



## Surgical Treatment of Rhinophyma, Conventional versus Diode Laser Technique

**Ammar H. Khammas** and **Ali I. Albayati**

*College of Medicine, Al Mustansirya University, Baghdad, Iraq*

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**Abstract:** To evaluate and compare laser surgery with the conventional techniques including cold knives and dermabraders in the treatment of rhinophyma. The study included 7 patients treated surgically for rhinophyma in the ENT dept., Al-Yarmouk teaching hospital in the period between 1997-2004. All the patients were suffering from moderate to major rhinophyma, four patients were treated by sharp blade excision and three by Laser surgery; follow up periods extended between 1-4 years post-operatively. The parameters employed for the evaluation were the length of procedure, preservation of normal tissues, the need for skin grafting, intra-operative bleeding, post- operative pain and discomfort, post- operative bleeding, and cosmetic end results. In regard to the parameters we followed; the Laser surgery in rhinophyma showed to be relatively longer than the conventional excision, but it was much more better in the aspect of tissue preservation, there was no need for skin grafting, very much less bleeding intra- operative, in general the laser surgery proved to be easier and smoother procedure, and cosmetic results have been excellent. Laser surgery in the treatment of rhinophyma holds a distinct advantage over the other surgical modalities.

### Introduction

Rhinophyma has been observed from the ancient times in Greece: *Rhino*: Greek for nose, *Phyma*: Greek for growth. This condition is a part of the skin disease, rosacea; it develops on top of a normal nose skeleton of bone and cartilage. The continuous proliferation of sebaceous glands “oily sweat glands” produces a plump shape and irregular surface. The thin blood vessels just under the skin surface are dilated and they produce a red and veiny aspect.

Rosacea has three stages; in the first stage the face gets red, the redness often persist after exposure to cold or irritants like soap, with time the small blood vessels develop making the redness more noticeable, most of the patients would have the feeling of stinging or burning and the skin starts to feel tight.

In the second stage of rosacea the redness covers a large area of the face, slight swelling, pimples and pustules develop, this is especially noticeable on the nose, as the condition progress prominent facial pores can develop.

The third stage is characterized by swelling and growth of the nose, this can be very disfiguring; at this stage its called rhinophyma, most of the patients do not progress to this stage of the disease (Starr *et al.*, 1996). The cause of rosacea is unknown; food or beverages that cause facial flushing such as alcohol, spicy food, hot soups, coffee, and tea may make rosacea temporarily more noticeable. Sunlight is a major trigger factor of rosacea and may be a cause of this condition (Mark, 1973).

Hypothesis has included gastrointestinal, psychological, infections, climatic, and immunological causes, although scientific

evidences have not substantiated any of these factors as a primary (Nunzi *et al.*, 1980; Marks, 1993). The incidence is almost exclusively in men over forty years of age (Savin *et al.*, 1972).

Because rhinophyma is a cosmetic disorder, it is expected to cause emotional distress if the symptoms are extensive or obvious enough.

Diagnosis is usually made without any testing, a skin biopsy may be needed just to confirm and support the diagnosis in some unusual cases (Marks *et al.*, 1969; Pochi, 1991).

Treatment of rhinophyma is absolutely surgical; reshaping of the deformed nose by the conventional methods using scalpels, dermabraders, or electrocautery, but the condition may recur (Pastorek, 1972; Verde, 1980).

The recent methods accomplished by Laser (either CO<sub>2</sub> Laser or diode Laser) the diode Laser is what we have employed in our study as the treatment of rhinophyma (Henning *et al.*, 1983; Shapshay, 1983).

### Patients and Methods

Seven patients with rhinophyma were managed in our department of otolaryngology, Alyarmouk teaching hospital in the period between 1997 and 2004, all of them were males, all were above 40 years of age, and their rhinophyma ranged between moderate to major types. Four of the patients were treated by sharp blade excision and three by laser surgery, the type of laser used, instrumentation, dose parameters, procedure, and safety rules were applied as follow:

**Surgical Laser system:** Diode surgical laser device delivering 15W in the mode of continuous wave laser radiation, with the Laser energy being delivered to the site of treatment by the means of flexible optical fiber coupled to the laser aperture.

The diode surgical laser we have incorporates class IV GaAlAs “Gallium Aluminum Arsenides” diode laser with wave length in the range 790- 830 nm, and visible aiming beam 4 mW Class IIIa diode laser with wavelength in the range of 630- 660 nm.

**Instruments and accessories:** Bare fiber of 600 µm, straight dermatological hand piece. The optical fiber protective sheath was removed by up to 5 mm.

**Procedure and dose parameters:** The way of application was by the direct contact of the diode laser induced thermo-therapy with the power of 10-15 W, the laser mode was chopping continuous wave controlled by foot switch, the exposure time we used was 1 minute for each exposure.

**Safety measures:** The safety measures to the surgeon and personnel were achieved by wearing goggles of wavelength 780- 830 nm. with optic density > 5. The safety to the patients was aiming mainly at protection of the eyes and skin by covering with wet drapes.

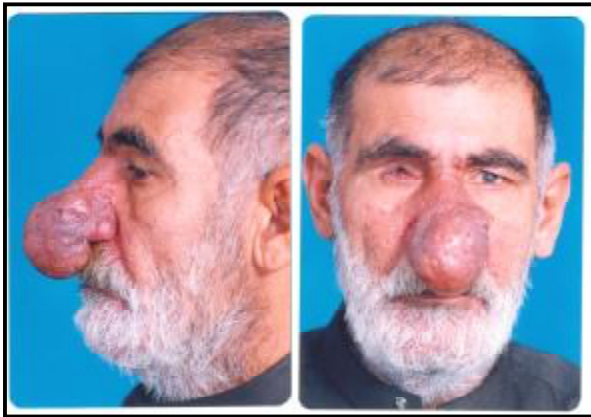
### Results

The results we got in our series of patients in regard to the diode laser treated patients were excellent when compared to the conventionally treated patients. During surgery; the diode laser showed to be an excellent cutting tool:

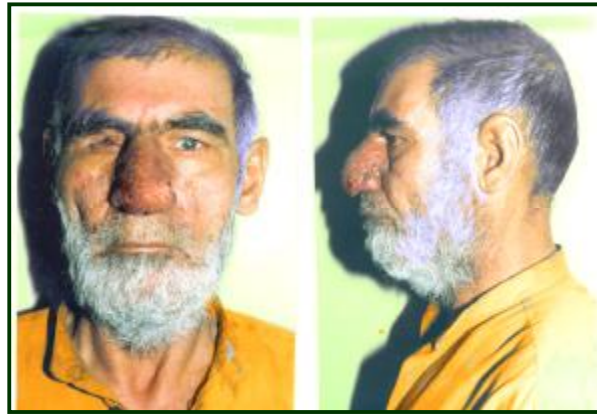
1. Making the procedure easier and smoother.
2. Haemostasis was far more better with diode laser for its ability to close most of the small vessels while cutting,
3. Preservation of the underlying normal tissue could be achieved efficiently by the accurate cutting using the diode laser knife.
4. The length of surgery was relatively longer with the diode laser, but we think it worth the trouble since we are looking for better results.

In the post-operative period, the patients were satisfied with the results, the follow up periods extended up to 3 years:

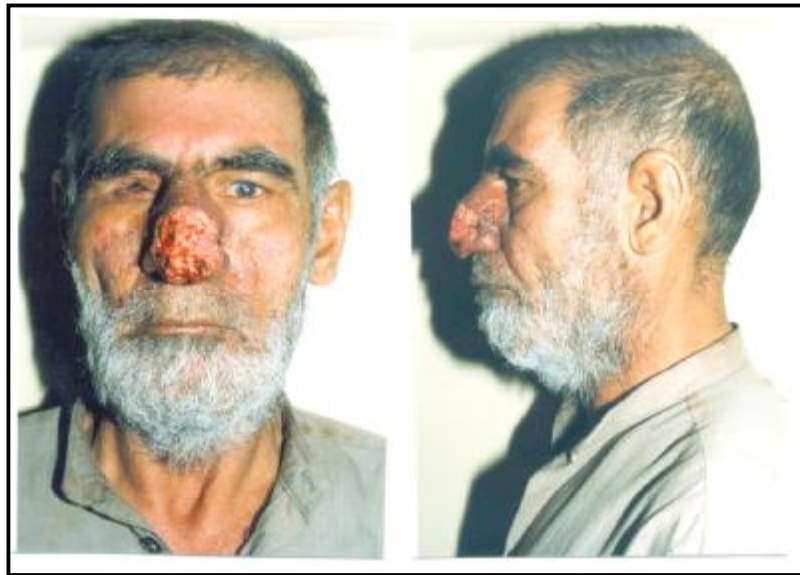
1. The cosmetic outcome with diode laser was more satisfactory than with the sharp knives shaving explained by the more accurate knife being the diode laser with the better preservation of the normal tissues beneath.
2. We needed no skin grafting in none of our patients as there was a fairly acceptable healing and covering of the nose with near normal epithelium.
3. In both ways of surgery the post-operative pain was minimal.
4. We met no post-operative infection or other complications almost in the same manners in both procedures as the site is known to have a rich blood supply, hence better healing is expected with the least of complications (Figs. 1, 2, 3).



**Fig. (1):** The pre-operative appearance of rhinophyma. The patients treated later with Diode Laser.



**Fig. (2):** Post-operative appearance of the rhinophyma treated with diode Laser (3 days after surgery).



**Fig. (3):** Post- operative (3 months) after treatment of rhinophyma with diode laser surgery.

### Discussion

In the previously described conventional techniques that have included the cold knives and the dermabraders, the bleeding must be controlled by the electro- cautery haemostate, which if used extensively would make the fine sculpturing of the nose difficult (Bohigian *et al.*, 1988). An alternative to that was the “Shaw scalpel” mentioned to be used in the

management of the extensive rhinophyma where the heated blade of scalpel could provide a rapid maintenance of haemostasis with minimal tissue damage, thus allowing rapid and accurate removal of the hypertrophied tissue; yet after removal of the bulk of rhinophyma with this Shaw scalpel, the CO<sub>2</sub> laser is needed to refine the nasal contour (Eisen *et al.*, 1989).

In our study the procedure of treatment using the diode laser technique was designed in

the way that the laser power and the total energy were calculated, assuming that the tissue cutting surface area is about 20 cm<sup>2</sup>, the laser power is between 10- 15 W, the total energy would be about **2100 J**, the hand piece end bare optical fiber is sized to 600 μm. , and the surface area of the spot treated by diode laser each exposure is 0.6 mm<sup>2</sup> of the tissue; the diode laser action is intended to raise the tissue temperature to the volatilization temperature at about 300°C (Thomsen, 1991). To reduce the possible thermal effects on the neighboring tissues by heat conduction, the laser is to be conducted intermittently with a maximum time of continuous exposure of 60 s for each exposure; a cooling time of 60 s is envisage for heat dissipation, so with this technique Laser was found to be an excellent cutting tool, while providing superior haemostasis, it simultaneously conserve the nearby tissues.

Greenbaum *et al.* (1998) laid a study of comparison between carbon dioxide laser and electro- surgery in the treatment of rhinophyma, a study of 3 patients treated by CO<sub>2</sub> laser on one half of the nose, and biterminal electro- cutting current on the other half: the results showed that carbon dioxide laser surgery was easier with better refinement of the nose (Greenbaum *et al.*, 1988).

Cosmetically speaking; the treated area healed well with an acceptable skin tone and nearer to natural skin colour with the diode laser surgery than with the cold knife surgery.

### Conclusions

Diode laser surgery holds a distinct advantage over the other surgical modalities in general:

1. Cosmetically: Diode laser as a surgical tool is more useful and recommended for the difficult cosmetic problems of rhinophyma and permits a better nose refinement.
2. The more efficient control of bleeding makes the diode laser surgery an easier and smoother procedure than the conventional procedures, although it takes a bit longer of time, but that would be for the better results.
3. The better conservation of the normal tissues makes the diode laser surgery a good and almost free of complications procedure, so recommended as a first choice treatment in rhinophyma.

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## العلاج الجراحي لتضخم الأنف الخارجي مقارنة بين الجراحة التقليدية و الجراحة بالليزر (دايود ليزر)

عمار هادي خماس علي إحسان البياتي

قسم الأذن والأنف والحنجرة ، كلية الطب ، الجامعة المستنصرية ، بغداد ، العراق

**الخلاصة** تضمن هذا البحث دراسة مقارنة لعلاج تضخم الأنف الخارجي بين الطرق الجراحية التقليدية وطرق الجراحة بالليزر. أجري البحث في قسم الأذن والأنف والحنجرة في مستشفى اليرموك التعليمي لسبع حالات عولجت أربع منها بالجراحة التقليدية وثلاث بالدايود ليزر للفترة مابين 1997 - 2004. تضخم الأنف الخارجي Rhinophyma هو تضخم الجلد و الأنسجة الرخوة والتي تحتوي على الغدد الدهنية للمنطقة الأمامية للأنف ويعتبر المرحلة الثالثة و الأخيرة من المرض الجلدي الذي يدعى بالطفح الوردي Acne Rosacea . يتفاوت حجم التضخم عند الأشخاص ويسبب حالة غير جمالية تؤدي بالمريض الى إنزعاج نفسي ويمكن علاج الحالة جراحيا إما بالطرق الجراحية التقليدية كالكي أو إزالة الجلد المتضخم بالسكين ، أو يكون العلاج بالليزر كما في بحثنا هذا ، حيث تم استعمال الدايود ليزر. أظهرت المقارنة بالنتائج بعض الفوائد المهمة بالعلاج بالليزر حيث اعطته الأفضلية على الجراحة التقليدية كمرونة و سهولة خطوات العمل خلال العملية وكذلك قلة نسبة النزيف والذي يعتبر مشكلة أساسية في العمليات التقليدية، وكذلك كانت النتائج الجمالية أفضل نسبيا في العلاج بالليزر.