

## Treatment of rhinophyma with carbon dioxide laser

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### Abstract

Rhinophyma is a slowly progressive, disfiguring disorder of the nose which represents the end stage of acne rosacea. The cosmetic deformity is often the reason for patients to seek medical attention. Over the years many treatment modalities, including dermabrasion, electrocautery, excision and grafting, decortication and cryosurgery amongst others, have been described to treat this condition, but none of them are very satisfactory. Special concern about the droplet dispersion of blood in dermabrasion have made this method less acceptable as it poses a potential risk to health workers.

We describe a technique in which this proliferative disorder can be treated, using carbon dioxide laser excision and vaporization. This method provides a very dry surgical field which allows the sculpting of the hypertrophic areas to be very effective, giving a very satisfactory cosmetic result.

**Key words:** Rhinophyma; Laser surgery; Carbon dioxide

### Introduction

Rhinophyma is a slowly progressive disfiguring disorder of the nose which represents an end stage of acne rosacea. The term rhinophyma is derived from the Greek words 'nose' and 'growth'. Hebra in 1845 first described its macroscopic features and Simon and Virchow described the condition microscopically late in the 19th century (Wilkin, 1983; Dotz, 1984; Wiemer, 1987).

Rosacea usually affects middle-aged or elderly men. Although the precise aetiology is unclear, many factors, including a saprophytic parasite named *Demodex folliculorum*, alcohol, caffeine, spicy foods and some other vasoactive influences, have been implicated but have not been proven (Pastorek, 1972; Wilkin, 1983; Dotz, 1984; Wiemer, 1987).

Early clinical changes include erythema, telangiectasia and pustules with a prominent vascular component in some patients. The skin and its appendages become progressively hypertrophic, leading to an unacceptable cosmetic deformity which makes patients eventually seek medical attention. Histologically, there is sebaceous gland hypertrophy and hyperplasia, perifollicular fibrosis, acanthosis and superficial vascular dilatation, and although it is considered a benign condition, sporadic case reports of coincidental basal and squamous cell carcinoma have been reported (Pastorek, 1972; Wilkin, 1983; Dotz, 1984; Wiemer, 1987).

In the management of rhinophyma many treat-

ment modalities have been employed over the years. The majority of them have obvious disadvantages including excessive blood loss, dispersion of blood, poor visibility of the operative field and post-operative pain leading often to an unsatisfactory cosmetic result.

Since 1980, carbon dioxide laser has been employed to treat this condition with excellent cosmetic results and minimal complications (Shapsay *et al.*, 1980; Roenigk, 1987; Bohigian, 1988; Hassard, 1988; Karim Ali, 1989; Haas and Wheeland, 1990).

### Case reports

Three men, 64-year-old (Figures 1a and 1b), 77-year-old (Figures 2a and 2b) and 72-years-old (Figures 3a and 3b) were referred to the Otorhinolaryngology department with a long-standing history of acne rosacea affecting the nose and in one case affecting the chin. The clinical examination revealed a large rhinophyma in the three of them and sebaceous hypertrophy of the chin in one. One patient also had multiple pustules and telangiectasia on the face. They underwent carbon dioxide laser excision and vaporization of the affected areas, and, after an uneventful recovery, not requiring any post-operative analgesia, were discharged home. They were reviewed at one and six weeks and a good cosmetic result was achieved (Figures 1c, 1d, 2c, 2d, 3c and 3d).

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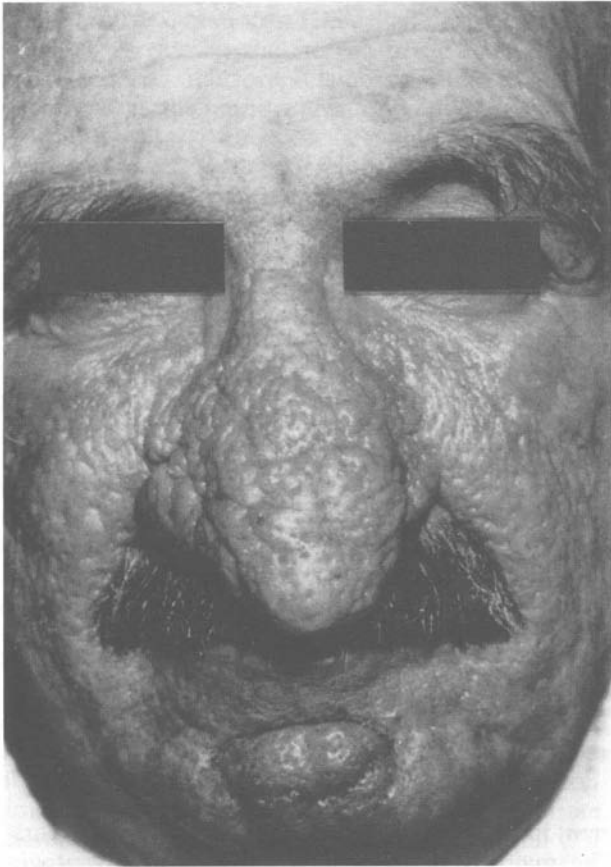


FIG. 1a  
Pre-operative frontal appearance of *Case 1*.

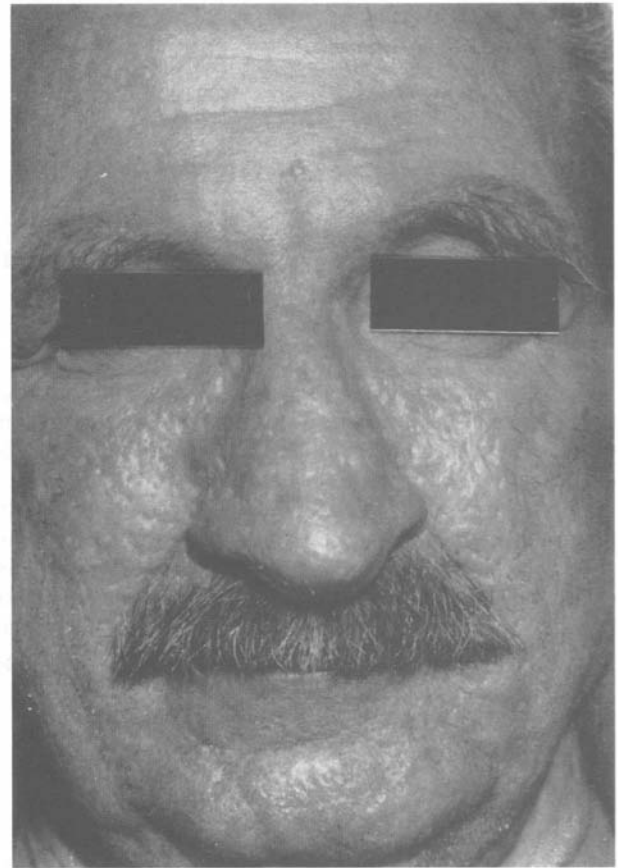


FIG. 1c  
Post-operative frontal appearance of *Case 1* at six weeks.

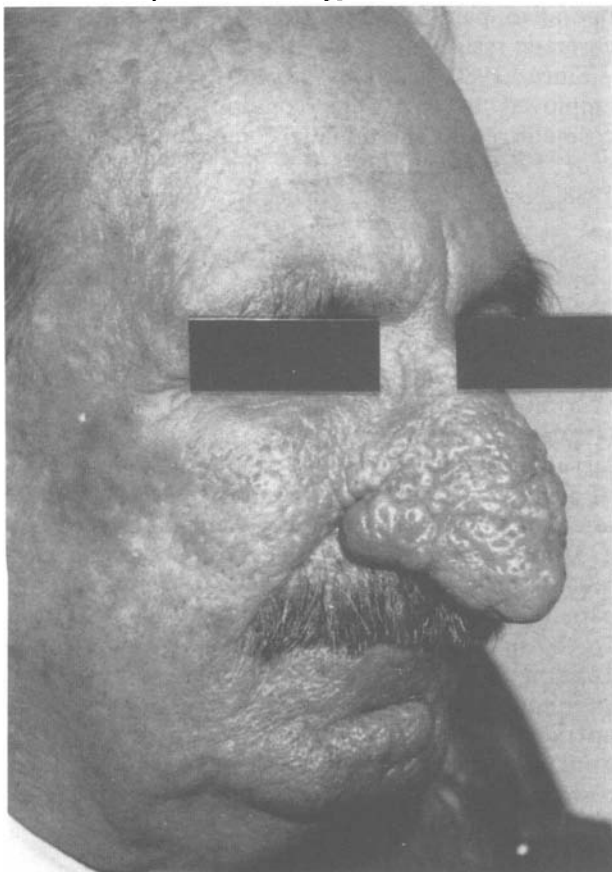


FIG. 1b  
Pre-operative oblique appearance of *Case 1*.

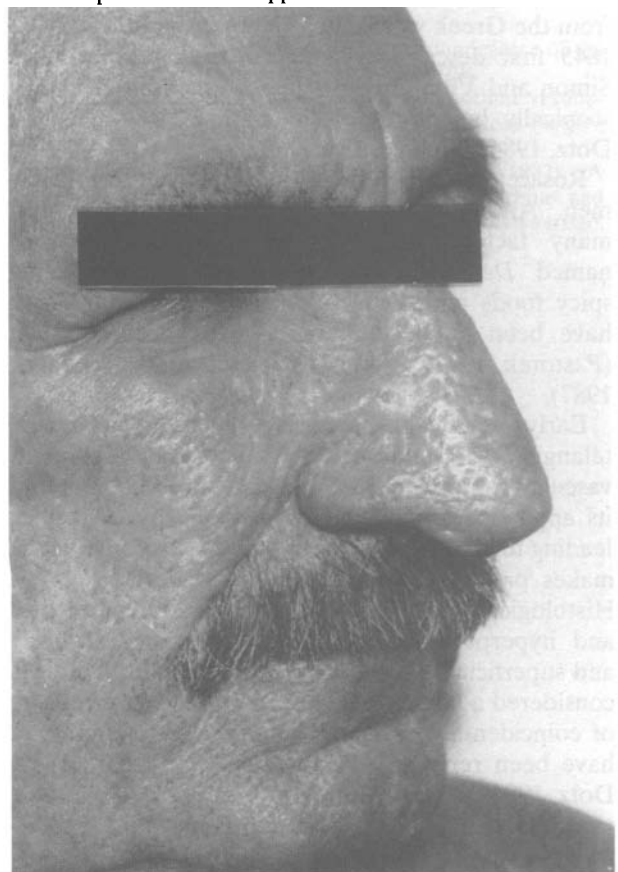


FIG. 1d  
Post-operative oblique appearance of *Case 1* at six weeks.

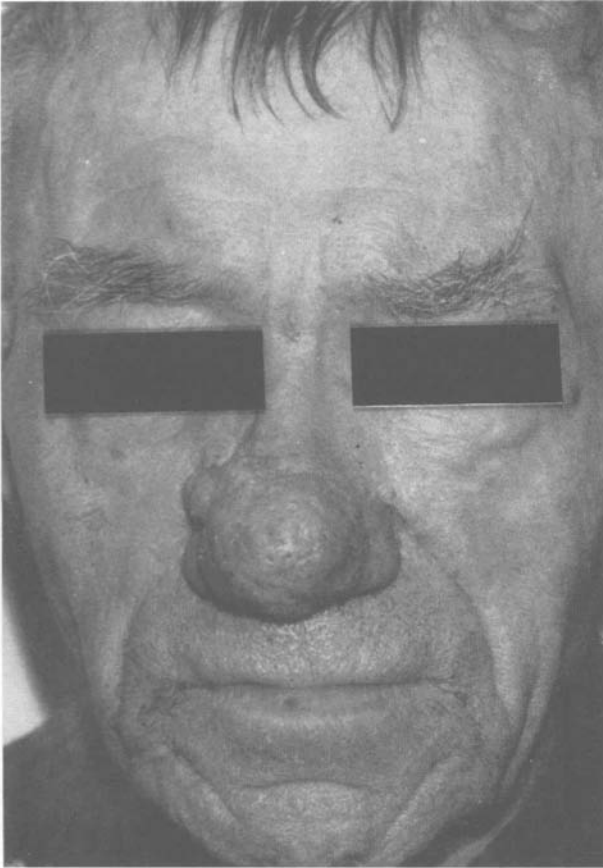


FIG. 2a  
Pre-operative frontal appearance of *Case 2*.

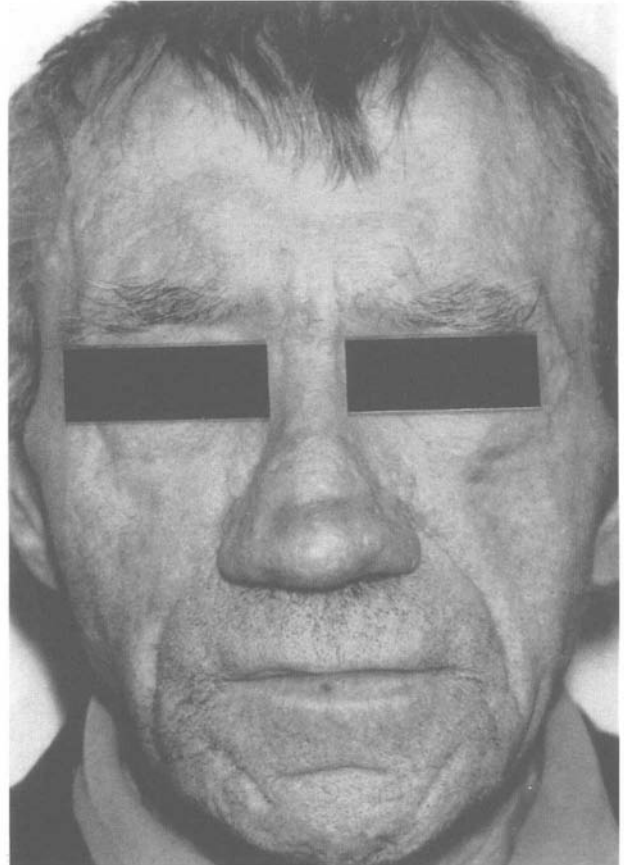


FIG. 2c  
Post-operative frontal appearance of *Case 2* at six weeks.



FIG. 2b  
Pre-operative lateral appearance of *Case 2*.

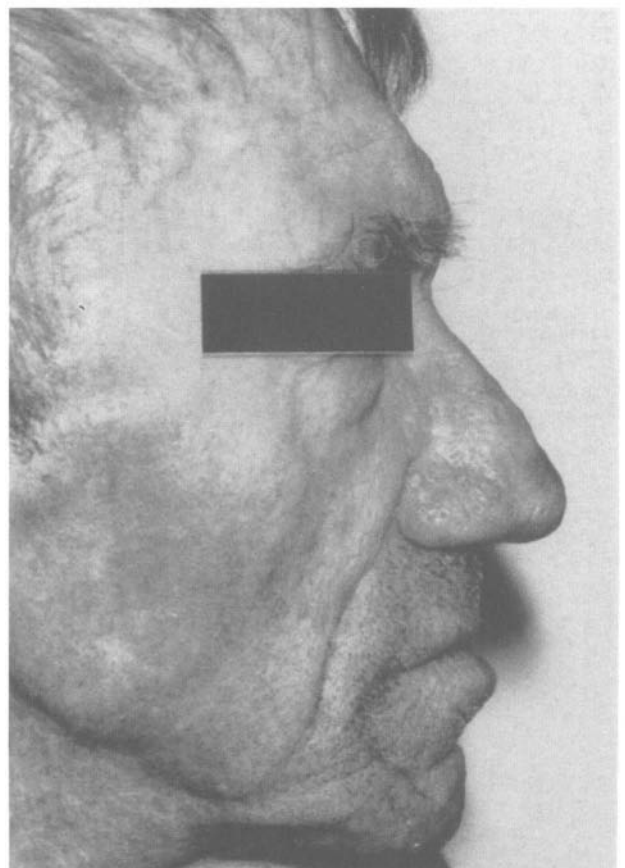


FIG. 2d  
Post-operative lateral appearance of *Case 2* at six weeks.

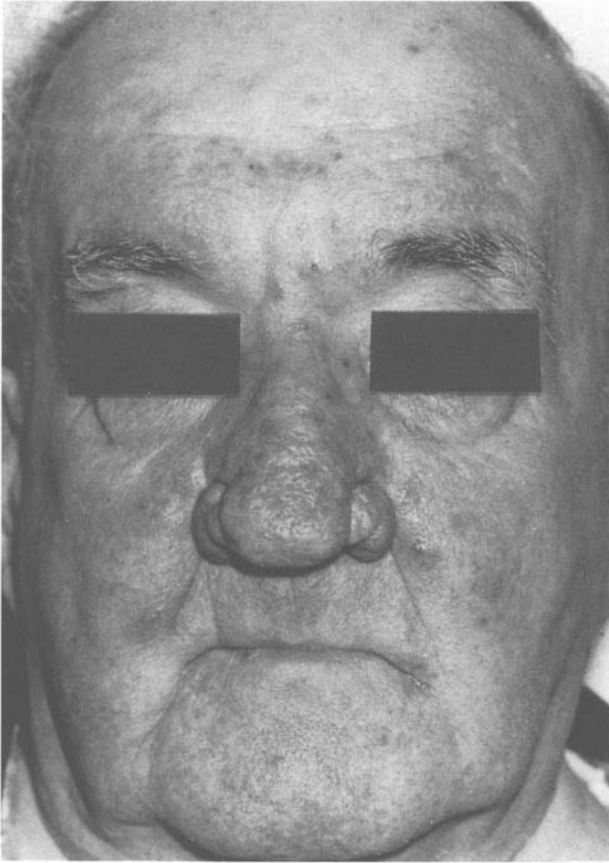


FIG. 3a  
Pre-operative frontal appearance of *Case 3*.

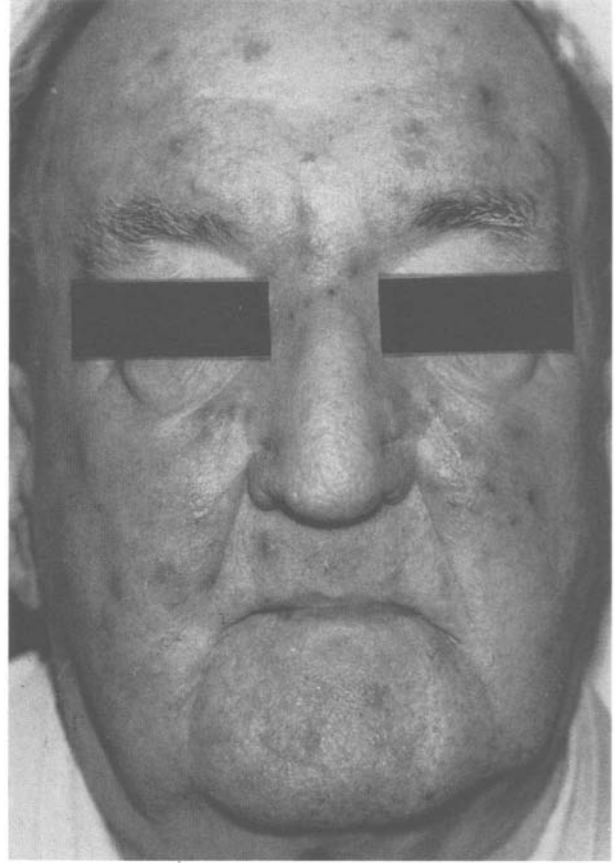


FIG. 3c  
Post-operative frontal appearance of *Case 3* at six weeks.

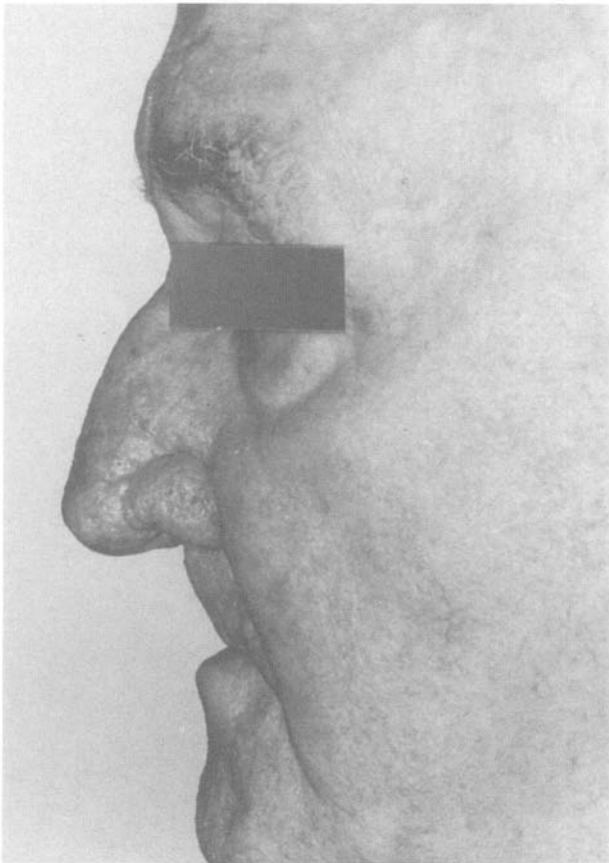


FIG. 3b  
Pre-operative lateral appearance of *Case 3*.

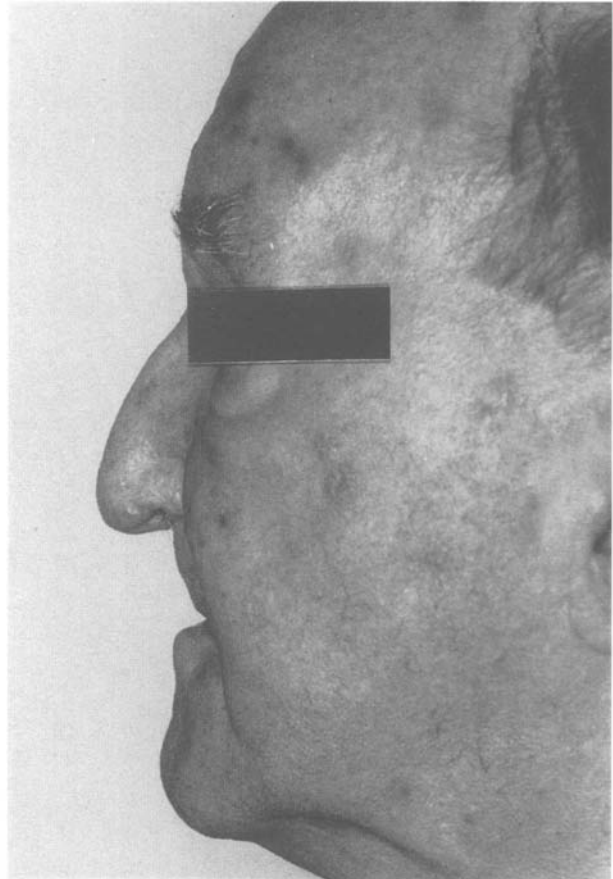


FIG. 3d  
Post-operative lateral appearance of *Case 3* at six weeks.

### Technique

The nose was prepared with Povidone-iodine 10 per cent in aqueous solution and the face of the patient is covered with cotton wool pads soaked in 0–9 per cent sodium chloride solution for protection, except for the nose and any other areas that may require vaporization. At the same time, laser safety measures are undertaken.

We operate a Zeiss Opmilas carbon dioxide 25 Laser using a continuous pulse beam with manual foot pedal control. Initially a beam with 5 watts of power focused to a spot size of 1 mm is used to delineate the area to be operated upon. Thereafter, the power is increased to 15 watts and by defocusing the aiming helium neon beam to a spot size of 2 to 3 mm; the ablation and vaporization is initiated. At this power, the penetrating capacity of the carbon dioxide laser is approximately between 0.1 to 0.5 mm, hence vaporization and 'sculpting' of the hypertrophied tissue is performed in progressive layers until a satisfactory shape is obtained. After each layer of tissue is removed the sebaceous material and the accumulated debris is wiped by using a gauze soaked in 0.9 per cent sodium chloride solution. The smoke produced is continuously aspirated with a Yaunker suction tube. The vaporization can be continued until a satisfactory cosmetic shape is obtained and as long as the sebaceous pores are visualized and sebaceous material obtained. If the skin appendages are vaporized, the re-epithelialization time becomes prolonged and there is a risk of scar contraction, leading to an unacceptable cosmetic result. During the vaporization the amount of bleeding encountered is virtually minimal and therefore the operating field is satisfactorily visualized.

The treatment of other facial areas as the chin, is undertaken in identical fashion, first by delineating the area and subsequently vaporizing in a defocused action.

After the procedure a paraffin gauze dressing is left for 24 hours until the post-operative serous discharge ceases. The average operating time was one hour and none of our patients needed post-operative analgesia. The vaporized area remains covered by a black scab which progressively disappears over a period of approximately four to six weeks.

### Discussion

For many years a number of treatments and surgical techniques have been employed to manage this cosmetically unpleasant disease. Medical treatment can be effective in the early stages of acne rosacea but it is very unsatisfactory for a well-established disfiguring rhinophyma (Pastorek, 1972; Wilkin, 1983; Dotz, 1984; Wiemer, 1987) (Table I). Several conventional surgical techniques are still widely employed amongst Otorhinolaryngologists, Plastic Surgeons and Dermatologists (Farina, 1950; Fisher, 1970; Nolan, 1973; Elliott *et al.*, 1978; Stindel, 1981; Dolezal and Schultz, 1983; Eisen

TABLE I

MEDICAL MANAGEMENT OF ACNE ROSACEA AND RHINOPHYMA

|                                      |
|--------------------------------------|
| A.—Avoidance of predisposing factors |
| Use of non-irritating sunscreen      |
| Avoidance of spicy food              |
| Avoidance of alcohol                 |
| Avoidance of pork and seafood        |
| B.—Antibiotic therapy                |
| Tetracyclines                        |
| Metronidazole                        |
| Erythromycin                         |
| Ampicillin                           |
| Chloramphenicol                      |
| Dapsone                              |
| C.—Other agents                      |
| Levamisole                           |
| Riboflavin                           |
| Vitamins A, D, E.                    |
| 13-cis-retinoic acid                 |
| Topical agents containing sulphur    |
| Isotretinoin                         |
| Phenol and trichloroacetic acid      |
| D.—Massage therapy                   |

*et al.*, 1986) (Table II). The majority of these techniques have the major disadvantage of producing excessive blood loss with subsequently poor visualization of the operating field resulting often in inaccurate removal and poor cosmetic result (Linehan, 1970; Nolan, 1973). Concern about the droplet dispersion of blood in dermabrasion have made this method less acceptable as it poses potential risk to health workers.

The use of CO<sub>2</sub> laser in the treatment of rhinophyma was first described by Shapshay and co-workers in 1980 and has many advantages over the conventional techniques (Shapshay *et al.*, 1980; Roenigk, 1987; Hassard, 1988; Karim Ali, 1989; Haas and Wheeland, 1990; El-Azhary *et al.*, 1991). The minimal blood loss during the procedure allows good and accurate control of the removal of tissue. The thin layer by layer removal and careful shaping or sculpting of the nasal tissue leads to a very good cosmetic result with an excellent skin colour and texture matching.

The healing after skin surface carbon dioxide laser surgery is quick and painless (Simpson, 1983; Bohigian *et al.*, 1988; Karim Ali, 1989; El-Azhart

TABLE II

SURGICAL PROCEDURES FOR EXCISION OF RHINOPHYMA

|                                         |
|-----------------------------------------|
| A.—Total excision                       |
| Excision and split-thickness skin graft |
| Excision and full-thickness skin graft  |
| Excision and local flaps coverage.      |
| B.—Partial excision or decortication    |
| Cold scalpel excision                   |
| Heated scalpel excision (Shaw scalpel)  |
| Electrocautery excision                 |
| Dermabrasion                            |
| Cryosurgery                             |
| Chemical peel                           |
| Any combination of the above procedures |
| C.—Laser excision                       |
| Carbon dioxide laser                    |
| Argon laser                             |
| Nd: YAG laser                           |

*et al.*, 1991). The black scab which is produced after the procedure disappears progressively from the proximal parts to the tip of the nose in approximately four to six weeks.

Post-operative pain is virtually non-existent and none of our patients requested analgesia following the procedure. Another advantage of this technique is that it can be done as a Day-case procedure or under local anaesthetic, especially for medically unfit patients (Roenigk, 1987; Haas and Wheeland, 1990). Although other types of laser have been employed to excise rhinophyma (Hulsberg and van Gemert, 1983; Dicken, 1986; Wenig and Weingarten, 1993), we found the carbon dioxide laser with minimal tissue penetration in the defocused action is an excellent surgical tool for this procedure. The CO<sub>2</sub> laser is also readily available in most United Kingdom Otorhinolaryngology departments.

It is essential to check the depth of the excision and vaporization; this can be done by squeezing the follicular pores and obtaining sebaceous material, and also checking regularly the profile and shape of the nose during the procedure. This simple method will assure that the excision is not done beyond the level of the sebaceous glands from which subsequent re-epithelialization will occur (Amedee and Routman, 1987). Some authors advocate the use of the operating microscope to avoid excessive removal of tissue (Hassard, 1988). When massive nodules are present, their excision can be performed by holding the laser handpiece parallel to the skin surface at an approximate level with the nasal contour (Haas and Wheeland, 1990). The average surgical time is approximately one hour, which, compared with other techniques, does not offer any significant advantage.

In cases in which the hypertrophy and the cosmetic deformity affects other parts of the face, CO<sub>2</sub> laser vaporization can also be used safely, again producing satisfactory cosmetic results. Although a very accurate and technically simple method, care should be taken to follow laser safety measures strictly.

Some authors advocate the use of the ultra pulse CO<sub>2</sub> laser modality. This utilizes faster laser repetition rates, and minimal lateral thermal tissue damage is achieved. This will produce less deposition of carbon particles on the surgical field and therefore improved the vaporization by making it more accurate and may also reduce the operating time (Reinisch *et al.*, 1994).

We conclude that this is a simple surgical technique which can be performed as a Day-case and which offers excellent cosmetic results with minimal complications.

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