COMBINING FRACTIONAL RF MICRONEEDLING AND SUPERFICIAL RF RESURFACING

Marge Uibu discusses combination treatments with a microneedling device for dermal rejuvenation, as well as the treatment of acne and acne scars

ABSTRACT
Full title
Clinical applications of the INTRAcel device combining bipolar and monopolar fractional radiofrequency microneedling and superficial radiofrequency resurfacing

Recent trends in aesthetic treatments are for a natural and healthy look, less invasive procedures, combined treatments, repetitive treatments, and regular care. The optimal aesthetic treatment should be effective, safe, suitable for different areas of the body, easy to perform, and with minimal recovery time. As ageing is a continuous process, the treatment should also be suitable for repetitive treatments, while reinforcing the natural and healthy look of the skin. Much is being discussed with regard to—if one starts early enough—whether it would be possible to postpone major surgical procedures. However, despite surgery, one still has to treat and maintain the quality of the skin. This article discusses the possibilities of using the INTRAcel platform in skin rejuvenation, acne, enlarged pores, acne scars, scars, and stretch marks.

MARGE UIBU, MD, is Dermatologist, Clinic of Aesthetic Dermatology and Plastic Surgery Ihoakatemia, Helsinki, Finland

email: marge.uibu@ihoakatemia.fi

ONE OF THE MAIN GOALS OF aesthetic treatments is to alleviate and slow down the appearance of the signs of ageing. Skin ageing begins with a little looseness of the skin and fine lines, and continues with flaccidity, wrinkles, photodamage and sagging of the tissues.

For a long time, ablative and fractional ablative laser treatments have been widely used for skin resurfacing and tightening. The well-known side-effects of these procedures are pain, prolonged downtime, erythema, permanent scarring, and pigmentation disorders. In rejuvenation, ablative laser treatments have a limited suitability for regular maintenance procedures and have a minor lifting effect. Therefore, there remains a need for a comprehensive approach to rejuvenation and safer, more effective aesthetic treatments.

Microneedling

Microneedling (sometimes called collagen induction therapy) is often used for rejuvenation and the treatment of scars. This treatment method uses a stamp or a roller, pressing 0.5–2 mm needles into the skin. The small wounds are closed immediately, but the mechanical injury initiates the wound healing process and stimulates the proliferation of fibroblasts and production of collagen and elastin[1]. The formation of new capillaries improves the blood supply to the skin. Microneedling is also used to increase the transdermal delivery of active skincare substances[2].

> “The advantage of radiofrequency is the relatively low-level heat developed by the devices, which diminishes the tissue burns and allows for a safer treatment profile.”

Radiofrequency

Radiofrequency (RF) energy generates heat depending on the resistance of the specific tissue. RF has been used to provide a controlled and moderate level of tissue heating in different areas of medicine for many years. RF is widely used in surgery, oncology, cardiology and other fields of medicine, and for many different indications. The advantage of RF is the relatively low-level heat ▷

KEYWORDS
fractional radiofrequency, microneedling, skin rejuvenation, acne scars

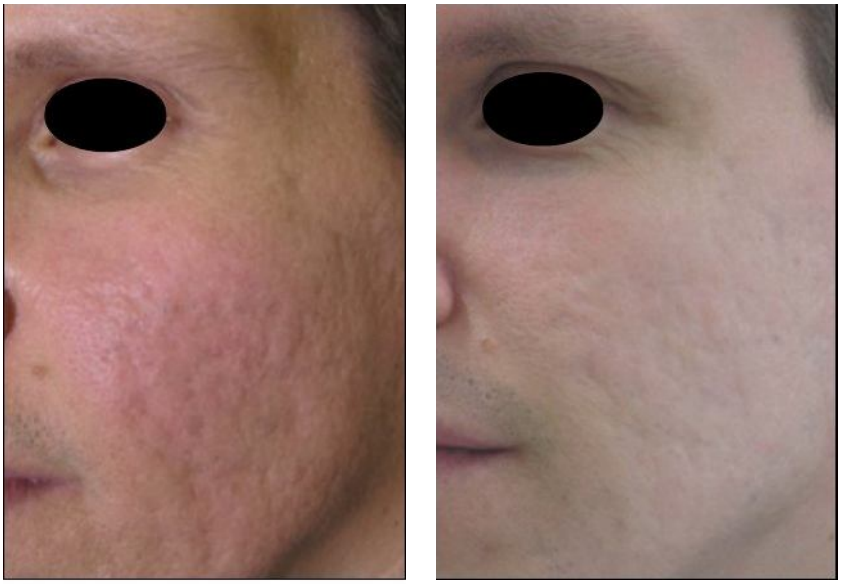

Figure 1 Severe acne scars, before and after six INTRAcel treatment sessions. Previous treatments were mechanical abrasion, ablative CO_2 (three sessions), and fractional CO_2 (10 sessions)

▷ developed by the devices, which diminishes the tissue burns and allows for a safer treatment profile.

RF has been used in aesthetic skin treatments for more than 10 years. It has been shown to stimulate the restructuring of collagen and elastin, resulting in better skin quality and the reduction of wrinkles[3,4]. The energy levels used in non-invasive RF devices have been limited to the tolerance of the epidermis. Therefore, the energy levels in the deeper dermis have been relatively low, resulting in a sub-optimal dermal heating effect. Subsequently, the results of non-ablative RF procedures have generally been moderate[5]. Fractional RF microneedling technology (FRM) overcomes this problem, targeting different levels of the dermis without inducing heat damage to the surface of the skin. This enables an effective treatment with a better safety profile. FRM has been reported to give good clinical results in the treatment of acne scars and large facial pores[6], and rejuvenation[7] with minimal side-effects.

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INTRAcel

The original INTRAcel device (Jeisys Co, Seoul, South Korea) uses 49 partly insulated microneedles targeting bipolar RF (FRM-bipolar) at variable pre-selected depths into the skin. The depth of the treatment can be selected between 0.5–2 mm and the RF emission is adjustable to seven levels ranging between 0–2.4 J. The energy deposition takes place within 0.04–0.1 seconds. Each needle has an insulated coating, allowing the release of thermal effect only from the tip of the needle, preserving the skin's surface. Therefore, the risk of post-inflammatory pigmentation disorders is reduced, and the microneedling treatment modality is suitable for all skin types. Furthermore, the barrier function of the skin is preserved, enabling a quick recovery.

The INTRAcel device was originally developed to treat acne scars and acne, but it was soon noticed that it can also be successfully used for rejuvenation treatments, other scar types, and stretch marks. It improves skin texture, fine lines, deeper wrinkles, and skin laxity. The second generation All New INTRAcel device is a three-fold treatment platform that includes monopolar fractional microneedling (FRM-monopolar), bipolar fractional microneedling (FRM-bipolar), and minimally ablative superficial RF rejuvenation (SRR). The monopolar RF can go deeper than bipolar RF. As skin impedance influences RF delivery, the new INTRAcel device includes an impedance monitoring function, automatically calculating the output value. This function is essential for safe and effective intradermal monopolar RF delivery. Each treatment modality can be used individually, as well as in combination.

Absolute contraindications for the treatment include pacemaker, previous use of gold thread skin rejuvenation, keloid formation constitution, and skin infections.

Clinical applications

Rejuvenation

The INTRAcel single-use microneedle treatment tip has 2000 pulses and one can select between bipolar and monopolar RF treatment mode. For the best results, multiple treatment passes with a 50% overlap at different depths and vector directions are used. According to the preliminary biopsy studies reported by Jeisys[8], lower energy delivery in FRM-monopolar mode seems to achieve the thickening of the collagen fibres, while higher energies seem to up-regulate fibroblast production in FRM-bipolar mode.

The bipolar and monopolar microneedling can be combined with the minimally-ablative superficial RF (SSR) treatment option for a more superficial effect. The

Figure 2 Female patient, aged 42 years, showing the first signs of ageing. Before (A, B, C) and after (D, E, F) two INTRAcel treatment sessions

superficial RF treatment option has 6000 pulses, and improves skin tone and reduces wrinkles through mild fractional RF resurfacing. It is useful for treating the upper and lower eyelids and in combination treatments for wrinkles in the periorbital, perioral and neck areas. It can also used as an individual treatment mode.

Acne and acne scar treatment

INTRAcel FRM-bipolar and monopolar modes can be used for the treatment of mild acne. As most of the sebaceous glands can be found at a 1 mm depth, the treatment depth of 0.8-1.5 mm will result in decreased sebum production and the tightening of enlarged pores. The heat may also reduce the growth of bacteria. The treatment is performed on a monthly basis for between three and five treatment sessions. The improvement in skin condition can usually be seen from the second treatment session. INTRAcel has been widely used for acne treatment in Asian countries; however, the European experience for this indication is still limited and requires further study.

In acne scars, both FRM-bipolar and FRM-monopolar, as well as superficial RF, can be used. The final clinical result will be visible within 3 months. In the study conducted by Cho et al[6], bipolar FRM resulted in improvement of acne scars in 22 patients, and a reduction of large pores in 21 out of 30 patients[7]. The patient satisfaction profile was favourable, with 26 patients being very satisfied or satisfied with the treatment results. The mean duration of erythema was 7.8 days and mild folliculitis was observed in two patients. With regular topical anaesthesia, with 5% Emla cream, the pain was mostly mild (n=18; 60%), but severe in two patients (n=6; 7%) and moderate in four patients (n=13; 3%). It is possible that the discomfort can effect compliance to serial treatments[9].

> “INTRAcel is effective for a variety of types of acne scars. The author has seen clear improvements – even with the most difficult ice-pick scars.”

Results

In Asian countries, the INTRAcel has been available since 2009, and in Europe since 2011. In the author's clinic, treatments using this device began in April 2011 and over 800 treatments have been performed to date. The main indications for the treatment have been rejuvenation and acne scars. In addition of the tightening effect, the lifting effect of the sagging skin of the face and neck is remarkable.

The author has treated a range of patients including cases of tightening the upper arms, elbows, and knees, and treating stretch marks and other scars on the body – all of which have reaped good results. The INTRAcel treatment also reduces telangiectasia, but is not the treatment of choice for this indication.

INTRAcel is effective for a variety of types of acne scars. The author has seen clear improvements – even with the most difficult ice-pick scars. It can also be used safely for patients who have undergone previous ablative laser resurfacing treatments.

Indeed, the author's personal experience with INTRAcel treatment in mild acne is encouraging – sebum secretion is diminished and inflammation decreased. However, in moderately inflamed acne the sebum secretion can be increased for a short period after the first treatment, resulting in a transient worsening of acne and requiring supportive topical treatment or oral medication. Good treatment response can be achieved by combining topical treatments and LED therapy. At present, the INTRAcel treatment option for acne remains for cases unresponsive to common treatment strategies. Severe acne should first be treated with oral medication.

In skin rejuvenation there is an immediate treatment effect followed by a gradual improvement over 4-8 weeks. In facial rejuvenation, the full face, including eyelids and neck, can be treated in the same session. ▷

Figure 3 Female patient aged 58 years before (A) and after (B) INTRAcel treatment. The skin tightening and lifting effects are clearly visible

▷ Although a single INTRAcel treatment gives immediately visible results, for a longer-lasting rejuvenation effect, up to three once monthly treatments may be required; while for deeper acne scars and stretch marks up to five treatments may be necessary. The recovery time following subsequent treatment sessions seems to become shorter compared with the first treatment.

The final improvement of the skin is a gradual process and takes a number of weeks, or even months. As the treatment result is totally natural, it is important to take pre- and post-treatment photographs. The routine comparison of photos during visits enables the physician to demonstrate the progressive clinical improvement, as changes are often bigger than the patient may notice or remember. This seems to be especially important while using the FRM-bipolar treatment mode alone. FRM-monopolar and superficial RF treatment modes also achieve immediately visible results.

Treatment regimens

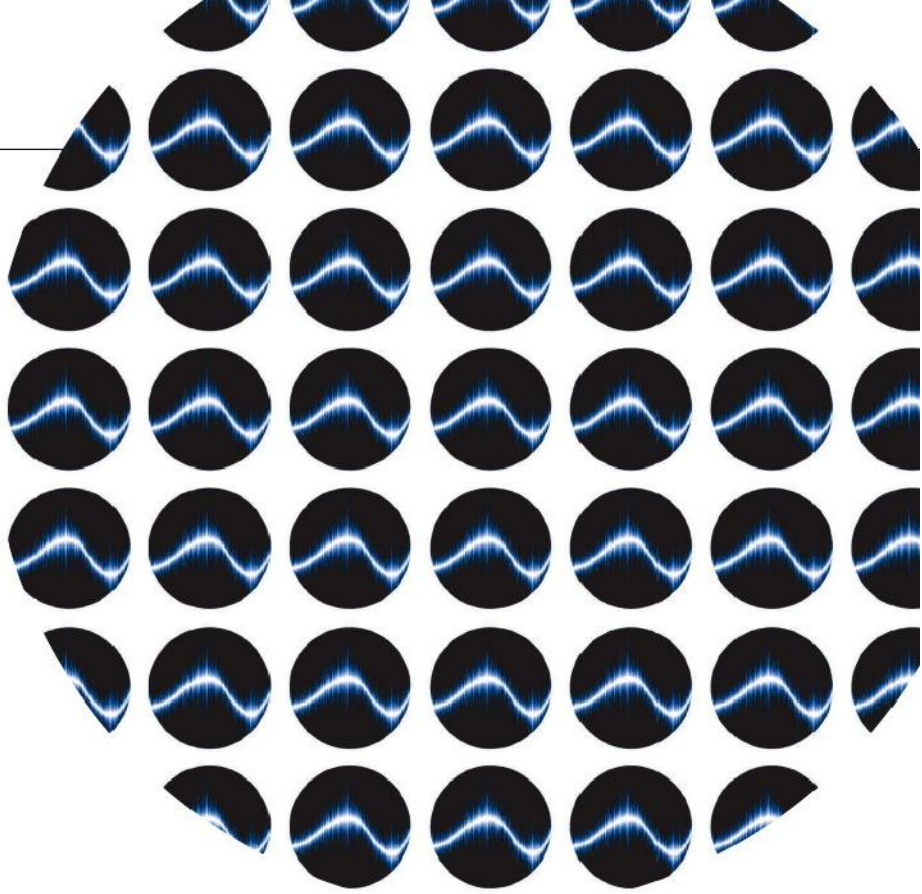
The treatment is performed under topical anaesthesia. In the author's clinic, the advanced combined topical anaesthetic protocol was developed, which combines topical anaesthetic cream with a superficial mild trichloroacetic acid (TCA) peel and adrenaline. The advanced protocol makes the treatment painless and avoids the risk of bleeding and bruising, while reducing downtime. The side-effects of the INTRAcel while using this procotol are slight redness and oedema. These normal, transient, procedure-related symptoms often resolve within 24 hours. Rarely, patients can experience dry skin for a maximum of 2 weeks. Interestingly, patients with atopic skin report their skin condition clearly improving. The reactivation of pre-existing herpes infection is possible, but rare. In these cases oral antiviral medication is recommended. The author's patients have not reported post-treatment pain.

After the treatment, post-treatment moisturising cream is used from two- to four-times per day, and a broad-spectrum SPF 30 sunscreen is recommended for daily use for at least 2 months in order to avoid sun damage. During the 18 months that the author has used this treatment methodology, no pigmentation disorders have been noted in the Scandinavian patients (mostly skin types I-III), even though many will take regular vacations in strong sunshine.

> “After the treatment, a broad-spectrum SPF 30 sunscreen is recommended for daily use for at least 2 months in order to avoid sun damage.”

Patient satisfaction after this combination treatment modality is high and most of the patients return for maintenance treatment after 1 year. In dermal rejuvenation, maintenance procedures are based on individual need, age and condition (usually one or two treatment sessions once per year). Sometimes, in patients over 60 years of age, the author will perform a maintenance treatment every 6 months.

INTRAcel seems to represent a new standard for skin rejuvenation and treatment for acne scarring for all skin types, and with little downtime. The ideal patient for non-surgical rejuvenation has mild-to-moderate signs of ageing. INTRAcel is also suitable for the correction of the more progressive signs of ageing. In such cases, in order to correct the volume loss and support the strongly



sagging tissues, it is useful to perform the combination treatment with volumising fillers using the cannula technique with appropriate vectors. It is important to use a volumising filler that has maximum purity, and good homogeneity and viscosity, giving the desired long-lasting lifting and volumising effect, with an even and natural looking result.

In a more comprehensive aesthetic treatment approach, the treatment regimen can involve other individual or maintenance aesthetic treatments such as chemical peels, mesotherapy, fillers, botulinum toxin A, LED therapy, photodynamic therapy, and surgical treatments.

> “The final improvement of the skin is a gradual process and takes a number of weeks or even months. As the treatment result is totally natural, it is important to take pre- and post-treatment photographs.”

Conclusions

The INTRAcel device provides a new possibility to combine bipolar and monopolar fractional RF microneedling and minimally ablative superficial RF treatments in the targeted multilayer mode during the same treatment session. It is an innovative treatment option for reducing the signs of ageing, acne, acne scars, scars and stretch marks. The treatment improves the texture of the skin, enlarged pores, reduces wrinkles, laxity and results in a younger, completely natural appearance and healthy skin.

After the treatment one can almost immediately resume the normal activities, full skin recovery being between 1 and 5 days. Individually adjustable treatment modalities, including treatment depth and energy level, selection or combination of monopolar RF and bipolar RF energies and available combination of needle and non-needle treatment arrays, safety profile and minimal downtime make INTRAcel a versatile device. Although INTRAcel treatments are considered to be relatively safe, in order to adjust the treatment protocol to the needs of the patient, the clinical applications require proper training and treatments should be performed by skilled professionals. In addition, more clinical studies are needed to reveal the full potential of the technology.

▶ ***Declaration of interest*** *None. The author did not receive any remuneration from Jeisys Co in writing this article.*

▶ ***Figure images*** *© Dr Marge Uibu*

Key points

- Fractional radiofrequency microneedling (FRM) is an innovative treatment option for reducing the signs of ageing, acne scars and stretch marks
- FRM improves the texture of the skin, enlarged pores, and reduces wrinkles and laxity
- FRM results in a completely natural appearance and healthy-looking skin
- FRM is an effective office-based treatment modality with a good safety profile and minimal downtime
- FRM is suitable for repetitive maintenance treatments and can be combined with any other aesthetic treatments

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