

## LONG-TERM RESULTS OF ARGON LASER PHOTOCOAGULATION IN THE TREATMENT OF RECURRENT TRICHIASIS

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**Abstract:** *The treatment of trichiasis has consistently posed a challenging therapeutic issue. A variety of treatment methods have been explored, each yielding different levels of success. We report our experience with the use of Argon laser photocoagulation for the treatment of recurrent trichiasis. A total of 30 lids (of 22 patients) with aberrant lashes were treated in our study. Each lash was treated with a beam of 50-200 microns (spot size), 0.2 s (time), and 0.7-1.2 watts (power). Neither infiltration nor topical anesthesia was used. The follow-up period averaged 6 months, with appointments scheduled for the 4th week, the 3rd month, and the 6th month. After the laser session, 80% of the eyelids were successfully treated with no signs of the condition reappearing. The remaining 20% of the eyelids needed more than one session to completely eliminate the recurrence of the condition. There was a significant correlation between the number of aberrant lashes per lid and the number of required laser sessions. Complete healing of the treated areas occurred within four weeks after treatment, with no vascularization or distortion of the lid margin. Argon laser treatment appears to be a safe and effective alternative to the other recognized methods of therapy in selected cases.*

**Keywords:** argon laser photocoagulation, trichiasis, eyelids therapy.

### **Introduction:**

Addressing trichiasis has consistently been a complex therapeutic challenge. Various treatment methods have been attempted, each with differing success rates. These include epilation, which often results in the recurrence of rubbing lashes; electrolysis, which has had limited success in the past; and cryotherapy, known for its reported side effects<sup>[1]</sup>. Surgical interventions involving the eyelid margin are typically reserved for patients with extensive trichiasis<sup>[1,2]</sup>.

The concept of using argon laser photocoagulation as a treatment for trichiasis was first proposed by Berry in 1979<sup>[3]</sup>. However, this treatment method didn't gain much traction until recently when Awan demonstrated its successful application in treating a small group of trichiasis patients<sup>[4]</sup>.

Our prospective study aims to evaluate the effectiveness of laser therapy by involving a larger patient group and conducting long-term follow-ups post-treatment. Additionally, this study seeks to assess any potential side effects of the procedure.

### **Methods:**

This is a single-center prospective study conducted in a Moroccan ophthalmology department over a 6-month period.

Our study involved the treatment of 30 eyelids from 22 patients with aberrant lashes. We did not include cases with ten or more aberrant eyelashes, whether associated with entropion or not. These cases were addressed using the Jones procedure, with or without a lateral tarsal strip (as shown in Figure 1).

After a comprehensive ophthalmic examination, which included an evaluation of visual acuity and a detailed inspection of the eyelids to pinpoint the exact location of the aberrant lashes and to identify any concurrent lid scarring, neovascularisation, or entropion, the patient was positioned at the slit lamp of the laser unit. The eyelid was slightly rotated outwards to align the laser beam with the root of the rubbing lash. The patient was instructed to look away from the direction of the eyelid being treated to ensure that no part of the cornea was visible in the treatment field.

Each lash was subjected to a laser beam with a spot size of 50-200 microns, a duration of 0.2 seconds, and a power of 0.7-1.2 watts (figure 2). We did not use any form of anesthesia, either infiltrative or topical.

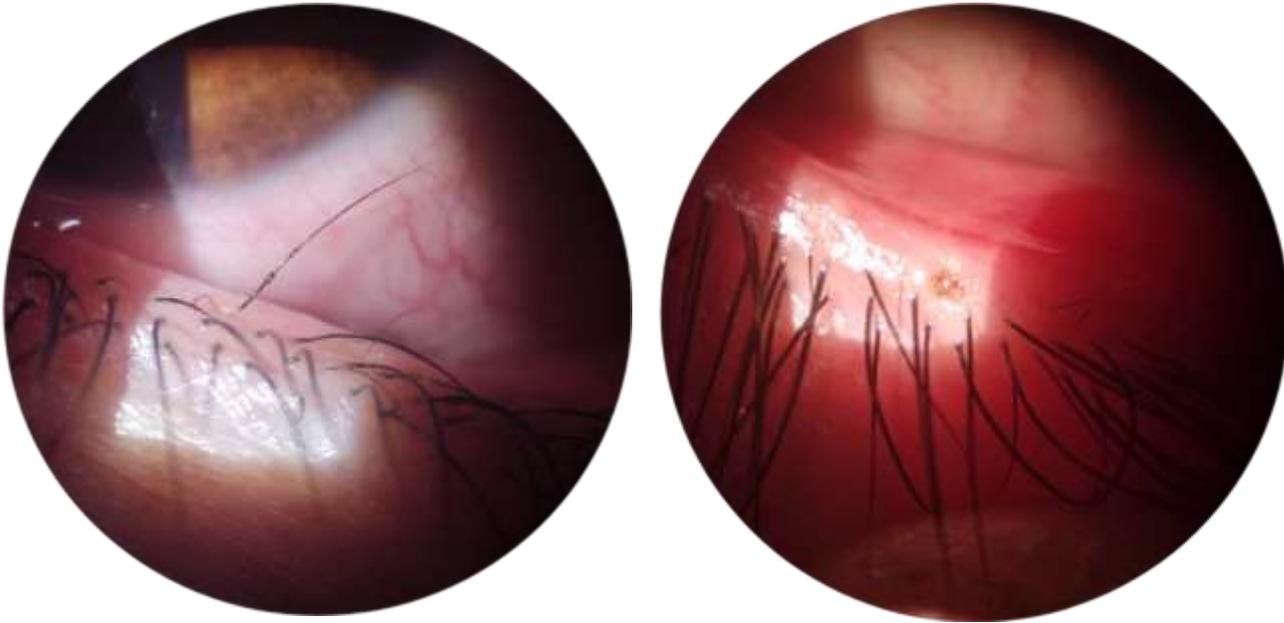
The initial application of the laser severed the lash at its base and created a crater. This crater was then deepened to obliterate the entire lash follicle by increasing the spot size to 200 microns. On average, this process required about 24 applications to complete.

After the laser treatment, patients were prescribed a topical antibiotic ointment to be applied twice daily for one week.

The average follow-up period was 6 months, with check-ups planned for the 4th week, the 3rd month, and the 6th month.

Patients were advised to return earlier if they experienced any symptoms suggestive of recurrence. Recurrent lashes were treated with repeat laser therapy following the established protocol.

The data was examined in an anonymous manner. Prior to the procedure, all participants were given written details about possible side effects. The IBM SPSS Statistics 25 software was used to carry out the statistical analysis.



**Figure 1 illustrates how the application of the laser created a crater at the base of the aberrant eyelash.**



**Figure 2 shows a lower eyelid entropion treated surgically with the Jones procedure, with a lateral tarsal strip**

**Results:**

Our study included 30 eyelids from 22 patients, consisting of 14 men and 8 women, with an average age of 70 years (ranging from 54 to 86). The duration of symptoms varied from 3 months to 4 years, with an average of 25.5 months. In 14 cases, the

laser procedure was performed on one eyelid, while in 8 cases, both eyelids were treated. Of these, 24 were lower eyelids and 6 were upper eyelids.

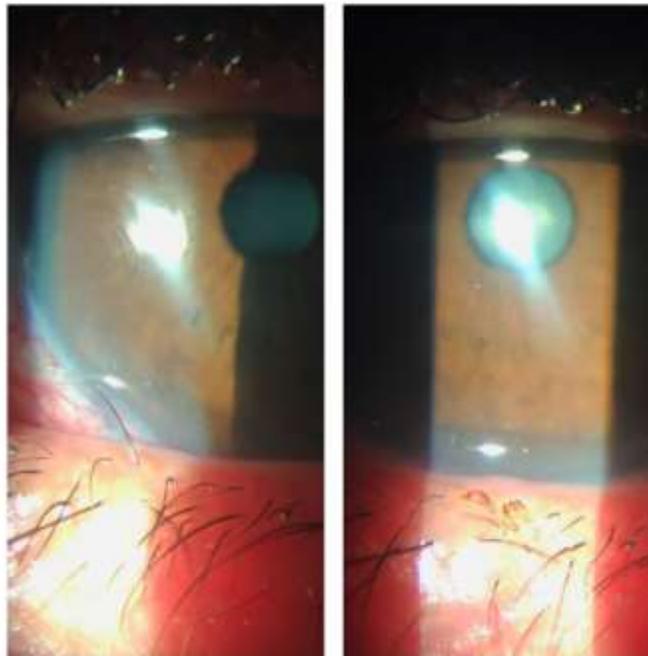
The underlying causes for the aberrant eyelashes were as follows: blepharitis in 20 cases, eyelid burns in two cases, scars from trauma to the free edge of the eyelid in two cases, and idiopathic (unknown cause) in 6 cases.

The distribution of aberrant eyelashes involved in the laser treatment was as follows: 6 eyelids had one aberrant eyelash, 14 cases had two eyelashes, 4 eyelids had three eyelashes, 2 cases each had four and five eyelashes, and two eyelids had six eyelashes.

The number of laser treatment sessions required was as follows: one session was needed in 20 cases, two sessions were required in 6 cases, three sessions were necessary in 3 cases, and four sessions were needed in one case.

The patients generally tolerated the procedure well, with most of them reporting a slight stinging sensation and tear production during the treatment.

Following the laser treatment, successful treatment was achieved in 80% of the eyelids with no recurrence of the condition. The remaining 20% required multiple sessions to fully eradicate the condition. A significant relationship was observed between the number of aberrant lashes per eyelid and the number of laser sessions needed. Full recovery of the treated areas was seen within four weeks post-treatment, with no signs of vascularization or deformation of the eyelid margin.



### **Discussion:**

Trichiasis, a condition where previously normal eyelashes acquire a backward orientation, is relatively common. If not addressed, it can result in corneal ulceration, vascularisation, hypoesthesia, and an increased risk of infectious keratitis<sup>[1,5]</sup>. It can be a particularly bothersome eyelid issue for both the patient and the ophthalmologist due to its persistent nature and distressing symptoms. The pain and discomfort of feeling like there's a foreign body in the eye, along with light sensitivity, can significantly restrict the patient's activities and lifestyle<sup>[6]</sup>.

This study showcases the effective application of argon laser therapy in treating trichiasis without the need for topical or infiltration anesthesia<sup>[1,7]</sup>. Other treatment methods for this challenging clinical issue have proven to be less satisfactory and can be accompanied by various complications. For instance, the removal of misdirected eyelashes doesn't usually have any morbidity, but it often fails to provide a permanent solution. Electrolysis, though an option, can be uncomfortable for the patient and has a high rate of recurrence. Radiotherapy, due to its potential for causing excessive structural and functional complications, is currently not a preferred method among ophthalmologists<sup>[8]</sup>.

Surgery is typically reserved for patients who do not respond to conservative treatment or those with coexisting entropion. Cryotherapy has a success rate of 70-90% in treating trichiasis, but it's a painful method, necessitates infiltration anesthesia<sup>[9,10]</sup>, and can lead to numerous complications<sup>[11]</sup>. These include lid edema, loss of all lashes, loss of meibomian gland secretion, skin depigmentation, and lid notching<sup>[5,8]</sup>.

The Argon laser emits a coherent blue-green light with a wavelength of approximately 488-515 nm. This light is absorbed by the melanin pigment in the eyelash being treated, and the subsequent conversion of the laser light into heat energy produces a therapeutic thermoablative effect. The laser is applied under slit-lamp magnification, allowing for a selective and accurately controlled ablation of the aberrant lash without affecting the surrounding healthy tissue<sup>[1]</sup>.

In our study, patients showed no evidence of recurrence of ingrowing lashes during an average follow-up time of 6 months, after one or more laser sessions. However, it's important to note that lids with ten or more ingrowing lashes were not included in our study as other treatment modalities were considered more suitable.

80% of the lids showed no recurrence following one to two laser sessions. The remaining 20% of the lids, which required three or more sessions, had thick and numerous aberrant cilia. This significant correlation between the number of aberrant lashes per lid and the number of required treatment sessions to achieve no recurrence can be explained by the observation that in the case of numerous lashes, it was more difficult to apply enough laser burns per lash to allow for deep penetration in a single laser session. Hence, the incomplete destruction of some of the hair follicles and the need for repeated laser therapy<sup>[1]</sup>.

The follicle of an eyelash is about 2 mm in depth from the lid margin surface. To achieve successful destruction of the hair follicle, the crater produced by the laser should be deep enough along the axis of the shaft to treat the cilium<sup>[1]</sup>. Additionally, it's worth noting that initiating the laser reaction when the lashes are pale can be achieved through a method that is simple, quick, cost-effective, safe, and highly efficient. This method involves applying a small drop of the patient's own blood, either in its liquid or coagulated state, to the base of the lash on the lid margin<sup>[12]</sup>. Another method described by J Sahni<sup>[13]</sup> is using a blue skin marker pen to mark the base of the problematic eyelash, enhancing the absorption of the argon laser due to the blue pigment.

While some practitioners use infiltration anaesthesia prior to laser therapy or topical anaesthesia, we found that anaesthesia was not required, the same result was first described in the study by Sharif et al. <sup>[1]</sup>. None of our patients had any form of anaesthesia before laser application and they all tolerated the session very well with very minimal discomfort. This can be attributed to the extremely short duration of laser application, very fast destruction of the tissue and the minuteness of the area affected by each laser application.

However, for the patients who require laser treatment in more than five aberrant lashes per lid, it might be advisable to use infiltration anaesthesia to allow the surgeon to go very deep with laser burns to destroy the follicles<sup>[1]</sup>.

### **Conclusion:**

In conclusion, trichiasis, a common complication of various eyelid disorders, can lead to corneal damage. Our research validates that the use of argon laser therapy is a reliable and effective substitute for other mentioned methods in treating recurrent trichiasis. Its primary benefits include the ability to treat trichiasis as an outpatient procedure, which is less time-consuming than other therapy methods. There's no need for anaesthesia, and the treatment is precise and selective, avoiding destruction of surrounding healthy tissue or skin depigmentation. Furthermore, the incidence of recurrence is very low and can be further reduced by repeated laser sessions.

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