

CASE REPORT

Syringoma of the face treated with fractional photothermolysis

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Abstract

We experienced that two Japanese women diagnosed with syringoma, confirmed by a punch biopsy, were successfully treated with fractional resurfacing. Both clinical cases have had positive results after only a few treatments, with high patient satisfaction, not only for the improvement of syringoma, but also for the improvement of aging skin, and with no side effects. From that aspect, laser treatment with fractional photothermolysis may be considered to be one of the effective treatment methods for syringoma. Although fractional photothermolysis was originally developed for an aesthetic purpose, it also can be utilized for intractable skin disease, as demonstrated by taking the concept of fractional photothermolysis and the results from this study with skin biopsy.

Key Words: *Fractional photothermolysis, laser, syringoma*

Introduction

Syringoma is a benign adnexal tumor of the skin (1), and it appears frequently in the periorbital area or around the trunk and tends to occur more frequently in females. There are strong demands from female patients to obtain an aesthetic improvement.

The traditional methods of treating syringoma are represented by cryotherapy, electrodesiccation (2), surgical excision or CO₂ laser treatment (3). However, with these treatment methods problems such as post-inflammatory hyperpigmentation (PIH) and scar formation occasionally occur.

Recently, a fractional resurfacing laser was developed with a brand new concept of fractional photothermolysis (4,5), and this kind of laser is considered to be well suited as the method of laser resurfacing for enlarged pore size, wrinkles and acne scars, and at the same time for improvement of skin texture (6–8).

We report that we have obtained successful results with the Fraxel SR laser (Reliant Technologies, Mountain View, CA, USA) for the treatment of syringoma that had resisted many treatments.

Report of cases

Case 1

A 64-year-old Japanese woman presented with a 30-year history of small, multiple, and aggregated skin-colored papules on the lower periorbital area (Figure 1A). There was no family history or past patient history of similar lesions. A 3-mm punch biopsy was obtained to determine the clinical diagnosis of syringoma or eccrine hidrocystoma. From the skin biopsy, the structure of lumen formation indicating epithelial funiculus was observed in the upper dermis and intercellular layer of dermis (Figure 2A). The epithelial funiculus surrounding lumens are shaped like a tadpole or a comma tail (Figure 2B). The clinical and histological findings were consistent with the diagnosis of syringoma. After the diagnosis was made, cryotherapy and CO₂ laser treatment were performed, but no improvement was noted. Therefore, the patient agreed to undergo fractional resurfacing. After the two treatments by fractional resurfacing, not only had her eruptions of syringoma disappeared, but also her facial texture and wrinkles

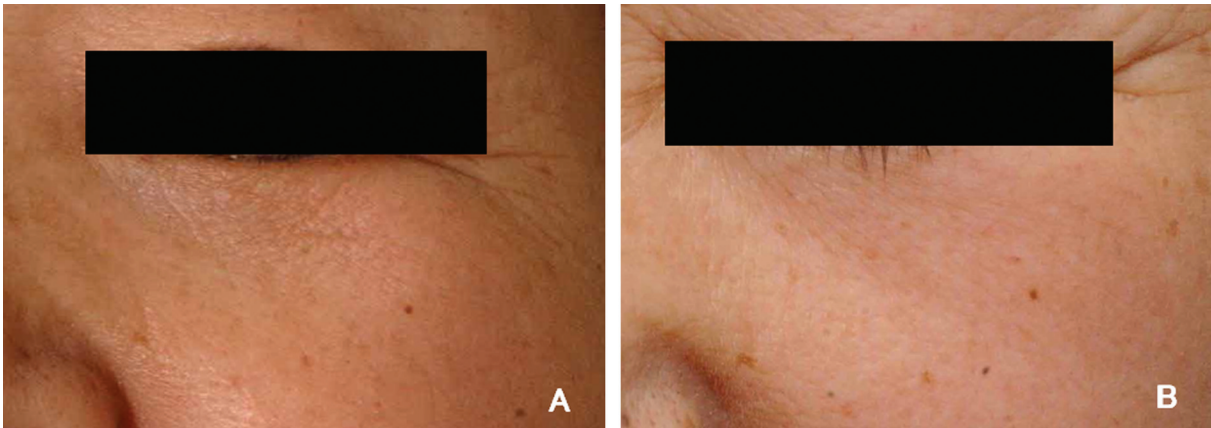


Figure 1. (A) Pre-treatment; (B) after two treatments. Not only had her eruptions disappeared, but also her facial texture and wrinkles were improved.

were improved (Figure 1B). Although it has been 6 months after two treatments, the patient was very satisfied with the treatments and the results.

Case 2

A 72-year-old Japanese woman presented with a 35-year history of small, multiple, and aggregated skin-colored papules on both periorbital areas. There was no family or patient history of similar lesions. The patient was diagnosed with syringoma which was confirmed by punch biopsy performed at a local dermatologic clinic. After diagnosis of syringoma, cryotherapy was performed at the same local dermatologic clinic, but the patient's condition did not improve. Therefore, she agreed to undergo fractional resurfacing. After three treatments, not only had her eruptions of syringoma dramatically improved, but also her facial texture and wrinkles were improved. Although it has been 6 months after three treatments, the patient was very satisfied with the treatments and the results.

Therapeutic challenge

Surgical excision, electrodesiccation, cryotherapy, and CO₂ laser treatment were initially taken into consideration but were rejected due to the high probability of scar formation and the fact that previous treatments were not successful. Later, a non-invasive light source was used to establish an adequate clinical response.

Solutions

The Fraxel SR laser relies on a 1550-nm diode-pumped erbium fiber laser delivered through an optically tracked microprocessor-controlled handpiece to produce an array of microscopic thermal zones (MTZs). Each of these zones is extremely narrow (approximately 100 μm in diameter) and 400–700 μm deep, producing a column of thermal damage that results in selective collagen denaturation. One hour prior to the procedure, 7% lidocaine gel was applied to the entire face to reduce discomfort. It was removed and tracking blue dye (Opti Guide Blue) was applied to the entire area.

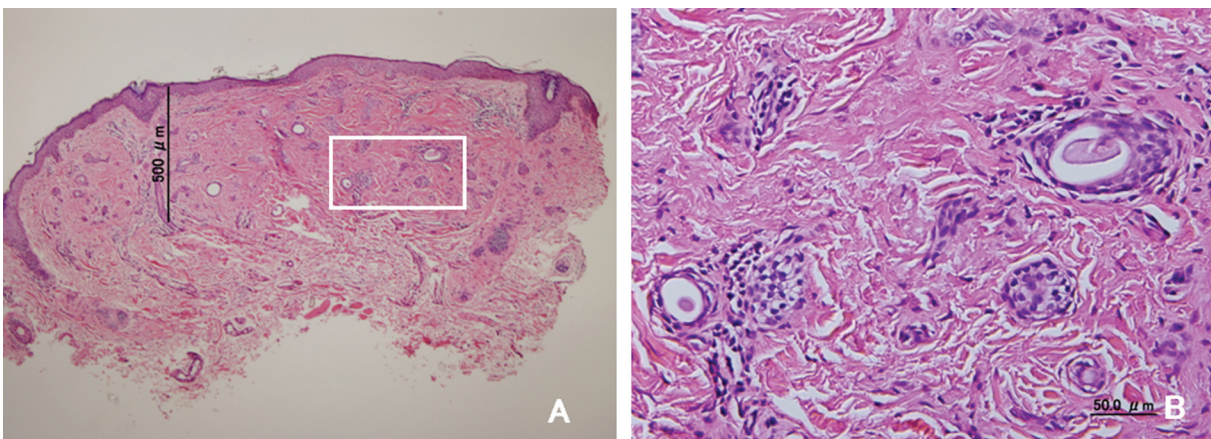


Figure 2. (A) The structure of lumen formation indicating epithelial funiculi was observed in the upper dermis and intercellular layer of the dermis. (B) The epithelial funiculi surrounding lumens are shaped like a tadpole or a comma tail at a size of 50–100 μm .

Then, a gel was applied to allow easy gliding of the treatment handpiece across the skin, according to the manufacturer's treatment guideline. The treatments were performed at a pulse energy of 10–13 mJ (125 MTZ) and a final total density of 2000 MTZ/cm².

Discussion

Syringoma is a benign adnexal tumor of the skin, which is differentiated into the eccrine sweat gland, and is characterized by small, dark yellow or yellow papules that are numerous formed mainly during adolescence. Features of syringoma from the skin biopsy include (i) the existence of epithelial funicules indicating the structure of lumen formation in the upper dermis to the intercellular layer of dermis, and (ii) epithelial funicules surrounding lumens have the diagnostic character of being shaped like a straight-lined short tail, and are considered to be similar to the shape of a tadpole or a comma tail (1).

Since syringoma appears frequently in the periorbital area or around the truncus and tends to occur more frequently in females than males, especially during adolescence, there are strong demands from female patients to obtain aesthetic improvement. The traditional methods of treating syringoma are represented by cryotherapy, electrodesiccation (2), surgical excision or CO₂ laser treatment (3). Cryotherapy is the easiest method among these, but it often requires several repeat treatments on the same area due to the uncertainty and inconsistency of treatment results. Like cryotherapy, electrodesiccation also has a disadvantage due to the high possibility of PIH and scar formation, since it is invasive to the surrounding tissues. Surgical excision is also an easy method to remove lesions with a high certainty of results, but it is not so well suited in these cases where the population of papules is large or a large papule has formed. This is due to the fact that a scar after surgery stands out more than the papule before surgery. In comparison with electrodesiccation, the CO₂ laser has been used for the treatment of syringoma more commonly recently because of minimal thermal damage to the surrounding tissue, but there is also a problem that PIH and scar formation occasionally occur, such as with cryotherapy and electrodesiccation.

In this study, we have obtained successful results with the Fraxel SR laser for the treatment of syringoma. The Fraxel SR laser was developed with a brand new concept of fractional photothermolysis (4,5). Unlike the CO₂ and Er:YAG lasers, which completely ablate the whole treated area, the Fraxel SR laser irradiates an array of various numbers of invisible micro-lasers (MTZs). By doing so, it coagulates only a portion of the whole treatment area during each pass of the handpiece so that soft tissue is coagulated partially at the same time the surrounded

un-irradiated area remains thermally undamaged to assist in healing and remodeling. Therefore, the Fraxel SR laser is considered to be well suited as the method of laser resurfacing for enlarged pore size, wrinkles and acne scars, and at the same time for improvement of skin texture (6–8).

As for skin condition after Fraxel SR treatments, the stratum corneum remains intact in histological observation, and the epidermis and upper dermis are coagulated and denaturated. Therefore, re-generation of tissues in the treated area stably evolves without the formation of erosion. With regard to dermal coagulation, it has been proved that the depth of coagulation is 95 µm with a diameter of 308 µm, and with an energy level set at 8 mJ (4). With an energy level of 20 mJ, the depth of coagulation is 727 µm with a lesion diameter of 108 µm (4). The finding from this histological study has shown that the depth of syringoma was 500 µm and the size of each syringoma was 50–100 µm. From the results of the skin biopsy from this study, dermal coagulation by the Fraxel SR laser is expected to sufficiently denaturate cells inhabited in syringoma in a non-ablative way.

Unlike traditional CO₂ and Er:YAG lasers, which ablate the whole treated area, the Fraxel SR laser partially coagulates the tissues by irradiating a various number of invisible micro-lesions so that it minimizes the occurrence of PIH and scar formation. However, this minimized non-invasive method requires several treatment sessions in exchange for the lower risk of side effects. The Fraxel SR laser coagulates only a portion of the treated area using the concept of fractional photothermolysis by not affecting the remaining healthy undamaged surrounding skin, so it is reasonably understood that only a single treatment may not sufficiently thermally damage all the syringoma cells.

However, both clinical cases have had positive results with only a few treatments, with high patient satisfaction, not only for the improvement of syringoma, but also for the improvement of aging skin, and with no side effects. From that aspect, the Fraxel SR laser treatment may be considered to be one of the more effective treatment methods for syringoma.

Although the Fraxel SR laser was originally developed for an aesthetic purpose, it also can be utilized for intractable skin disease, as demonstrated by taking the concept of fractional photothermolysis and the results from this study with a skin biopsy.

As more experience with the Fraxel SR laser is gained, it is essential to give more thought to additional effective treatment protocols for other indications.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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