Case Report

Med Laser 2022;11(1):57-60
https://doi.org/10.25289/ML.2022.11.1.57
pISSN 2287-8300 · eISSN 2288-0224

MEDICAL LASERS
Engineering Basic Research and Clinical Application

Case Report

A Refractory Filler Granuloma Successfully Treated with a Combination of an Insulated Monopolar Radiofrequency (RF) Microneedle Device and a Quantum Molecular (QM) Resonance Technology Device

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With an increase in the indications and number of filler injection cases, there has been an increase in the complications related to the treatment. A foreign body granuloma is a late/delayed-onset dermal filler complication. Despite its rare incidence, a filler granuloma can cause both cosmetic and psychological problems in patients, especially when it is chronic and refractory to treatment. We report a case of a patient with a chronic refractory filler granuloma that was successfully treated with a combination of an insulated monopolar radiofrequency microneedle device and a quantum molecular resonance technology-based device. We expect further developments in technology and medical devices for effective treatment of filler granulomas.

Key words
Dermal filler; Granuloma; Quantum molecular resonance device; Radiofrequency

Received December 13, 2021
Accepted January 26, 2022

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INTRODUCTION

Dermal fillers have been widely used for cosmetic purposes, including rejuvenation and augmentation. However, although the incidence is low, various complications can occur after filler injection.[1,2] Among them, foreign body granuloma is a late/delayed-onset dermal filler complication. It can appear several months to years after injection. Although foreign body granuloma is known to be a non-allergic inflammatory reaction and is often triggered by a systemic bacterial infection, it is difficult to predict its occurrence in a patient.[3]

Radiofrequency (RF) microneedle device uses intralesional electrocoagulation inducing the thermal coagulative zone inside the tangled ductal structure via its microneedle, which penetrates the epidermis and reaches the target depth in the dermis. The difference in electrical impedance between the epidermis (high) and the dermis (low) allows the RF energy to flow in the targeted dermal tissue.[4] The technique can be also applied for selective destruction of intradermal target tissues such as benigh tumor, facial seborrhea, sebaceous glands in acne, and eccrine glands in axillary bromhidrosis and hyperhidrosis.

Quantum molecular resonance (QMR) technology is based on the principle of quantum mechanics, which dictates the existence of a quantum value of energy sufficient to break a molecular bond without increasing the kinetic energy of the hitter molecules, thereby avoiding a temperature increase. In dermatologic field, the technology showed potential application in chronic wound healing.[5]

Herein, we report the case of a patient with chronic refractory filler granuloma on her forehead that was successfully treated with a combination of insulated monopolar RF microneedle device and a quantum molecular resonance (QMR) technology-based device.

CASE REPORT

A 69-year-old woman presented with a subcutaneous nodule on her forehead for over four years (Fig. 1A). On physical examination, a skin-colored, non-tender firm nodule was palpated on the forehead. One year prior to the presentation of the lesion, the patient received hyaluronic acid filler injection at the same site. After nodule formation, the patient had received multiple hyaluronidase and glucocorticoid injections in the intralesional area, taking systemic antihistamines and antibiotics. However, the patient reported that the lesion had not improved.

In our clinic, the patient was treated with a combination of a minimally invasive needle RF device (AGNES®, AGNES Medical, Inc., Seongnam, South Korea) (Fig. 2A) and a QMR device (Corage®™, QuanteQ, Seoul, South Korea) (Fig. 2B). After applying topical anesthetic cream, intralesional needle RF was performed at a frequency of 1 MHz through a proximally insulated microneedle (F1A-type) for four shots (10 W, 100 ms). Then, the QMR device was performed with the following parameters: 35 W per 180 s per 2 cycles. A handheld probe with a flattened ceramic surface was used to deliver the resonant energy evenly

Fig. 1. Clinical presentation of a 69-year-old woman (A) Before treatment. Skin-colored firm subcutaneous nodule on her forehead (dashed circle). (B) Marked improvement of the forehead contour after four sessions of treatment.

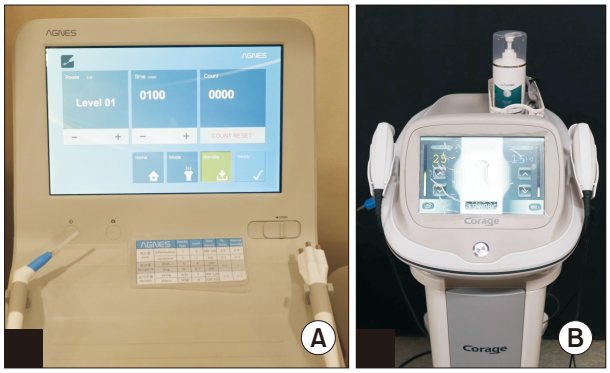

Fig. 2. Therapeutic devices applied in the case. (A) Minimally invasive needle RF device, (B) QMR device.

throughout the treated area. Treatment was performed in a total of four sessions at 2-week intervals. Marked improvement was detected even on the surface of the forehead (Fig. 1B). No adverse events were reported, except for mild erythema and swelling, which resolved within 24 h. Additionally, the patient was satisfied with the treatment outcome. The patient has provided written informed consent for the publication of her case details.

DISCUSSION

Despite its rare incidence, filler granuloma can cause both cosmetic and psychological problems in patients, especially when it is chronic and refractory to treatment. Studies have demonstrated that hyaluronidase, systemic/intralesional steroids are effective for filler granuloma.[3,6] However, longstanding, intractable nodules can persist despite these treatments. Surgical excision, which can be considered at last, poses the possibility of complications, including incomplete removal of the granuloma or scar formation. Thus, we attempted to treat refractory filler granulomas using minimally invasive devices. We have previously reported how we successfully treated a patient with chronic, refractory filler granuloma using a bipolar needle RF device and a combination of high-intensity focused ultrasound and QMR devices.[7,8]

A RF microneedle device disperses high energy into the depth of its insulated tip.[9] Due to converting electrical energy into heat by tissue electrical resistance, a thermal coagulation zone is created at a controlled depth around the needle tip without unwanted epidermal damage. Furthermore, insulated microneedles allow RF energy to bypass the epidermis. Consequently, collagen denaturation occurs within the thermally modified deep tissues and the resulting neocollagenesis.[10]

We also included a QMR technology device to maximize the therapeutic effects. As discussed in the previous report, the device generates complex resonance waves, including more than 16 frequencies ranging from 4 to 64 MHz, to produce an electric field therapeutic zone. QMR devices reportedly decrease the number of inflammatory cells and upregulate the expression of vascular endothelial growth factor, resulting in wound healing. In addition, QMR technology has shown an anti-edema effect, which would be particularly beneficial in patients with filler granulomas because a filler granuloma is often accompanied by generalized edema at the site of filler injection.[5]

Although there are recommendations for treatment of filler granulomas, standard guidelines have not been established to date. We present a patient with refractory filler granuloma successfully treated with a combination of a single insulated microneedle RF device and a QMR technology-based device. We expect further developed technologies and medical devices to be effective for treating filler granulomas.

FUNDING

None.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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AUTHOR CONTRIBUTIONS

Concept and design: SKM, KHY, BJK. Analysis and interpretation: SHS, YGK. Writing the article: GJJ, JWP. Final approval of the article: SKM, KHY, BJK. Overall responsibility: BJK.

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How to cite this article: Jeong GJ, Park JW, Shin SH, Koh YG, Mun SK, Yoo KH, Kim BJ. A refractory filler granuloma successfully treated with a combination of an insulated monopolar radiofrequency (RF) microneedle device and a quantum molecular (QM) resonance technology device. Med Laser 2022;11:57-60. https://doi.org/10.25289/ML.2022.11.1.57