methods: A prospective study was conducted on 30 healthy patients. All patients underwent three treatments, at 1-month intervals, and were followed for 1 month after the last treatment. Areas treated were the abdomen, inner and outer thighs, flanks, inner knees, and breasts (males only). No other body contouring procedure was used during the study. Efficacy was determined by change in fat thickness, assessed by ultrasound measurements, and by circumference measurements. Weight change was monitored to assess whether reduction in fat thickness or circumference was dependent on or independent of weight loss. Safety was determined by clinical findings, assays of serum triglycerides, and liver ultrasound evaluation for the presence of steatosis.

Results: All patients showed significant reduction in subcutaneous fat thickness within the treated area. The mean reduction in fat thickness after three treatments was 2.28 ± 0.80 cm. Circumference was reduced by a mean of 3.95 ± 1.99 cm. Weight was unchanged during the treatment and follow-up period. No adverse effects were observed.

Conclusions: This study shows the efficacy and safety of focused ultrasound, using the UltraShape™ *Contour I*, as a non-invasive transdermal method for reducing unwanted fat deposits in the body. Multiple treatments combined with appropriate patient and treatment area selection can produce dramatic improvements in body contour. Lasers Surg. Med. 39:315–323, 2007. © 2007 Wiley-Liss, Inc.

Key words: body contouring; focused ultrasound; non-invasive lipolysis

INTRODUCTION

Greater demand in body aesthetic medicine for non-invasive procedures has motivated researchers to develop new techniques to replace traditional treatments for body contouring. In the past, the only way to achieve dramatic improvement in body silhouette was by removing local fat deposits through liposuction or other surgical procedures. These surgical approaches have drawbacks for patients (hospitalization, general or tumescent anesthesia, pain, post-operative bruising and swelling, long post-operative recovery, and other risks inherent to surgical procedures) and create technical challenges for surgeons [1–4]. Such drawbacks prompted the development of a new device (*Contour I*, UltraShape Ltd, Tel Aviv, Israel) to reduce subcutaneous fat volume in areas that would normally be treated by liposuction, and to provide significant improvement in the contour of these areas while avoiding invasive techniques and their associated disadvantages.

Ultrasound can be used in medicine as a diagnostic method, when used in imaging, or as a therapeutic modality. The UltraShape™ system applies ultrasound in a therapeutic manner. The system emits focused ultrasound waves to deliver concentrated energy into a focal volume at a precise depth in the subcutaneous tissue. This system was designed to use mechanical (non-thermal) energy to disrupt fat cells and without damaging neighboring structures (skin, blood, and lymph vessels, muscles, and nerves), due to their differential susceptibility to mechanical stresses induced by the ultrasound.

The approach of using non-invasive focused ultrasound for tissue disruption differs from other therapeutic ultrasound devices in important ways (Fig. 1). The first and most obvious distinction is between invasive therapeutic ultrasound, such as is used in internal ultrasound assisted liposuction (UAL), and external therapeutic ultrasound of various types. Among external ultrasound treatments, the approach of tissue or substance destruction should be distinguished from tissue warming. As a rough generalization of currently marketed systems (which are

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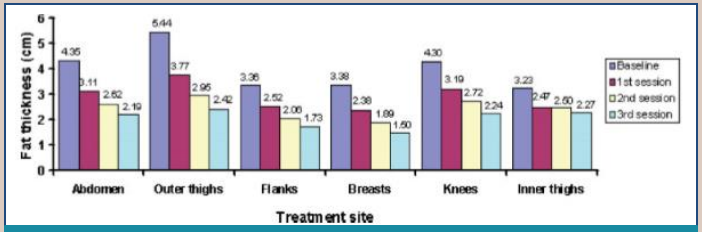


Modification de l'épaisseur de la graisse en fonction du traitement

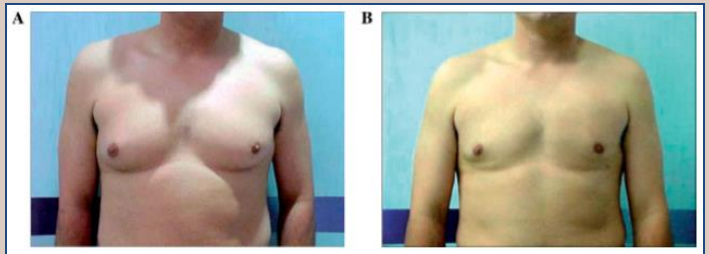


Fig. 5. Pseudo-gynecomastia (A) before treatment and (B) after treatment.

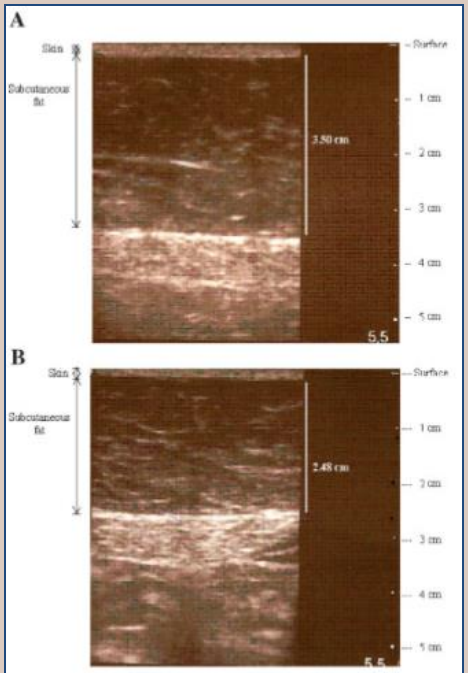
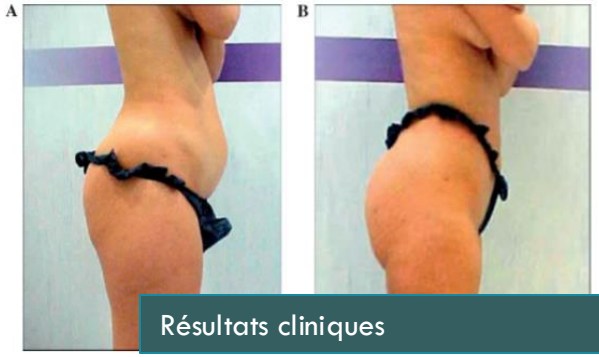


Fig. 3. Fat thickness assessment by ultrasound (A) before treatment and (B) after treatment.

Modification de l'épaisseur de la graisse en fonction du traitement



Résultats cliniques

Fig. 6. Abdomen (A) before treatment and (B) after treatment.

07

SYNTHÈSE BIBLIOGRAPHIQUE DES RECHERCHES SUR LE HIFU

❖ *Analyse de l'efficacité du traitement par HIFU*

JOURNAL OF COSMETIC AND LASER THERAPY
https://doi.org/10.1080/14764172.2018.1511907

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Efficacy and safety of noninvasive focused ultrasound for treatment of subcutaneous adiposity in healthy women

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ABSTRACT

Introduction: In recent years, a new method focused ultrasound (FUS) has been used in the treatment of localized fat. The objectives of this work were to evaluate the efficacy and safety of the FUS in the treatment of abdominal subcutaneous fat. Materials and Methods: Thirty-one healthy women were divided into two groups: G1 (N = 7), 6 sessions, 3 passes, once a week and G2 (N = 23), 10 sessions, 2 passes, twice a week. Outcome measures were reduction of circumference and fat thickness. Safety monitoring included laboratory testing (serum lipids profile and liver function tests) and adverse events were also assessed. Patient satisfaction and tolerance questionnaires were also applied. One patient underwent abdominoplasty and received a single session of FUS 24 h before surgery and a skin sample was collected for histological analysis. Results: The results showed improvement in body contouring and reduction of the thickness of the fat layer observed by ultrasonography in both groups: G1 ($P < 0.001$) and G2 ($P < 0.0001$). The histology showed disrupted adipocytes and collapsed membranes 24 h after the FUS treatment. Conclusion: FUS represents an effective and safe treatment for reducing localized adipose tissue by adipocytolysis.

ARTICLE HISTORY
Received 18 August 2017
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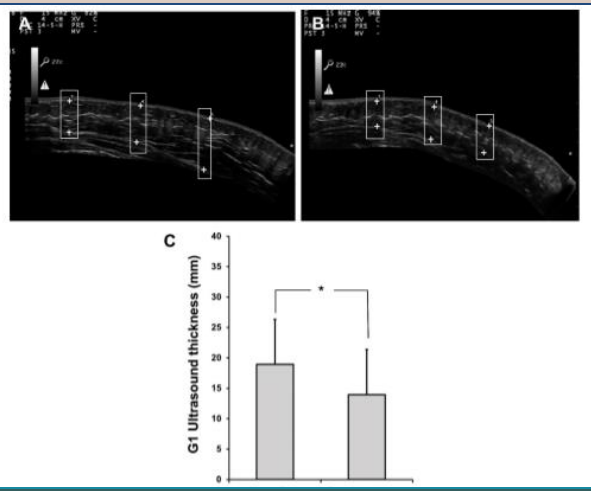
KEYWORDS
HIFU; cavitation; adipocytolysis; adipocyte



L'analyse de la couche adipeuse par ultrasons a confirmé une réduction significative de l'épaisseur de la couche adipeuse.

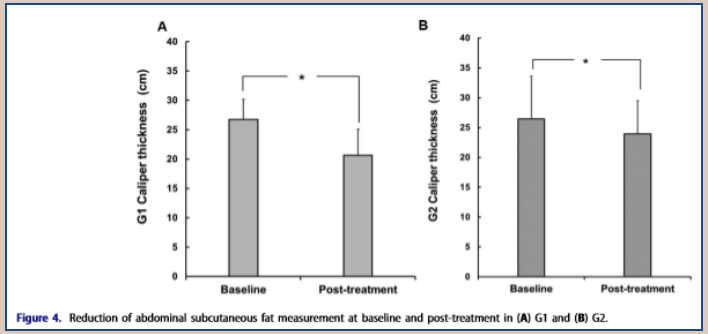


Figure 4. Reduction of abdominal subcutaneous fat measurement at baseline and post-treatment in (A) G1 and (B) G2.

La réduction de l'épaisseur de la couche adipeuse a été confirmée pour tous les groupes selon l'analyse effectuée à l'aide d'un étrier.

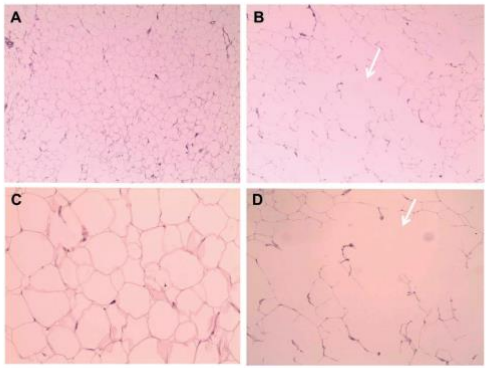


Figure 9. Human abdominal subcutaneous fat tissue collected during abdominoplasty. (A and C) Histology of adipocytes at baseline and (B and C) 24 h after single treatment with focused ultrasound. Arrows indicate disrupted or denatured cells (adipocitolysis) and collapsed membranes (HE stain). (A and B): magnification X10; (C and D): magnification X40.

Cellule adipeuse dissoute (flèches) après 24 heures de traitement HIFU sur une cellule adipeuse humaine.

FOCUS DUAL

PROGRAMME CLINIQUE

08

PROGRAMME CLINIQUE

❖ *Épaisseur de la peau d'un adulte coréen*

	Epiderme (mm)	Derme (mm)	Epaisseur totale de la peau skin (mm)
Front	0.1	0.8	0.9
Contour des yeux	0.05	0.47	0.53
Joues	0.1	1.1	1.2
Menton	0.08	0.75	0.83
Cou	0.1	1.3	1.4

(Surg Radiol Anat.2002 Aug-Sep;24(3-4):183-9.Skin)

08

PROGRAMME CLINIQUE

❖ *Guide de traitement*

Semaines	1	2	3	4	5	6	7	8	9	10
Acné	Needle RF	Régénération	Needle RF	Régénération	Needle RF	Régénération	Needle RF			
Pores	Needle RF	Re	HIFU	Needle RF	Régénération	HIFU	Needle RF	Régénération		
Rides	HIFU	Needle RF	Re	HIFU	Needle RF	Re	HIFU	Needle RF	Régénération	
Lifting	HIFU	Needle RF	Régénération	HIFU	Needle RF	Régénération	HIFU	Needle RF		
Vergetures	Needle RF			Needle RF			Needle RF			

FOCUS DUAL

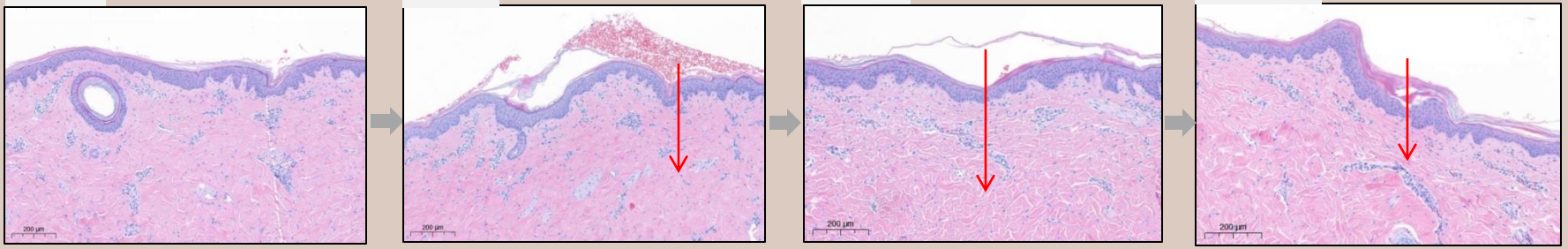
PRÉ-ESSAIS CLINIQUE

09

PRÉ-ESSAIS CLINIQUE

❖ *Comparaison des résultats entre un niveau de RF '0' et un niveau '10' avec la pièce à main RF Needle*

※ RF level '0'



Structure normale de la peau

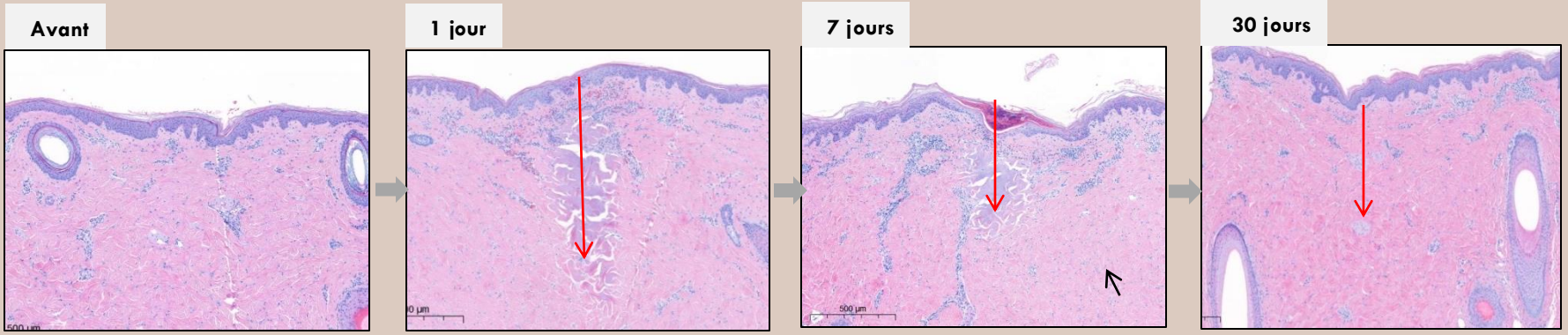
Différenciation de la couche cornée le long de l'aiguille, aucun changement du derme

Normalisation de la peau

Normalisation de la peau

✓ ***Seul l'effet de cicatrisation de la plaie par l'aiguille a été temporairement confirmé, mais aucun changement du collagène dans la couche dermique n'a été observé***

※ RF level '10'



Structure normale de la peau

La réponse de cicatrisation progresse en fonction de l'étendue de la zone de dommage thermique jusqu'au derme

Réépidermisation de l'épiderme au niveau du site de l'aiguille
Remodelage du collagène

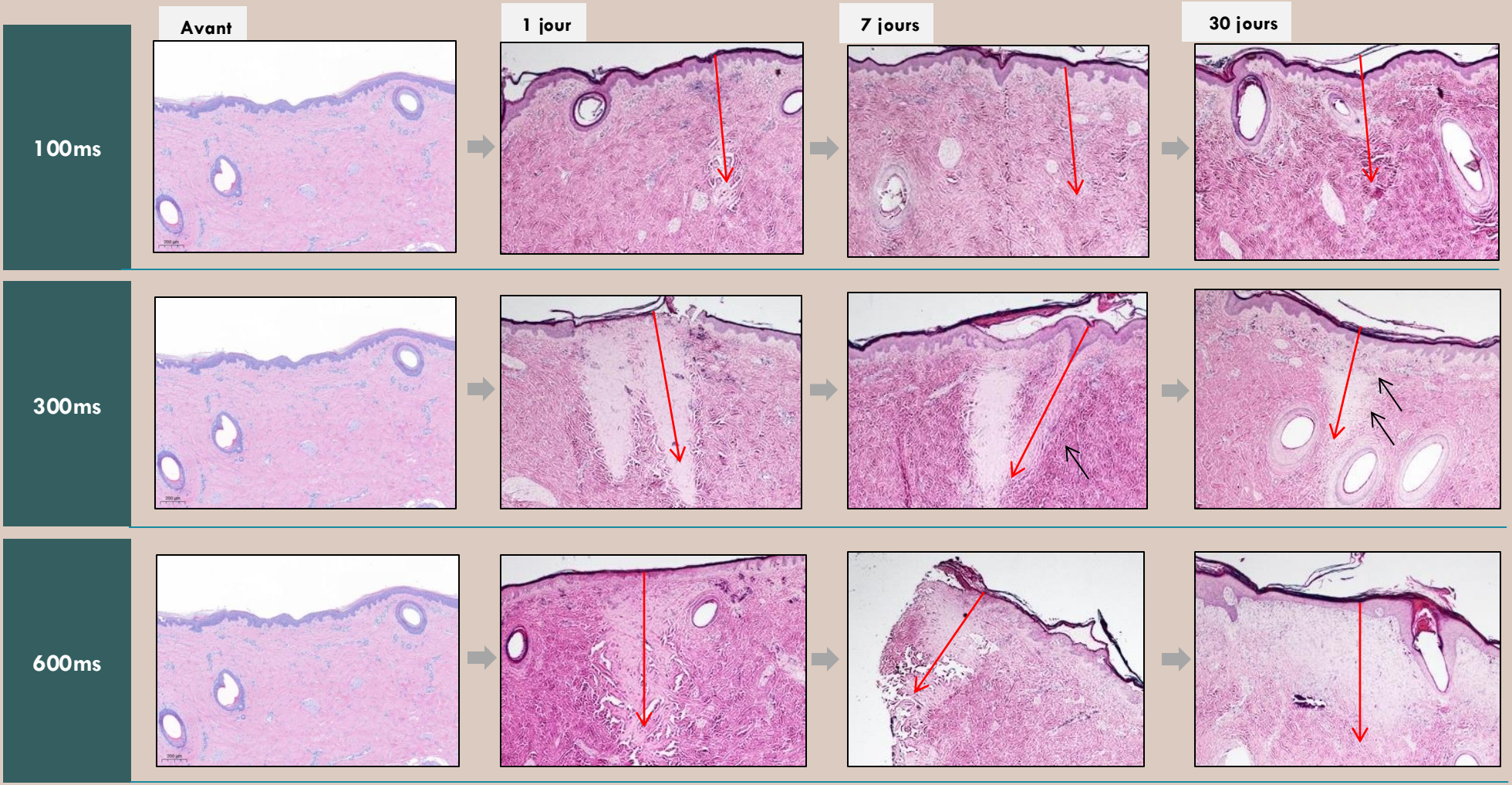
Structure de la peau récupérée
Enrichissement de la structure du collagène dans le derme

✓ ***Remodelage du derme et de l'épiderme dû au dommage thermique de la peau par radiofréquence à l'aide de l'aiguille.***

09

PRÉ-ESSAIS CLINIQUE

❖ *Aspect cellulaire dans le temps lorsque le niveau de RF de la pièce à main RF Needle est '10'*

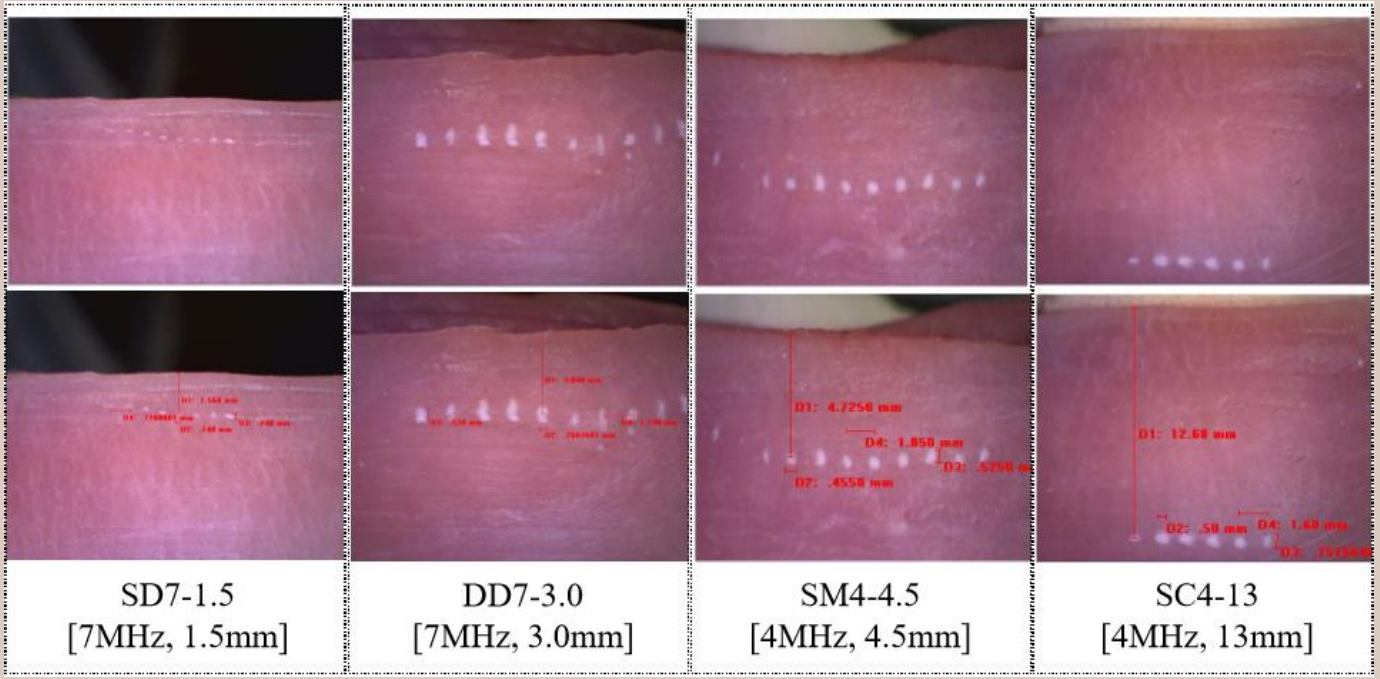


Plus la durée d'application de l'énergie par radiofréquence est prolongée, plus l'étendue des dommages thermiques est importante, renforçant ainsi la structure du collagène dans le derme.

09

PRÉ-ESSAIS CLINIQUE

❖ *Test de coagulation de la pièce à main HIFU*



SD7-1.5 [7MHz, 1.5mm]	DD7-3.0 [7MHz, 3.0mm]	SM4-4.5 [4MHz, 4.5mm]	SC4-13 [4MHz, 13mm]

Sortie (J)	0.25	1.0J	0.9J	1.7J
Profondeur du focus (mm)	1.56	3.04	4.72	12.60
Longueur de l'axe X (mm)	0.14	0.26	0.45	0.50
Longueur de l'axe Y (mm)	0.24	0.52	0.52	0.75
Intervalle du focus (mm)	0.72	1.14	1.05	1.60