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FACIAL PLASTICS: FUNCTIONAL RHINOPLASTY (TD WANG AND CZ JOHNSON, SECTION EDITORS)

# Rhinophyma: Taking Care of the "WC Fields" Nose

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## Abstract

**Purpose of Review** To summarize and critically review etiology and management of rhinophyma, with emphasis on operative interventions.

**Recent Findings** The mainstay of treatment for rhinophyma is operative, with use of partial-thickness procedures that allow wound healing via secondary intention. Dermabrasion and laser therapy can be performed under local anesthesia with acceptable hemostasis and good outcomes. However, as malignancies have been identified in rhinophyma tissue, histopathologic analysis is an important consideration. Surgical excision using electrocautery may allow for improved hemostasis compared to cold steel, but both excisional methods are simple, have short operative times, and allow for histopathologic analysis. Postoperative care, including gentle cleansing, infection prophylaxis, occlusive ointments, and avoidance of sun exposure, is vital to promoting re-epithelialization.

**Summary** Rhinophyma remains a complex and poorly understood condition that can severely impact quality of life. Surgical intervention is the main treatment modality, with excision via electrocautery and consideration of laser therapy as the preferred method to control hemostasis and allow histopathologic analysis.

**Keywords** Rhinophyma · Rosacea · Phymatous rosacea · Laser surgery · Rhinophyma excision

## Introduction

Rhinophyma, or phymatous rosacea, is a benign overgrowth of the sebaceous glands, blood vessels, and dermal tissue of the nose that was most often associated with the American comedian W.C. Fields [1, 2]. The term rhinophyma stems from Greek etiology, with *rhis* meaning "nose" and *phyma* meaning "growth" [3]. Rhinophyma can lead to esthetic deformity, nasal obstruction, and/or difficulty with continuous positive airway pressure (CPAP) adherence. It may occur de novo or represent an advanced stage of rosacea and may lead to significant psychologic distress and stigmatization [4]. Rosacea is a common, chronic inflammatory skin disease characterized by flushing, erythema, pustules, and dilated vasculature that can progress to progressive skin thickening and enlargement [5]. Rosacea is classified as erythematotelangiectatic, papulopustular, phymatous, and ocular [5]. While the phymatous subtype most frequently affects the nose (rhinophyma), it may impact the chin (gnatophyma), forehead (metophyma), ears (otophyma), and eyelids (blepharophyma) [5].

## Epidemiology

The prevalence of rosacea is 5.5%, and rhinophyma accounts for approximately 3.7% of rosacea cases, most commonly affecting Caucasian males in the fifth to seventh decades of life [2, 3, 6, 7]. Rhinophyma has a male-to-female ratio that ranges from 12:1 to 30:1, which is thought to be related to increased androgen activity in males [1–3]. This is in

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contrast to rosacea overall, which typically affects middle-aged females [5].

## Pathophysiology

The exact cause and disease process behind rhinophyma are still unknown, with no clear genetic link identified. However, rhinophyma development is thought to be similar to rosacea and multifactorial. It is postulated that vascular abnormalities and vasodilation lead to dermal fluid accumulation, leading to inflammation, fibrosis, and telangiectatic growth with increased factor XIII [8–10]. Upregulation of fibrogenic forms of transforming growth factor (TGF)-B has been identified in rhinophyma tissue, which may be implicated in pathogenesis [11]. Further supporting this, Tamoxifen (an anti-estrogen medication) may mediate fibrosis associated with rhinophyma, as it has been shown to downregulate expression of TGF-B2 in vitro [6, 12, 13]. Mast cells are also increased in rhinophyma and may promote vasodilation, angiogenesis, and tissue fibrosis [8, 14].

Other etiologies are less clear. A skin mite, *Demodex folliculorm*, has been implicated but is not present in all histologic specimens [8]. While heavy alcohol use was historically considered a cause of rhinophyma, this has not been supported in the literature and is no longer thought to be an associated factor [15]. Other triggers of rosacea, which are associated with flushing and autonomic stimulation such as medications, ultraviolet (UV) light exposure, caffeine, increased temperatures, and spicy foods, may possibly be associated with rhinophyma [16, 17]

## Clinical Characteristics and Diagnosis

Rhinophyma presents as painless hypertrophy of the nasal soft tissues with a bulbous appearance of the tip lobule, nodules, telangiectasias, and erythema, leading to esthetic deformity [3] Rhinophyma affects the lower two-thirds of the nose, which includes the nasal tip, ala, and dorsum. The nasal tip is enlarged and more involved by disease than the nasal dorsum or sidewalls, and progressive hypertrophy leads to distortion of the nasal subunits [3, 18]. Further nasal tip enlargement leads to tip ptosis and derotation, contributing to a decreased nasolabial angle. [18] There may be pits and fissures that trap sebum and bacteria leading to chronic infection, as well as scarring. [3] In severe cases, rhinophyma can cause external nasal valve collapse resulting in nasal obstruction and difficulty with CPAP adherence, but it has not been found to involve the underlying cartilage or bony structures. The severe nasal lobulations, edema, and thickening can lead to significant psychological distress, anxiety, and depression [12].

Rhinophyma histopathologic features are nonspecific and similar to rosacea [8]. Common features include perivascular inflammatory infiltrates with lymphocytes and plasma cells, irregular telangiectasias, sebaceous gland hyperplasia, *Demodex folliculorum* follicular plugging, follicular dilation, solar elastosis, folliculitis, and granuloma formation [8]. There is an associated 5–10% risk of basal cell carcinoma, which may be associated with fibrous scarring, trauma, and hyperplastic cellular changes in rhinophyma tissue [2, 19]. Further, there have been other malignancies identified incidentally including squamous cell carcinoma, angiosarcoma, sebaceous gland carcinoma, and amelanotic lentigo maligna melanoma [6, 20, 21•]. Common presenting symptoms of malignancy may include rapidly progressing enlargement, ulceration, and discharge [22]. Obtaining samples for histopathologic analysis is an important consideration in order to rule out malignancy. However, there are no definitive guidelines for the evaluation and management of malignancies identified in rhinophyma tissue [21•, 22].

Several grading systems of rhinophyma have been proposed for both clinical and histologic classification. The grading system most commonly used in treatment studies was developed by el-Azhary and classifies rhinophyma severity into minor, moderate, and major groups [23]. The minor group is characterized by telangiectasias and mild thickening or texture changes, the moderate group is characterized by thickening of the nasal skin and early lobule formation, and the major group is characterized by nasal skin hypertrophy and prominent lobule formation [23]. More recently, Wetzig et al. published a rhinophyma severity index (RHISI) grading disease on a scale of 0 to 6 (0: no evidence of rhinophyma; 1: mild skin thickening, 2: moderate skin thickening; 3: strong skin thickening, small lobules; 4: lobules with fissures; 6: giant rhinophyma), with an extra point provided for presence of strong asymmetry, multiple cysts, or strong vessels, and a maximum score of 6 [4]. Daoud et al. recently proposed a new classification system with a stage that progresses with peripheral extent of disease: (1) skin changes confined to the lower third of the nose; (2) skin changes involving whole nose; (3) skin changes extending to areas adjoining the nose such as lips and cheeks; (4) skin changes interfering with nasal passage; and a grade that changes with disease thickness: (A) diffuse erythema and telangiectasia; (B) skin thickening, irregular texture, edema, pitting, hypertrophy, and hyperplasia; and (C) papules and pustules [24•].

A histologic grading system was developed by Jansen et al. and classifies rhinophyma into four histologic subtypes: glandular, fibrous, fibroangiomatous, and actinic [25]. The glandular subtype is notable for sebaceous gland hyperplasia, *Demodex folliculorum* mites, intermediate filaments, neuroglandular antigen, and vasoactive intestinal peptide (VIP) receptor positive cells. The fibrous subtype is characterized by diffuse connective tissue hyperplasia, variable sebaceous

gland hyperplasia, actinically damaged elastotic material with vascular enlargement, absence of pilosebaceous structures, and Factor XIII staining. The fibroangiomatous classification is defined by ectatic veins, pustules, less prominent sebaceous hyperplasia, the presence of fibrosis, telangiectasias, and inflammatory lesions. The final subtype, actinic, is characterized by nodular masses of elastic tissue and proliferation of sebaceous glands. While these staging systems may facilitate communication regarding disease severity, the clinical significance of these systems is still unclear. One study evaluating 24 patients treated with wide shave excisions for rhinophyma identified no significant histopathologic differences between groups using the RHISI staging system [8]. However, they did find that a higher preoperative RHISI score was a risk factor for recurrence [8].

## Medical Management

General management of rosacea may facilitate treatment of rhinophyma, such as skin care, photoprotection, and avoidance of triggers [26]. These practices may include use of mild nonalkaline skin cleansing and moisture regimens, avoidance of skin irritants, such as toners, astringents, abrasives, and sensory stimulants (alcohol, acetone, menthol, etc.), and application of broad-spectrum sunscreen with sun protection factor (SPF) 30 or greater [26, 27].

While there are multiple medications for the treatment of rosacea, only few have shown efficacy in the treatment of rhinophyma [18]. Oral doxycycline may be used for cases of clinically inflamed rhinophyma [28]. Isotretinoin at low doses (0.2–1.0 mg/kg) may also be useful due to its actions on sebaceous glands; oral isotretinoin has been used successfully to reduce nasal volume in patients with rhinophyma [29, 30]. However, isotretinoin is teratogenic and should not be taken by patients who are pregnant or may become pregnant. As noted previously, tamoxifen has been shown to downregulate TGF-B2 expression in vitro and may mediate fibrosis in rhinophyma, though this is not currently used in clinical practice [6]. Radiation is not typically used to treat rhinophyma due to risk of malignancy but may be considered in patients with comorbidities that would make them poor surgical candidates [6]. Medical management for rhinophyma is limited, as no medication has shown successful regression of rhinophyma but may be most useful at early stages of disease [31].

## Procedural Treatment

The mainstay of treatment for rhinophyma is operative, and a wide range of approaches have been described, including laser therapy, cold or hot scalpel excision, electrosurgery/electrocautery, dermabrasion, and coblation. The key steps are debulking, sculpting, and hemostasis, with the goal to normalize the nasal contour. Full-thickness procedures were first performed in the mid-1800s down to the perichondrium or periosteum, but even with skin grafts and regional flap coverage, there was significant resultant scarring and risk of flap or graft failure. [32] Thus, partial-thickness excisions, in which tissue is removed to the pilosebaceous unit and the wound is left to heal by secondary intention, became more widely utilized [32]. Two-step reconstruction may also be considered, whereby acellular dermal matrix is used followed by full-thickness skin grafting, though this has limitations including unpredictability of the neodermis thickness. [33] While prior recommendations suggest waiting 6–12 months after isotretinoin exposure before operative intervention, recent evidence suggests isotretinoin use may not impact wound healing or lead to scarring [34]. Table 1 displays a proposed treatment algorithm.

### Laser Therapy

Ablative treatment using carbon dioxide (CO2) or erbium:yttrium–aluminum-garnet (Er:YAG) lasers have been used in the treatment of rhinophyma by creating thermal

**Table 1** Algorithm for management of rhinophyma

| | |
|---|---|
| **Maintenance** | • Skin cleansing and moisture regimen<br>• Avoidance of triggers<br>• Application of sunscreen (SPF > 30)<br>• Consider low-dose oral isoretinoin in mild cases<br>• Consider oral doxycycline for acute infection or inflammation |
| **Surgical excision** | • Cold-steel<br>• Loop electrocautery<br>• +/− Dermabrasion or laser therapy<br>• Electrocautery or possible laser therapy for hemostasis |
| **Histopathologic analysis** | • If malignancy is identified, consider full-thickness re-excision or referral to dermatology for Mohs excision |
| **Postoperative care** | • Antibiotic ointment, white petrolatum, or moist occlusive dressing<br>• Prophylactic antibiotics<br>• Local wound care as needed<br>• Sun avoidance and sunscreen |

damage at a specified skin depth [31, 35]. Laser surgery can be performed under local anesthesia, sedation, or general anesthesia. Postoperative care typically utilizes gentle cleansing and occlusive ointment. CO2 lasers are the most frequent lasers utilized and can be adjusted to address specific goals, such as continuous cutting mode for debulking and resurfacing for scultping [32]. However, assessing depth of treatment is difficult, and the thermal zone of injury extends 0.5 mm below the visibly affected surface [32]. Madan et al. evaluated outcomes of 124 patients who underwent ablative CO2 laser treatment of rhinophyma [35]. They identified safe depth of ablation by noting expulsion of sebum from sebaceous gland ablation, determining absence of sebaceous secretions as indicative of the end point [35]. While they noted high patient satisfaction, side effects included post-treatment erythema, pain, hypopigmentation, scarring, infection, and alar notching [35]. Similarly, el-Azhary et al. reported good outcomes with an acceptable rate of immediate (within 6 weeks) and delayed complications [23]. Immediate complications consisted of milia and pustules, while delayed complications included leukoderma, hypertrophic scarring, and alar retraction that each occurred in one patient out of a cohort of thirty [23].

The Er:YAG laser has a reduced thermal injury zone due to its wavelength more closely approximating the peak absorption of water when compared to CO2 lasers but is considered less hemostatic [32]. Technological advances have allowed for the addition of a dual mode to improve coagulative properties of Er:YAG lasers and facilitate hemostasis during resurfacing. Recently, Orenstein et al. and Mathis et al. demonstrated good to excellent outcomes with the use of full surface ablation with the Er:YAG laser in patients with mild to severe rhinophyma among a cohort of six patients and eleven patients, respectively [36, 37]. No dyschromia was reported in either study, and re-epithelialization appeared complete by day 14 [36, 37]. One patient reported by Mathis et al. did undergo surgical debulking prior to laser ablation to reduce procedural time [37].

Compared to traditional ablative treatment, fractionated resurfacing techniques that heat tissue in columns, called microscopic treatment zones (MTZ), have improved the safety profile of these devices, since the uninjured areas facilitate faster re-epithelization and healing with decreased risk of side effects [31]. Serowka et al. reported successful results in five patients with rhinophyma undergoing treatment with fractional ablative CO2 laser treatments [31]. All patients tolerated the procedure well with clinical improvement and re-epithelization within 4–7 days, as well as no adverse events and limited edema and erythema [31]. All patients received herpes simplex virus (HSV) prophylaxis [31]. Similarly, the Er:YAG laser can also be used for fractional treatment of rhinophyma. Badawi et al. demonstrated good patient satisfaction after 4 treatments with fractional Er:YAG among sixteen patients with mild to moderate rhinophyma, with re-epithelialization by 2–5 days [38]. One of the most notable characteristics from this study is that all participants were Fitzpatrick III–IV skin type, and no hyper- or hypopigmentation occurred posttreatment [38]. As this modality debulks less than traditional ablative lasers, it is better suited for mild to moderate rhinophyma. However, the use of fractionated laser treatment has disadvantages, including prolonged procedural times and hemostasis [39].

## Scalpel Excision

Surgical excision of the hypertrophic tissue using "cold" steel is a fast procedure that allows pilosebaceous tissue to re-epithelialize with good cosmetic outcomes. A 15 or 10 blade can be used for tissue removal with frequent palpation to identify depth. Additional methods such as the use of razor blades or dermabrasion can facilitate fine contouring [32]. The tissue can then be sent for histopathologic analysis. Recent reports have demonstrated utilization of a five-blade scratcher, which includes a handle, cutting edge groove, fixing bolt, fixing sleeve, and blade [40]. Five blades are placed into the feeding groove, and the depth of incision depends on length of exposed blade surface. The knife blade is used to excise hypertrophied rhinophyma tissue, and the scratch knife is used to decussate the lesions until normal tissue appears. One group reported outcomes among thirty patients utilizing this procedure, with all patients utilizing petrolatum gauze atop the wound for postoperative care [40]. Ninety percent of patients reported good postoperative cosmetic results determined by patient questionnaire responses, while three required CO2 laser for residual hyperplasia or asymmetry [40].

The main disadvantage of scalpel excision is obtaining hemostasis, which may hinder visibility during surgery and prolong operating time. F.J. Stucker popularized a method of excision using a Weck blade coupled with tumescence and an argon beam coagulator for improving hemostasis [41]. In this technique, the hypertrophied dermis was infiltrated with lidocaine and epinephrine to create significant hydrostatic pressure thereby compressing the capillaries that feed the dermal tissue, as well as providing vasoconstriction [41]. After excision and sculpting, the argon beam coagulator is used at a setting of 60 W to obtain hemostasis. The technique produces operative times from 7 to 10 min, minimal blood loss, and minimal collateral damage from the use of the argon beam coagulator [41]. Electrocautery can help with hemostasis, as well as epinephrine injections [32]. The reported advantages of the technique include short operative time, good visualization, precise sculpting with tactile feedback, excellent hemostasis, a physiologic dressing, and low complication rates [42].

The "Hot-Knife" technique utilizes a heated tool, a Shaw knife, that coagulates as it cuts to improve hemostasis [32].

The concern with this technique is excessive energy transfer to deep tissues resulting in excessive scarring.

If malignancy is identified within the specimen excised, referral for Mohs microsurgery may be warranted due to ill-defined margins and anatomic distortion, or full-thickness excision should be pursued [22, 43, 44]. Kwah et al. reported a patient with two basal cell carcinomas identified within rhinophyma tissue, both excised using Mohs surgery with resultant defects contoured using electrocautery [45]. The wound was allowed to heal via secondary intention, antibiotic ointment was applied, a non-adherent dressing was changed three times weekly, and the patient had a good cosmetic outcome on follow-up [45]. Therefore, subsequent healing by secondary intention may be an effective management for postoperative wound healing after excision of malignancy in rhinophyma tissue; however, data is limited in this regard.

## Dermabrasion

Dermabrasion is a technique that uses a high-speed rotating device to remove the outer layers of the skin down to the reticular dermis [46•]. This leads to similar disadvantages as cold-steel approaches with bleeding and poor visualization and is typically used in conjunction with additional methods for fine contouring [32]. Similarly, Versajet Hydrosurgery, which directs a focused jet stream of saline parallel to tissue for debridement, has been used for management of rhinophyma. Taghizadeh et al. evaluated six patients who underwent scalpel excision followed by Versajet Hydrosurgery debridement, and all patients reported excellent results at 3-month follow-up with response choices of poor, satisfactory, good, or excellent [47]. Prophylactic antiviral therapy may be considered in these cases perioperatively [46•].

## Electrosurgery/Electrocautery

Electrosurgery uses radiofrequency energy to generate heat within tissue allowing for cutting and coagulation, which can lead to reduced procedural times and improved hemostasis [12, 32]. Electrocautery, on the other hand, refers to applying heat externally to remove excess tissue. Loop cautery is one such technique that is simple, low-cost, and minimizes bleeding [46•]. Chellappan et al. recently reported a case utilizing loop electrocautery for treatment of severe rhinophyma noting minimal blood loss, procedure length of less than 90 min, and patient satisfaction with cosmesis [12]. There is risk of damage to the underlying cartilage framework leading to cartilage necrosis, as well as higher risk of scarring due to tissue destruction by extending the excision too deep, not leaving enough overlying pilosebaceous units over the cartilage [32]. Figure 1 displays preoperative, intraoperative, and postoperative results using the loop cautery technique coupled with the Er:YAG laser.

## Coblation

Coblation is a method that directs radiofrequency through a liquid medium forming a plasma field that dissolves tissue, as opposed to utilizing thermal damage [32]. This method is quick and can be performed under local anesthesia in the office, with lower costs compared to laser therapy [48, 49]. This technique is able to dissolve tissue at lower temperatures (40–70 °C) than electrocautery, which may reduce the risk of thermal damage, and can facilitate hemostasis as well as contouring [48, 49]. Postoperative erythema, as well as edema, of the tissue may be observed following the procedure [50, 51].

## Septorhinoplasty

Some groups have advocated for use of septorhinoplasty at the same time as operative treatment of rhinophyma [52]. Hassanein et al. reported their subunit method for this procedure, where incisions are placed at subunit borders (between both sidewalls and dorsum, dorsum and tip, and alae and sidewalls), and six flaps are raised [52, 53]. The hypertrophic tissue is debulked, structural support and tip definition are performed using cartilage graft and sutures as indicated, the thinned skin is redraped, and quilting sutures are performed. If the skin is not suitable as a flap, then a full-thickness skin graft is utilized [52]. The authors report wide exposure for debulking with scars that are well camouflaged, ability to resect a defective subunit, wound contraction that facilitates subunit contour, and avoidance of secondary intention [52]. However, this is more technically demanding, many patients require revisions, and the redraped skin may still be diseased and contribute to a poor wound healing environment [52].

There is little evidence to compare initial cartilage grafting with a second staged procedure after debulking and contouring are performed. An initial combined procedure eliminates the need for repeated general anesthesia [1]. If there is extensive external valve collapse, contraindication to secondary intention, or failure of partial excisional techniques, then subunit method with cartilage grafting may be a consideration [1, 53].

For patients that continue to have nasal obstruction following excision of rhinophyma, Rohrich advocates for staged rhinoplasty citing the need to prevent devascularization of the nasal tip [3]. However, no specific recommendation is made regarding timing of staged rhinoplasty after excision of rhinophyma. It seems reasonable to suggest timing that allows for complete healing of the skin and soft tissue envelope but prior to the development of alar retraction to allow for stabilization of the alar rim, although timing regarding the development of alar retraction varies.

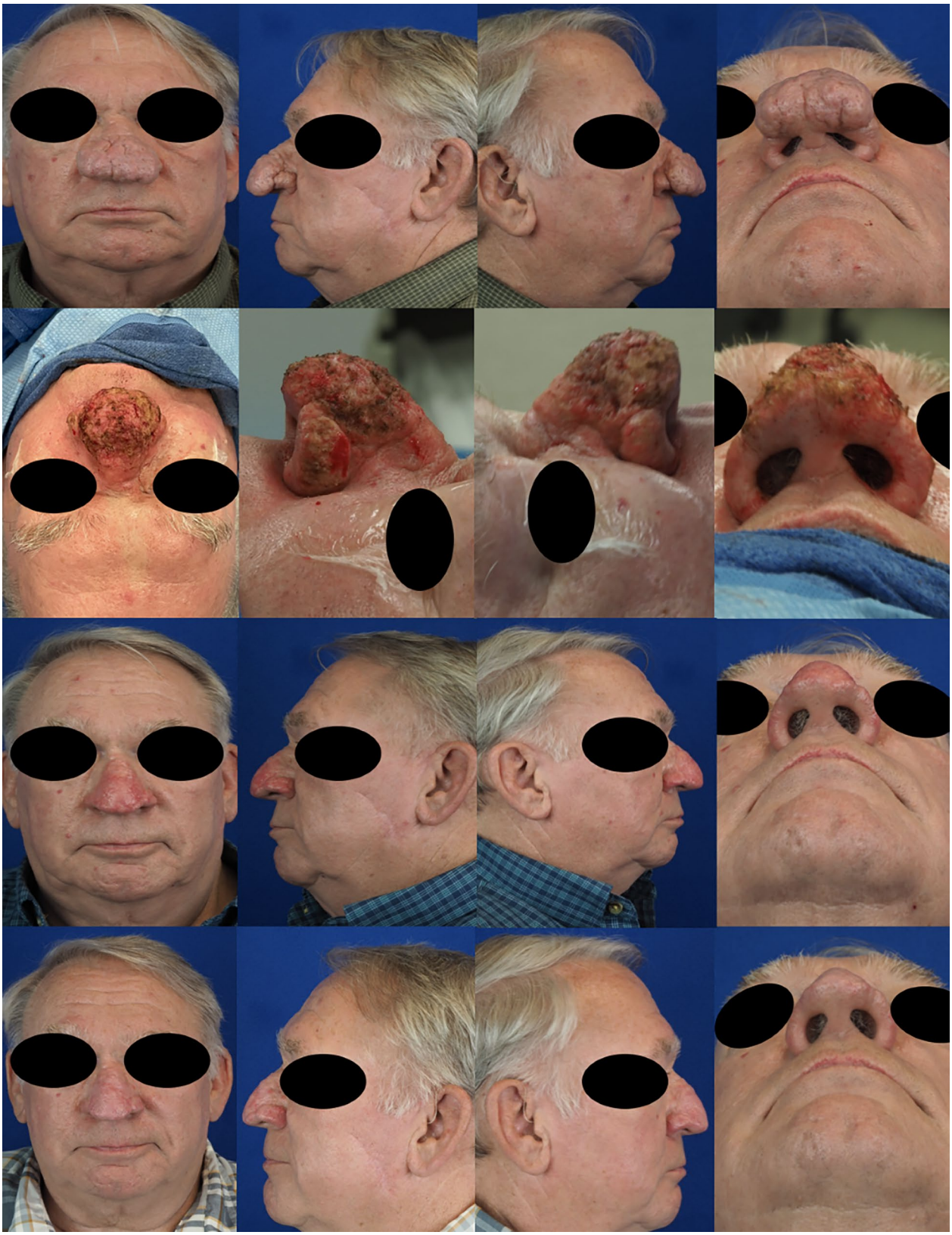

**Fig. 1** **A. First row**: Preoperative photos of a patient with severe rhinophyma. **Second row**: Intra-operative photos following loop electrocautery excision and Er:YAG laser ablation of rhinophyma. **Third row**: Postoperative photos 3.5 weeks after rhinophyma excision. **Fourth row:** Postoperative photos 3 months after rhinophyma excision. **B. First row**: Preoperative photos of a patient with moderate rhinophyma. **Second row**: Intra-operative photos following loop electrocautery excision and Er:YAG laser ablation of rhinophyma. **Third row**: Postoperative photos after rhinophyma excision

**Fig. 1** (continued)

## Combined Surgery

While there are multiple procedures to consider when addressing rhinophyma, a combination of approaches may provide optimal outcomes. Daoud et al. reported outcomes utilizing their new classification system as described earlier in thirty-three patients undergoing surgical treatment for rhinophyma, of which twenty-nine underwent treatment with scalpel excision, dermabrasion, and CO2 laser [24•]. They suggest that any disease that is grade A can be treated with CO2 laser alone, while stages 1–2 with grade B classification can be treated with CO2 laser and dermabrasion, and all stages with grade C classification require CO2 laser, dermabrasion, and excision [24•]. Shaving with the scalpel was used to debulk the tissue, dermabrasion was used to smoothen rough edges left behind by the scalpel and also remove more tissue, and CO2 laser was used for hemostasis, contouring, and shrinking the skin [24•].

## Postoperative Care

Maintaining a clean, moist wound after operative intervention for at least 2–4 weeks is vital to promote maximal re-epithelialization. Occlusive ointments and/or dressings

should be utilized. Viral prophylaxis and antibiotics are typically prescribed for 5 to 10 days [54, 55]. Patients should be counseled to avoid sun exposure and start sunscreen after full reepithelization has occurred to minimize posttreatment erythema and avoid dyspigmentation of the treated regions [46•].

Future areas of exploration include application of growth factors, such as platelet-rich plasma (PRP) or stem cells, that may enhance wound healing and accelerate epithelialization [46•].

### Recurrence

One study out of Germany evaluating rhinophyma outcomes after excision demonstrated a recurrence rate of 47.8% in twenty-three patients with a mean follow-up of 37 months ± 13 months [4]. A study of histopathologic analysis of specimens found that clinical severity was the only variable associated with recurrence [8]. A second study from Germany noted a recurrence rate of 38% after excision of rhinophyma with a mean follow-up of 54 months [56]. Further data comparing long-term results of different techniques, revision rates, and recurrence rates are needed to help guide treatment decisions.

## Conclusion

Rhinophyma is a challenging and psychologically distressing disease process with an etiology and pathogenesis that remain unclear. Innovative advancements have led to numerous techniques to address rhinophyma. Surgical excision remains the principal treatment modality, and the use of electrocautery allows for hemostatic control. An additional consideration when choosing a technique is histopathologic analysis due to the potential for incidental malignancies found in rhinophyma tissue.

**Author Contribution** VP and CZJ were responsible for article conceptualization, reviewing the literature, drafting the article, and assisting with critical revision. NK was responsible for the clinical photography and performing critical revisions of the article.

### Compliance with Ethical Standards

**Conflict of Interest** The authors declare no competing interests.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

## References

Papers of particular interest, published recently, have been highlighted as:
• Of importance


1. Benyo S, Saadi RA, Walen S, Lighthall JG. A systematic review of surgical techniques for management of severe rhinophyma. 2021;14(4):299–307.
2. Fink C, Lackey J, Grande DJ. Rhinophyma: a treatment review. Dermatologic Surg. 2018;44(2):275–82.
3. Rohrich RJ, Griffin JR, Adams WP. Rhinophyma: review and update. Plast Reconstr Surg. 2002;110(3):860–9.
4. Wetzig T, Averbeck M, Simon JC, Kendler M. New rhinophyma severity index and mid-term results following shave excision of rhinophyma. Dermatology. 2013;227(1):31–6.
5. Mikkelsen CS, Holmgren HR, Kjellman P, et al. Rosacea: a clinical review. Dermatology Reports. 2016;8(1):6387.
6. Chauhan R, Loewenstein SN, Hassanein AH. Rhinophyma: prevalence, severity, impact and management. Clin Cosmet Investig Dermatol. 2020;13:537–51.
7. González LF, Herrera H, Motta A. Electrosurgery for the treatment of moderate or severe rhinophyma. Actas Dermosifiliogr. 2018;109(4):e23–6.
8. Schüürmann M, Wetzig T, Wickenhauser C, Ziepert M, Kreuz M, Ziemer M. Histopathology of rhinophyma—a clinical-histopathologic correlation. J Cutan Pathol. 2015;42(8):527–35.
9. Goh M, Gönen ZB, Sayan A, Ilankovan V. Evolution of surgical modalities in the management of rhinophyma: our experience. Br J Oral Maxillofac Surg. 2021;59(2):222–7.
10. Liu A, Al-Lami A, Kapoor K. Rhinophyma: when Red Nose Day is no laughing matter. Br J Gen Pract. 2019;69(680):137.
11. Payne WG, Wang X, Walusimbi M, Ko F, Wright TE, Robson MC. Further evidence for the role of fibrosis in the pathobiology of rhinophyma. Ann Plast Surg. 2002;48(6):641–5.
12. Chellappan B, Castro J. Management of severe rhinophyma with electrocautery dermabrasion—a case report. Int J Surg Case Rep. 2020;72:511–4.
13. Payne WG, Ko F, Anspaugh S, Wheeler CK, Wright TE, Robson MC. Down-regulating causes of fibrosis with tamoxifen: a possible cellular/molecular approach to treat rhinophyma. Ann Plast Surg. 2006;56(3):301–5.
14. Aloi F, Tomasini C, Soro E, Pippione M. The clinicopathologic spectrum of rhinophyma. J Am Acad Dermatol. 2000;42(3):468–72.
15. Lazzeri D, Larcher L, Huemer GM, et al. Surgical correction of rhinophyma: comparison of two methods in a 15-year-long experience. J Cranio-Maxillofacial Surg. 2013;41(5):429–36.
16. Clarós P, Sarr MC, Nyada FB, Clarós A. Rhinophyma: our experience based on a series of 12 cases. Eur Ann Otorhinolaryngol Head Neck Dis. 2018;135(1):17–20.
17. Cohen AF, Timestra JD. Diagnosis and treatment of rosacea. J Am Board Fam Pract. 2002;156(3):214–217.
18. Little SC, Stucker FJ, Compton A, Park SS. Nuances in the management of rhinophyma. Facial Plast Surg. 2012;28(2):231–7.
19. Leyngold M, Leyngold I, Letourneau PR, Zamboni WA, Shah H. Basal cell carcinoma and rhinophyma. Ann Plast Surg. 2008;61(4):410–2.
20. Lazzeri D, Agostini T, Pantaloni M, Spinelli G. Rhinophyma and non-melanoma skin cancer: an update. Ann Chir Plast Esthétique. 2012;57(2):183–4.

21.• Powell E, Ly L, McBurney E. Incidental skin cancers in debulked rhinophymatous tissue. Dermatol Surg. 2021;47(6):812–813. **Findings from this study add to our understanding of incidental skin cancers identified in rhinophyma tissue, and supports histopathologic examination of debulked rhinophymatous tissue.**
22. Lazzeri D, Colizzi L, Licata G, et al. Malignancies within rhinophyma: report of three new cases and review of the literature. Aesthetic Plast Surg. 2012;36(2):396–405.
23. el-Azhary RA, Roenigk RK, Wang TD. Spectrum of results after treatment of rhinophyma with the carbon dioxide laser. Mayo Clin Proc. 1991;66(9):899–905.
24.• Daoud M, Ullas G, Kumar R, Raghavan U. Rhinophyma: combined surgical treatment and quality of life. Facial Plast Surg. 2021;37(1):122–131. **Findings from this study suggest that use of a classification system may facilitate type of surgical treatment for rhinophyma.**
25. Jansen T, Plewing G. Clinical and histological variants of rhinophyma, including nonsurgical treatment modalities. Facial Plast Surg. 1998;14(4):241–53.
26. Del Rosso JQ, Tanghetti E, Webster G, Gold LS, Thiboutot D, Gallo RL. Update on the management of rosacea from the American Acne & Rosacea Society (AARS). J Clin Aesthet Dermatol. 2020;13(6 Suppl):S17.
27. Levin J, Miller R. A guide to the ingredients and potential benefits of over-the-counter cleansers and moisturizers for rosacea patients. J Clin Aesthet Dermatol. 2011;4(8):31.
28. Schaller M, Almeida LMC, Bewley A, et al. Rosacea treatment update: recommendations from the global ROSacea COnsensus (ROSCO) panel. Br J Dermatol. 2017;176(2):465–71.
29. Tüzün Y, Wolf R, Kutlubay Z, Karakuş Ö, Engin B. Rosacea and rhinophyma. Clin Dermatol. 2014;32(1):35–46.
30. Wee JS, Tan KB. Phymatous rosacea presenting with leonine facies and clinical response to isotretinoin. Australas J Dermatol. 2017;58(1):72–3.
31. Serowka KL, Saedi N, Dover JS, Zachary CB. Fractionated ablative carbon dioxide laser for the treatment of rhinophyma. Lasers Surg Med. 2014;46(1):8–12.
32. Krausz AE, Goldberg DJ, Ciocon DH, Tinklepaugh AJ. Procedural management of rhinophyma: a comprehensive review. J Cosmet Dermatol. 2018;17(6):960–7.
33. Torresetti M, Scalise A, Di Benedetto G. Acellular dermal matrix for rhinophyma: is it worth it? A new case report and review of literature. Int J Surg Case Rep. 2019;59:120.
34. Tolkachjov SN, Sahoo AB, Patel NG, Lohse MSCM, Murray JA, Tollefson MM. Surgical outcomes of patients on isotretinoin in the perioperative period: a single-center, retrospective analysis. J Am Dermatol. 2017;77:159–61.
35. Madan V, Ferguson JE, August PJ. Carbon dioxide laser treatment of rhinophyma: a review of 124 patients. Br J Dermatol. 2009;161(4):814–8.
36. Orenstein A, Haik J, Tamir J, et al. Treatment of rhinophyma with Er:YAG Laser. Lasers Surg Med. 2001;29(3):230–5.
37. Mathis J, Ibrahim SF. Erbium-doped yttrium aluminium garnet (Er:YAG) laser resurfacing restores normal function and cosmesis in patients with severe rhinophyma. J Clin Aesthet Dermatol. 2019;12(7):28.
38. Badawi A, Osman M, Kassab A. Novel management of rhinophyma by patterned ablative 2940nm erbium:YAG laser. Clin Cosmet Investig Dermatol. 2020;13:949.
39. Sadick H, Goepel B, Bersch C, Goessler U, Hoermann K, Riedel F. Rhinophyma: diagnosis and treatment options for a disfiguring tumor of the nose. Ann Plast Surg. 2008;61(1):114–20.
40. Li W, He X, Chen W, Ding P, He X, Zhang H. A novel surgical approach for rhinophyma: experience from a cohort of thirty patients. J Craniofac Surg. 2022;33(1):233–5.
41. Stucker FJ, Hoasjoe DK, Aarstad RF. Rhinophyma: a new approach to hemostasis. Ann Otol Rhinol Laryngol. 1993;102(12):925–9.
42. Lian TS, Thompson RW. Management of rhinophyma. Int J Head Neck Surg. 2016;7(3):188–91.
43. Tamir G, Murakami C, Berg D. Mohs' surgery as an approach to treatment of multiple skin cancer in rhinophyma. J Cutan Med Surg. 1999;3(3):169–71.
44. McKenna DJ, McKenna K. Basal cell carcinoma lurking within gross rhinophyma. Clin Exp Dermatol. 2006;31(1):173–4.
45. Kwah R, Lawrence C. Wound management in a patient with rhinophyma and basal cell carcinoma. J Am Acad Dermatol. 2011;65(1):e11–2.
46.• Hom DB, Harmon J. Dermabrasion for scars and wire loop electrocautery for rhinophyma. Facial Plast Surg. 2019;35(3):267–273. **This article highlights operative technique for use of loop electrocautery for rhinophyma.**
47. Taghizadeh R, Mackay SP, Gilbert PM. Treatment of rhinophyma with the Versajet™ Hydrosurgery System. J Plast Reconstr Aesthetic Surg. 2008;61(3):330–3.
48. Timms M, Roper A, Patrick C. Coblation of rhinophyma. J Laryngol Otol. 2011;125(7):724–8.
49. Hetherington HE. Coblation-assisted decortication for the treatment of rhinophyma. Laryngoscope. 2009;119(6):1082–4.
50. Rosenbach A. Coblation: a new technique for skin resurfacing. Aesthetic Surg J. 2000;20(1):81–3.
51. Sahin C, Turker M, Celasun B. Giant rhinophyma: excision with coblation assisted surgery. Indian J Plast Surg. 2014;47(3):450.
52. Hassanein AH, Vyas RM, Erdmann-Sager J, Caterson EJ, Pribaz JJ. Management of rhinophyma: outcomes study of the subunit method. J Craniofac Surg. 2017;28(3):e247–50.
53. Hassanein AH, Caterson EJ, Erdmann-Sager J, Pribaz JJ. The subunit method: a novel excisional approach for rhinophyma. J Am Acad Dermatol. 2016;74(6):1276–8.
54. Gilbert S, McBurney E. Use of valacyclovir for herpes simplex virus-1 (HSV-1) prophylaxis after facial resurfacing: a randomized clinical trial of dosing regimens. Dermatol Surg. 2000;26(1):50–4.
55. Gaspar Z, Vincuillo C, Elliott T. Antibiotic prophylaxis for full-face laser resurfacing: is it necessary? Arch Dermatol. 2001;137(3):313–5.
56. Schweinzer K, Kofler L, Spott C, et al. Surgical treatment of rhinophyma: experience from a German cohort of 70 patients. Eur J Dermatol. 2017;27(3):281–5.