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MASTER CASE PRESENTATION

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A microneedling device for the treatment of spider vein: A case report

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Abstract

Spider vein is mostly seen in patients with liver disease, although the underlying problem is sometimes unknown. If spider vein appears on the face, it can affect the self-esteem and self-image of patients. Particularly, females are more vulnerable to these complications. Spider nevi are mostly left untreated since they are considered a cosmetic matter; in case of treatment, the procedure is costly with limited satisfaction. Therefore, this study reports the successful treatment of a spider vein case using a microneedling procedure.

KEYWORDS
Microneedling, Spider Vein, Vein

1 | INTRODUCTION

Spider vein is a common benign vascular anomaly that may appear as solitary or multiple lesions.[1] They are usually found with a diameter of less than 2 cm, and they rarely grow to assume larger sizes, that is, more than 2 cm.[2] Spider vein is a common disease among women.[3] Depending on the diagnosis method and the criteria for diagnosis, the prevalence rate is about 4%-47%.[4] Women suffering from this problem usually feel high levels of distress regarding their appearance.[5] In many cases, spider nevi regress spontaneously.[6] Treatment of spider vein depends on the cause of the intra-arteriolar vasodilation. Patients with an underlying systemic disease, such as cirrhosis, should be managed according to the standard of care.[4]

In the cosmetic approach, there are several treatments available to treat spider vein. Sclerotherapy, as a traditional treatment for spider vein, has a low cost; however, it may have some adverse complications.[7] Lasers have shown fewer side effects, but there are still a number of substantial complications. The lower efficacy of the laser treatment compared to sclerotherapy has limited its application for the treatment of spider veins.[8] There has been a long-lasting interest in finding an effective alternative to sclerotherapy that can provide equivalent or better efficacy. Laser therapies have been used with different levels of success. However, the higher cost of lasers with their lower efficacy compared to sclerotherapy and the significant potential complications, such as hyperpigmentation, hypopigmentation, scarring, pain, and ulceration, have resulted in the limited popularity of lasers for the treatment of spider vein.[9] Therefore, sclerotherapy has remained the preferred relevant treatment. However, this method does not show a high level of success either.[10,11]

The electrosurgery of blood vessels has been used since the 1920s, and it has greatly improved the efficiency of operative procedures. It employs high-frequency electrical current passing through the tissue, generating heat to deliver the desired clinical effect. This is different from electrocautery, in which electrical current heats an instrument, and a clinical effect is achieved when the instrument is applied to the tissue. However, the result of a previous study indicates some damage along with the formation of scar tissue after using electrocoagulation for the treatment of spider vein.[11] In this study, a new alternative method is introduced for the management of spider veins, which is delivered using microneedles.

2 | CASE DESCRIPTION

A 62-year-old woman presented with a history of spider vein for the last few years, diagnosed by a number of dermatologists. Physical examination revealed that she was a completely healthy woman with no history of physical diseases. She had multiple classical spider nevi on her face. She did not have any family members with spider vein.

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Laboratory tests revealed a hemoglobin level of 10.8 g/dl, a white-cell count of 4190/mm3, and a platelet count of 76,000/mm3. Renal function tests were normal. The patient had no previous skin care, including the use of day/night creams, and even sunscreen.

The device utilized as a microneedle was Revive, which can activate the needles at a rate of up to 150 hits/second. The frequency is adjustable, which is indispensable for a minimal invasive penetration of the dermis without tearing off the epidermis. The specifications of the device include the following: type: DA-3.0-MN-MP, rated voltage: 15 V – (DC), power input: 7 V A max, working frequency: selectable from 50 to 150 hits per second, drive: Precision DC motor, operating mode: continuous operation (Figure 1).

The patient was informed about the procedure, the mechanism, and the possible complications of microneedling before treatment. She signed an informed consent form to present her case as a case report in publications. A skin anesthetic cream was applied half an hour before the treatment. Then, the skin was thoroughly cleaned with normal saline, followed by deep cleansing with a pad coated with a tonic lotion. Afterward, the skin was disinfected with an alcohol pad, and the treatment was initiated.

The frequency was adjusted on 120 hits per second. Approximately 1.0 to 1.5mm is selected as an effective depth to achieve good results.[12] The depth of work was 1 mm maximum in the cheeks and 0.3 mm below the eyes, and microneedling was performed on the whole face.

The procedure was performed by rolling the device on the patient's skin surface in "back and forth" motions up until pinpoint bleeding and mild to moderate erythema in the treatment region—after 10 to 15 passes in the same direction plus four transversal passes on the same area, inflicting 250-300 punctures/cm^2. Once the procedure was completed, cleansing was carried out with 0.9% saline. The treatment procedure lasted for about 30 minutes.[13] Afterward, the needle was withdrawn, and additional veins were treated in a similar fashion. The assessments were performed based on the clinical analysis of photographs taken before and 30 days after the first session.



FIGURE 1 The Microneedling Device Used



FIGURE 2 Untreated and Improved Spider Veins on the Face. (Left) Examination Day before Treatment. (Right) One Month after Treatment

The patient was asked to apply appropriate color-free sunscreen and hydrator creams daily. She was recommended to avoid sunlight as much as possible for at least seven days. The second visit was fixed for her for 30 days later. Two sessions were performed on her entire face, observing a 30-day interval. Clearance of skin in the second therapy session can be observed in the following figures (Figure 2).

3 | CONCLUSIONS

In general, spider nevi do not require any treatment in cirrhotic patients due to a high risk of bleeding from these vascular lesions.[14] However, the untreated face spider nevi negatively affect the quality of life of the patients.[15] This study utilizing the microneedle has presented an effective approach with a clearance rate of more than 50% achieved after the first pass (Figure 2).

These changes can occur following various microneedling mechanisms. I believe thicker skin is more clear as spider vein is a collection of small dilated arterioles (blood vessels) clustered very close to the surface of the skin. Skin restructure leads to a thicker skin. The efficiency of the microneedling mechanism for skin restructuring relies on the natural wound healing process which triggers the generation of growth factors, such as alpha and beta (TGF-α and TGF-β), the connective tissue activating protein, the connective tissue growth factor, and the fibroblast growth factor (FGF).[16] Overall, the wound healing after microneedling increased cell activity, release of various proteins, potassium, and growth factors from the cells into the exterior layer, leading to the migration of fibroblasts to the site of the injury and collagen induction.[17] Subsequently, this procedure

stimulates the production of collagen and elastin in the papillary layer of the dermis. In high ages, arteries are more fragile and skin is thinner. The reconstruction of vascular walls could also help improve the appearance of the skin.

In line with the finding of the current study, the results in a recent study on the quantitative evaluation of the effectiveness of microneedling on histological changes showed a statistically significant increase in epidermal thickness with enhanced formation of dermal papillae.[18] Furthermore, the evaluation of extracellular matrix proteins showed statistically significant improvement of elastin and collagen deposition and formation in response to the microneedling therapy.[19] In fact, this explains the mechanism of the efficacy of microneedling for the case of spider nevi.

Microneedling offers a relatively low-cost and minimally invasive tool for the treatment of multiple cosmetic and dermatologic conditions. The result seems to be comparable with sclerotherapy and laser treatment and represents an effective alternative treatment. Meanwhile, no complications appeared in this treatment, while complications and risks have been reported in other methods. In this case study, an innovative potential approach for the treatment of spider veins has been introduced and described, using an insulated microneedle. Therefore, considering the fact that microneedling is highly cost-effective and safer compared to common methods, this method can be recommended as a valuable alternative to sclerotherapy and laser treatment. It is recommended for future researchers to utilize this method in different ages, genders, and races to find more support for this new idea.

CONFLICT OF INTEREST

The author declares that he has no conflicts of interest to disclose.

ETHICAL APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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