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Laser Therapy for Treatment of Syringoma: Review Article

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ABSTRACT
Background: Often seen in a periocular distribution, syringomas are benign skin-adnexal tumours of eccrine origin that manifest as little dome-shaped papules and may affect the aesthetic look of the face. The neck, belly, or genitalia outside are all possible locations. There has been progress in the treatment of syringomas and other dermatological issues thanks to the development of laser technology in recent years. Many advancements in both technology and technique have been made in the treatment of syringoma using lasers since the first attempts were made.
Objective: Review of the literature on Laser Therapy for Treatment of Syringoma.
Methods: We looked for data on laser therapy and syringoma treatment in medical journals and databases like PubMed, Google Scholar, and Science Direct. However, only the most recent or extensive study was taken into account between January 2000 and May 2021. References from related works were also evaluated by the writers. There are not enough resources to translate documents into languages other than English, hence those documents have been ignored. It was generally agreed that documents such as unpublished manuscripts, oral presentations, conference abstracts, and dissertations did not qualify as legitimate scientific study.
Conclusion: Among ablative lasers, fractional laser modality has been shown to be the safest option. Despite its usefulness in combating Syringoma, the drug is not without side effects.
Keywords: Laser Therapy, Treatment of Syringoma.

INTRODUCTION

Often seen in a periocular distribution, syringomas are benign skin-adnexal tumours of eccrine origin that manifest as little dome-shaped papules and may affect the aesthetic look of the face. It can also be present on the neck, belly, or external genitalia **(1).**

Syringoma is derived from the Greek word syrinx, which meaning tube. Eccrine duct tumours are benign adnexal tumours based on their histological features. When cells multiply in the duct's lumen, they form spiral structures that restrict the flow of perspiration and prevent it from exiting the skin **(1).**

Syringoma affects 0.6% of the population, most commonly affecting girls throughout adolescence, with an age peak between the years 20 and 30 **(1-3).**

Figure (1): Syringoma on eyelids **(2).**

Figure (2): Syringoma on forehead **(3).**

Laser Therapy of Syringoma:

There has been progress in the treatment of syringomas and other dermatological issues thanks to the development of laser technology in recent years. Many advancements in technology and enhanced laser procedures have been made since the first attempts were made to treat syringoma with laser **(4).**

Ablative lasers for syringoma:

1- Carbon dioxide laser:

One of the earliest kinds of laser was a carbon dioxide (CO_2) laser. Because of its high water absorption, it was rapidly identified as an appropriate surgical laser. The wavelength of light emitted by a CO_2 laser is 10,600 nm, which is far in the infrared region of the electromagnetic spectrum. Through a process of heating and evaporating intracellular water, it damages the tissue it is directed towards. Because skin has such a high concentration of water, the CO_2 laser is ideally suited for its accurate, risk-free ablation and good hemostasis **(4).**

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Scarring was a common side effect of the first generation of CO2 lasers because the continuous beam of light caused the surrounding normal skin to be exposed to excessive conduction heat. Pulsed CO2 lasers have replaced traditional methods of resurfacing [5]. The use of CO2 laser in conjunction with other treatments has proven effective. Twenty patients were treated with a combination of 50% trichloroacetic acid (TCA) and CO2 laser, and the results were excellent for the most part, with no patients experiencing any of the potentially life-threatening adverse effects of the treatment. After drilling three to four holes with a low-parameter CO2 laser, TCA (at a concentration of 50 percent) was injected into the lesions [4].

The carbon dioxide (CO2) laser has been implemented in several settings. Ten patients with syringomas were treated with a high-powered CO2 laser, and all of them had their tumours completely removed. The most prevalent adverse reaction was a prolonged erythema. There was no evidence of scarring, and only four individuals needed additional spot treatments [4].

Five patients with periorbital syringomas discovered that the combination of radiofrequency ablation and a CO2 laser with low-energy settings was safe, simple, less uncomfortable, and produced good cosmetic results [6].

Meesters *et al.* [7] some benign cutaneous tumors, such as syringomas, may respond well to timed exposure CO2 laser drilling, which has the added benefit of being a relatively quick procedure with a low risk of lasting side effects. However, its efficacy is limited when dealing with more advanced cancers that grow at a rapid rate.

Fourteen percent of the 29 patients in a prospective study who had their periorbital skin treated using the pinhole method and an ablative 10,600 nm CO2 laser showed mild improvement, eight patients showed moderate improvement, ten showed significant improvement, and seven patients showed near-total resolution (26.9 percent). A whopping 24.1% Here, the CO2 laser is targeted to the problem location, where it can give high energy to kill the lesion while also stimulating neocollagenesis and dermal matrix remodelling, for a noticeable improvement in skin texture after the surgery is complete [8].

Researchers showed that patients with periorbital syringomas fared better when treated with a combination of CO2 laser and botulinum toxin A, as opposed to only the laser alone. Eccrine sweat gland secretion is controlled by the autonomic nervous system, and botulinum toxin A interferes with these terminals [9].

Williams and Shinkai [10] conducted a comprehensive analysis of the literature analysing 215 patients treated with various medicinal and surgical modalities as topical atropine, peels, dermabrasion, cryotherapy, intralesional electrocoagulation, laser therapy, and laser treatment combinations. The authors speculated that intralesional electrocoagulation and carbon dioxide (CO2) laser therapy would be the most effective treatments.

2- Erbium: yttrium aluminium garnet laser:

As less heat is produced, the coagulative effect is less, making it more challenging to achieve and maintain hemostasis during and after the surgery. The postoperative erythema that follows Er: YAG resurfacing typically lasts between 6 weeks and 6 months, which is slightly shorter than the average. Such a protracted time of rest is generally not acceptable for patients [11].

Er: YAG laser was used to treat syringomas of the eyelids in twenty-four patients. >80% of these microscopic eccrine tumours could be eliminated in as few as one to three treatments. However, it has been observed that relapses can occur during the hot summer months [12].

Aesthetically, periorbital syringomas can be removed effectively with an Er: YAG laser utilizing the multiple ovoid-shape ablation technique, as demonstrated in one study. Syringomas in the treated area had vanished in more than 75% of 43 of 49 individuals after an average of 4 treatments [13].

Fractional lasers for syringoma:

The most common kind of laser therapy for syringoma patients was vaporization using ablative lasers. Recent advances in fractional laser resurfacing have been driven by patient desire for less invasive treatments that maintain an outstanding safety profile and minimally impact patient downtime [14].

The first FP gadgets weren't meant to do any permanent damage, therefore they didn't. In 2004, **Tierney and coworkers** [15] presented the first nonablative FP device, an erbium glass fibre laser operating at 1,550 nm. To counteract the consistent heat damage caused by a regular Er: YAG or CO2 laser, this specialized laser system was developed. First described by **Hantash and coworkers** in 2007, the ablative FP device [16].

Micro-thermal zones (MTZs) are small columns of thermal damage produced by fractional lasers that travel deeply into the dermis. As the thermally intact tissue around each MTZ provides a structural reservoir, the untreated viable tissue can migrate in and begin the healing process quickly [17].

When it comes to chromophores, water is the one that all the fractional devices are aiming towards. This enables targeted heat injury to collagen, blood vessels, and epidermal keratinocytes, all of which contain water. As a result, the epidermis and dermis experience thermal injury, which triggers a renewal of the epidermis and a production of new collagen [18].

Stratum corneum preservation and carefully limited tissue coagulation without vaporization are unique features of nonablative systems, which set them apart from ablative fractionated devices. As opposed to this, fractionated ablative systems employ the vaporization of epidermal and dermal microcolumns of tissue, with a layer of coagulation around the columns [19].

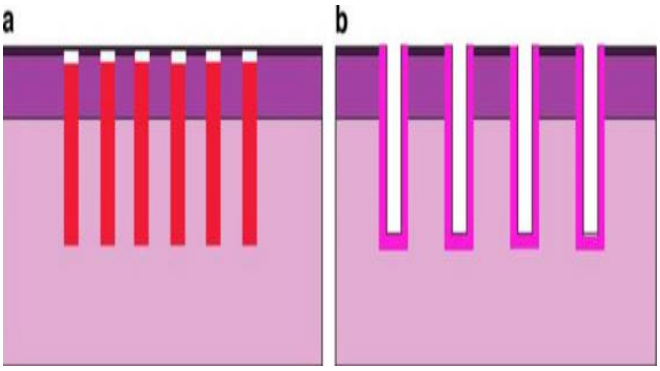

Figure (3): (**a)** Non-ablative FP histology depicted in a schematic format. Epidermis and dermis denatured into columns, with the dermo-epidermal connection disrupted but the stratum corneum unharmed. Surrounding tissue is undamaged. (**b)** A simplified histological diagram of ablative FP. Micro-columns that have been ablated, with eschar lining them and coagulation zones that are shaped like annuli [19].

Several medical problems have responded well to treatment with fractional lasers. Every time a new use is discovered, it adds to the ever-expanding list of indications. Several studies with greater levels of evidence support the use of this treatment for a variety of purposes, including ageing skin, acne scars, and traumatic scars [20].

Negative effects from using fractional lasers are often mild and short-lived. Sunscreens and moisturisers can alleviate the mild erythema, swelling, and peeling that often occurs. When comparing fractional ablative lasers to fractional non-ablative lasers, it is important to note that fractional ablative lasers are more likely to cause adverse effects [20].

1.Erythema:

The duration of this is often no more than a week, although it could be as short as two days. However, higher fluence and more stackings in fractional laser treatments have been linked to erythema and linear abrasions that last up to 3-4 weeks [21].

2. Post-treatment edema:

Edema after treatment varies from patient to patient. Edema typically lasts between 1 and 3 days, though it can persist for up to a week in certain cases. As one's fluency grows, so does one's risk of edoema. A simple treatment is to apply ice at 10-minute intervals for the first 24 hours after treatment. After treatment, some doctors recommend using topical or short-term systemic corticosteroids [22].

3. Petechiae:

After exposure to greater fluences, occasional petechiae may appear, most frequently in the periorbital region. It usually takes 3 days for such petechiae to appear. In order to reduce the incidence of such purpura, Nonsteroidal anti-inflammatory drugs, aspirin, and other blood thinners should not be taken by patients in the postoperative period. Patients should be instructed to avoid rubbing or scratching the treated region for the first 24 hours following treatment due to increased skin fragility [23].

4. Post-inflammatory hyperpigmentation and hypopigmentation:

Those with darker skin tones are more likely to have this, and patients with a history of post-inflammatory hypopigmentation (PIH) or melasma are at increased risk. Extreme caution should be taken while treating these individuals with greater fluences or numerous stackings. Precautionary It is recommended that such patients undergo a two-week pretreatment with depigmenting chemicals and a stringent sun protection strategy before to receiving therapy [24].

Ablative fractional lasers:

The ablative fractional method was first used. The goal was to find a method that was as risk-free as using a nonablative laser but just as successful as the ablative one. Er: YAG lasers with a wavelength of 2,940 nm and CO2 lasers with a wavelength of 10,600 nm are two of the most common types of lasers employed in this field at present [25].

Fractional CO_2 laser for syringoma:

The fractional CO2 laser has been proved to be effective and safe for most skin types, with temporary and acceptable side effects, by combining fractional photothermolysis and the creation of coagulation zones with an ablative 10,600-nm wavelength. In comparison to traditional CO2 laser, this treatment not only has a faster recovery time, but also a lower chance of scarring [26].

By breaking the beam of energy up into several smaller beams, the fractional CO2 laser can treat both fully ablative indications and non-ablative skin rejuvenation concerns [4].

It is still difficult to treat periorbital syringomas. Since periorbital syringomas are considered benign, non-progressive, and often asymptomatic, the goal of treatment is to enhance cosmetic appearance [27]. In one case report, a female patient aged 53 had her periocular syringomas treated with a fractional CO2 laser, leading to a noticeable improvement in her looks. In addition to reducing the number of syringomas, the treatment also revitalised the entire periocular region [14].

Because of its high penetrating strength and proven efficacy, the CO2 laser is often regarded as the treatment of choice for syringomas. However, there are risks associated with deep ablation, such as post-inflammatory hyperpigmentation, which must be taken into account after the surgery is over, especially in phototypes IV, V, and VI. The pulse energy can be given more safely when the procedure is carried out in a fractionated manner, using the multiple-hole approach and/or the pinhole method, with low parameters; nevertheless, the resolution is partial, and many treatments are required [27].

CONCLUSION

Among ablative lasers, fractional laser modality has been shown to be the safest option. Despite its usefulness in combating Syringoma, the drug is not without side effects.

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  Nil.

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