Letter to the Editor

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Postoperative Treatment of Linear Thyroidectomy Scars with the Pinhole Method Using a 10600-nm Carbon Dioxide Laser

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The formation of linear hypertrophic scars along suture lines is a frequent and undesired event after the conventional thyroidectomy.[1] Previous reports have described good therapeutic results in minimizing the scars with fractional lasers and intralesional steroid injections.[1-4] However, in the cases of narrow linear scars, the fractional laser can damage the surrounding tissue despite using the smallest spot size. Intralesional steroid injections can also worsen scar appearance, causing atrophy and telangiectasia of the surrounding skin (Fig. 1A). Here, we describe the use of a pinhole method using a 10600-nm carbon dioxide (CO_2) laser to treat linear thyroidectomy scars.

Five female Korean patients, who developed linear hypertrophic scars during the postoperative treatment of thyroidectomy scars, were included. All five patients had a linear thyroidectomy scar on the anterior neck with a length of 6 cm to 8 cm. The mean patient age was 44.6±6.9 years (range, 39–52 years). We performed two to three CO_2 laser (Spectra SP; Lutronic, Goyang, Korea) treatments using the pinhole method in 4- to 8-week intervals for each patient. Final treatment outcomes were evaluated after 8 weeks from the last CO_2 laser treatment. All the participants provided written informed consent. Thirty minutes after applying topical anaesthesia (EMLA; AstraZeneca AB, Södertälje, Sweden), the treatment was performed using 300-mJ pulse energy and a 100-Hz frequency with a 1-mm spot diameter. The CO_2 laser penetrated the skin depending on the scar thickness, creating multiple small holes 1- to 2-mm apart (Fig. 1B). Clinical photographs were taken, and the Vancouver Scar Scale (VSS) was graded at every visit to evaluate the treatment efficacy. The VSS includes grades for pigmentation (0=normal, 1=hypopigmented, 2=mixed pigmentation, 3=hyperpigmented), pliability (0=normal, 1=supple, 2=yielding, 3=firm, 4=ropes, 5=contracture), height (0=flat, 1≤2 mm, 2=2–5 mm, 3≥5 mm), and vascularity (0=normal, 1=pink, 2=red, 3=purple).[1] Two blinded physicians also evaluated the final outcomes using a four-point grading scale (grade 1, <25% improvement; grade 2, 26–50%; grade 3, 51–75%; grade 4, >75%).

All five patients showed posttreatment improvement (Fig. 1C-F). Four of the five patients showed clinical improvement greater than grade 3 (three patients showed grade 4 improvement, one patient showed grade 3 improvement, and one patient showed grade 2 improvement). The mean total VSS scores decreased significantly: 10.2±1.3 pretreatment and 4.6±1.1 posttreatment. One patient developed persistent erythema after the first session; this complication continued for 3 weeks but spontaneously resolved.

Ablative fractional lasers have been widely used to effectively minimize the appearance of thyroidectomy scars.[2,5] However, this laser has some limitations regarding the penetration depth and size of the focused beam. Fixed spot sizes and shapes in the commercially available lasers often interfere with the fine manipulation during lasering. The pinhole method using a CO_2 laser creates multiple tiny holes penetrating from the epidermis to the deeper dermis.[6,7] This improves the scar texture by inducing collagen bundle regeneration and realignment following the physical breakage and thermal damage.[6,8] The biggest benefit of this method is that the small holes can be adjusted for the various scar types. By controlling the hole depth and distance, we can effectively treat the narrow hypertrophic scars while preventing the damage to the surrounding tissue. Moreover, the pinhole method is very safe; none of the patients experienced significant adverse effects, such as postoperative

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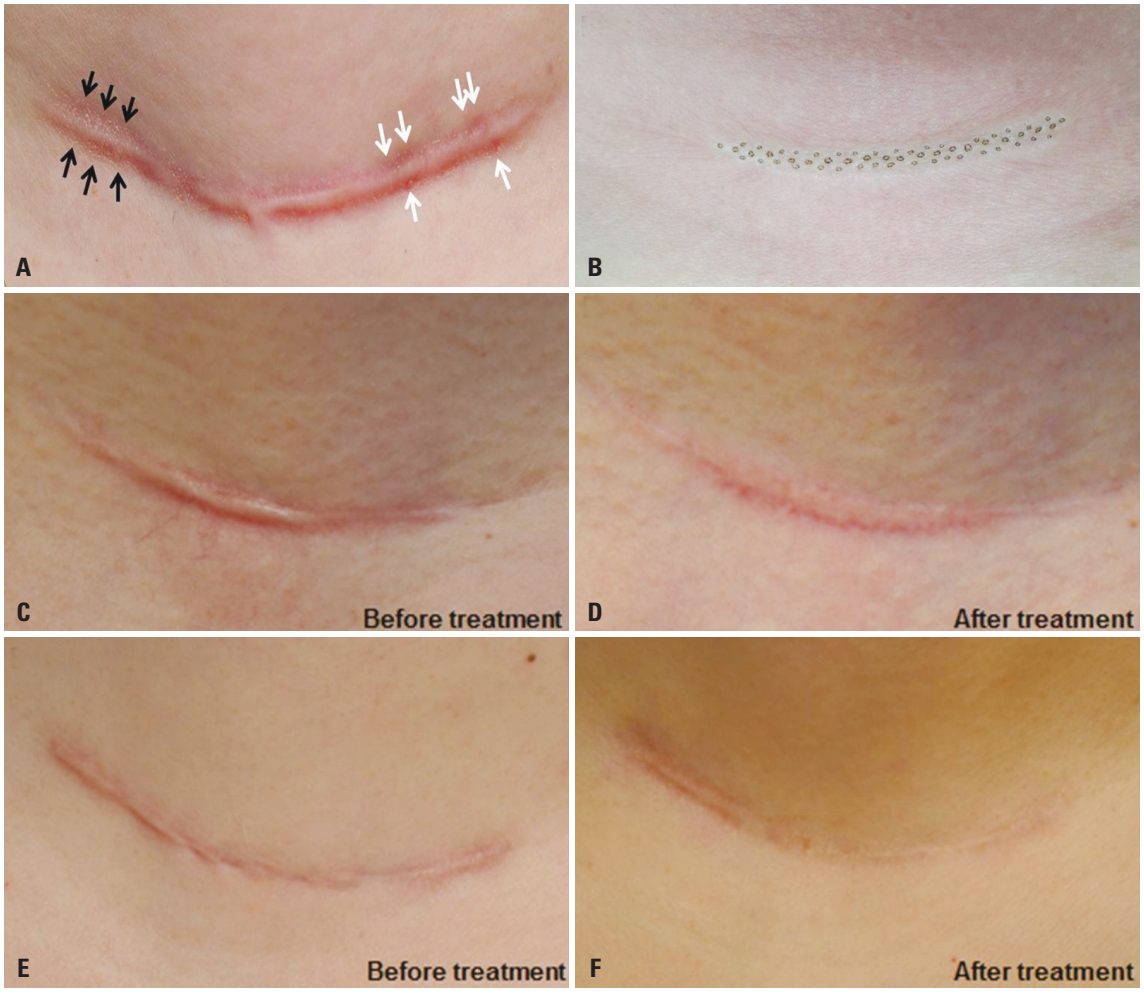

Fig. 1. (A) Treatment of narrow linear scars after thyroidectomy can be challenging. Treatment with a fractional laser damages the surrounding tissue due to the larger spot size (black arrows). Intralesional steroid injections cause surrounding atrophy and telangiectasia (white arrows). (B) With the pinhole method, tiny holes with adequate penetration depth were created in the area of the scar. Clinical photographs of 46-year-old (C and D) and 39-year-old (E and F) female Korean patients. Marked improvement was observed after the treatment with the pinhole method. The pinhole method ensures scar flattening and successfully blurs the scar margins.

bleeding and oozing.

In conclusion, the pinhole method with the CO_2 lasers should be strongly considered to safely and easily reduce the appearance of linear, narrow, hypertrophic scars.

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