

Laser Management of Vascular Anomalies



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KEYWORDS

- Laser • Vascular anomaly • Infantile hemangioma • Port-wine capillary malformation
- Venous malformation

KEY POINTS

- Laser therapy is central to the management of vascular anomalies, with lesion-specific selection of wavelength, pulse duration, and fluence enabling safe, targeted treatment.
- Pulsed dye lasers are effective for superficial lesions such as involuting infantile hemangiomas and port-wine capillary malformations, while Nd:YAG treats deeper or thicker anomalies; photodynamic therapy provides an effective option for refractory PWCM.
- Laser therapy can effectively improve post-involution sequelae of infantile hemangioma, including residual erythema, telangiectasia, and select skin textural changes.
- Clinical outcomes vary according to laser modality, lesion depth, and anatomic location.
- Multidisciplinary care, careful parameter selection, and post-treatment photoprotection minimize complications and optimize functional and cosmetic outcomes.

INTRODUCTION

Vascular anomalies comprise a heterogeneous group of congenital vascular disorders that collectively impose a significant functional, aesthetic, and psychosocial burden. Lesions may result in pain, bleeding, ulceration, or compromise of adjacent structures, while visible deformities often lead to long-term cosmetic concerns and psychological distress. These challenges highlight the importance of treatment strategies that are effective, durable, and minimally invasive.

Laser therapy has undergone substantial advancement and now plays a central role in the management of vascular anomalies.^{1,2} Early laser systems were constrained by limited selectivity, inadequate depth of penetration, and a narrow therapeutic window. The application of selective photothermolysis, coupled with progressive

refinements in wavelength selection, pulse duration, fluence modulation, and epidermal cooling, has significantly improved treatment precision and safety. Modern laser platforms enable targeted treatment of abnormal vasculature across a range of depths, expanding clinical indications from superficial capillary malformations (CMs) to selected venous and mixed vascular lesions.

Contemporary management of vascular anomalies is inherently multidisciplinary and technology-driven. Optimal outcomes often require coordinated care among plastic surgeons, dermatologists, pediatric specialists, interventional radiologists, and anesthesiologists. Within this framework, laser therapy is frequently integrated with medical, surgical, and endovascular interventions to achieve lesion-specific and patient-centered outcomes. As laser technologies continue to evolve, their role has shifted from adjunctive or cosmetic use to an

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Abbreviations	
PDLs	pulsed dye lasers
TRT	thermal relaxation time
IPL	intense pulsed light
IH	infantile hemangioma
PWCM	Port-wine Capillary Malformation
PDT	photodynamic therapy
VMs	venous malformations
AVMs	arteriovenous malformations
VVMs	verrucous venous malformations

essential component of comprehensive vascular anomaly management.

PRINCIPLES OF LASER

Laser-tissue interaction in the treatment of vascular anomalies is governed by the principle of selective photothermolysis, whereby laser energy at a specific wavelength is preferentially absorbed by target chromophores—primarily oxyhemoglobin and deoxyhemoglobin—resulting in controlled thermal injury to abnormal vessels while sparing surrounding tissues. Wavelength selection is critical, as it determines both the degree of hemoglobin absorption and the depth of tissue penetration. Oxyhemoglobin exhibits major absorption peaks at approximately 418, 542, and 577 nm; accordingly, pulsed dye lasers (PDLs) operating at 585 nm and 595 nm closely align with these peaks while providing improved tissue penetration, making them highly effective for superficial vascular lesions. Optimal treatment outcomes depend on the appropriate selection of pulse duration, fluence, and spot size, which should be tailored to the diameter and thermal relaxation time (TRT) of the target vessels to maximize efficacy while minimizing adverse effects such as purpura, dyspigmentation, or scarring. Small vessels (approximately <100 μm in diameter) have short TRTs and dissipate heat rapidly; therefore, laser pulse durations should be shorter than the vessel TRT, typically within the millisecond range, to confine thermal injury to the vascular lumen. In contrast, medium and larger vessels have longer TRTs due to increased diameter and blood volume and consequently require longer pulse durations to achieve effective and uniform photocoagulation.

For deeper or larger-caliber vascular anomalies, longer wavelengths with greater tissue penetration are required. The 755 nm Alexandrite laser and the 1064 nm Nd:YAG laser exhibit lower hemoglobin absorption but penetrate more deeply into the dermis and subcutaneous tissues, enabling treatment of thicker, deeper, or nodular lesions. In

particular, the 1064 nm Nd:YAG laser is well suited for deep venous malformations (VMs) and hypertrophic components because it can deliver sufficient thermal energy to vessels located several millimeters beneath the skin surface. Intense pulsed light (IPL), although noncoherent and broadband, can be spectrally filtered to target vascular chromophores across a range of vessel sizes and depths, making it a versatile option for selected superficial vascular anomalies. A thorough understanding of the interplay among wavelength, chromophore absorption, pulse characteristics, and tissue optics is essential for individualized, safe, and effective laser management of vascular anomalies.

LASER MANAGEMENT BY LESION TYPE
Infantile hemangioma

Laser therapy has an established yet carefully defined role in the management of infantile heman-gioma (IH). With the widespread adoption of systemic beta-blocker therapy, particularly oral propranolol, laser treatment is no longer considered first-line for most proliferative lesions. Instead, its use is best tailored to specific clinical scenarios in which laser technology can provide meaningful functional or cosmetic benefit while minimizing risk.

The primary indications for laser therapy in IH include superficial lesions in the involuting or involuted phase, as well as ulcerated hemangiomas. During involution, vascular density decreases, and lesions become flatter and lighter in color, making them more amenable to selective photo-thermolysis. PDL, targeting oxyhemoglobin at wavelengths typically around 585 to 595 nm, is particularly effective in treating residual superficial erythema and telangiectasia. In contrast, hemangi-omas in the proliferative phase are generally not ideal candidates for laser monotherapy, as deeper and more actively growing vascular components limit laser penetration and efficacy while increasing the risk of adverse effects such as ulceration or scarring. Although some studies have reported that laser therapy is effective across all phases of IH, including the proliferative phase, and that combined PDL and Nd:YAG treatment may be beneficial, outcome assessment requires careful interpretation.³ Evaluation of IH involution should not be limited to volumetric reduction alone but must also incorporate the presence of scarring, ul-ceration, residual sequelae, and overall aesthetic outcome. When these broader criteria are applied, laser therapy seems best suited for involuting IH, which most commonly presents with residual ery-thema and telangiectasia (Figs. 1 and 2).



Fig. 1. Vascular dilation and residual erythema after IH involution (left) and after treatment with PDL and Nd:YAG lasers (right).

Ulcerated IHs represent another important indication for laser intervention.^{4,5} PDL applied only to the ulcerated part (energy density, 6.0–8.5 J/cm²; pulse duration, 0.45–1.5 ms; spot size, 7 mm) has been shown to accelerate re-epithelialization, reduce pain, and promote healing in ulcerated lesions, particularly when superficial. For most cases, laser therapy can be used either alone (2–4-weekly treatments, depending on the severity and depth of the ulceration) or in conjunction with wound care and medical therapy, depending on lesion depth, location, and severity.

Laser treatment may also serve as an adjunct to other therapeutic modalities, including topical beta-blockers or systemic oral therapy.⁶ Combined approaches are conceptually appealing, as lasers may improve superficial components while pharmacologic agents address deeper vascular proliferation. However, beta-blocker monotherapy has been clinically validated and supported by high-level evidence as an effective treatment,^{7,8} whereas high-quality evidence demonstrating the superior efficacy of combined therapy over monotherapy remains limited. Well-designed prospective studies are therefore needed to better define

the role, timing, and optimal sequencing of laser therapy within multimodal treatment strategies.

For thicker or deeper residual lesions, PDL alone may be insufficient due to its limited depth of penetration. In such cases, long-pulsed Nd:YAG laser (LP-Nd:YAG), with greater tissue penetration, can be considered to target deeper vascular components.⁹ Finally, laser therapy also plays a role in addressing post-involution skin changes. Residual anetoderma, wrinkled skin, or mild textural irregularities can be distressing to patients and families. In such cases, multiple sessions of fractional carbon dioxide (CO₂) laser therapy or ablative lasers may stimulate dermal remodeling and improve skin texture and cosmetic appearance (**Fig. 3**). While these interventions are typically delayed until after involution is complete, they represent an important component of comprehensive, long-term IH management.

Nonetheless, laser therapy has clear limitations. Very deep or very thick residual hemangiomas respond poorly to laser treatment and are often best managed conservatively. Many of these lesions continue to improve with time, eventually involuting into fibrofatty tissue. If significant bulk or contour deformity persists after involution, surgical resection or liposuction may provide superior aesthetic outcomes compared with repeated laser sessions.

Port-wine capillary malformation

Treatment strategies for port-wine capillary malformation (PWCM) have evolved substantially over the past several decades. The introduction of selective photothermolysis established laser therapy as the cornerstone of PWCM management and led to its widespread acceptance as the gold standard. Concurrently, advances in photodynamic therapy (PDT) have provided an alternative and complementary therapeutic option, particularly for lesions that are resistant to



Fig. 2. Residual telangiectasia after IH involution (left) and following 4 sessions of PDL treatment (right).



Fig. 3. Changes in skin texture and scarring following cheek IH involution. One month after a single session of fractional CO₂ laser therapy, the patient showed marked improvement in skin texture.

laser treatment. Together, these modalities have expanded treatment possibilities and improved outcomes for patients with diverse PWCM phenotypes.

PDL remains the first-line treatment of PWCM because of its optimal vascular selectivity and favorable safety profile. Operating at wavelengths between 585 and 595 nm, PDL targets oxyhemoglobin within ectatic capillaries, enabling selective photothermal injury to abnormal vessels located primarily in the superficial dermis. These characteristics make PDL especially suitable for lighter-colored PWCM and for treatment in pediatric patients with thin skin. The addition of dynamic epidermal cooling systems has further enhanced the therapeutic window by reducing epidermal injury and allowing the use of higher fluences with improved patient tolerance.

Early PDL systems primarily used a wavelength of 585 nm; however, 595 nm has become the contemporary standard. This wavelength maintains a high absorption coefficient for oxyhemoglobin while offering slightly increased penetration depth and greater absorption by dermal water, thereby reducing epidermal thermal injury. Comparative studies have demonstrated no significant difference in overall clearance rates between 585 nm and 595 nm PDL, but the latter provides superior control of treatment-related complications, particularly hypopigmentation (**Fig. 4**). As a result, 595 nm PDL has been widely adopted in clinical practice.

Dynamic epidermal cooling represents a critical adjunct to PDL therapy. Techniques such as cryogen spray cooling or contact cooling protect the epidermis and melanocytes, reduce treatment-associated pain, and permit the use of higher energy densities. These benefits are particularly important in patients with darker skin phototypes, in whom the risk of postinflammatory

hyperpigmentation or hypopigmentation is increased. By improving safety and comfort, epidermal cooling has broadened the applicability of PDL across a wider patient population.

Optimization of spot size has also contributed to improved outcomes. Larger spot sizes, typically 10 mm or greater, allow deeper penetration and more uniform energy distribution, making them advantageous for treating extensive or diffuse lesions. Smaller spot sizes provide greater precision and are useful for targeting residual or irregular vascular patterns following initial treatment.¹⁰ The ability to adjust spot size allows clinicians to tailor therapy to lesion morphology and vascular heterogeneity.

Treatment interval has been another area of investigation. Clinical comparisons between conventional 6-week intervals and shortened 3-week intervals have shown no significant increase in adverse events with more frequent treatments. Shortened intervals may reduce overall treatment duration and improve patient adherence, particularly in infants and young children.¹¹ Early intervention in pediatric patients often results in higher clearance rates with fewer sessions and may prevent later disease progression, including soft tissue hypertrophy and nodularity.¹²

Multi-pulse or double-pass PDL techniques have been explored as a means of enhancing vascular damage. However, clinical and histologic studies indicate that double-pass treatment does not significantly improve clearance compared with single-pass treatment. The mean depth of photothermal vascular injury remains limited to approximately 0.36 to 0.41 mm with both approaches, suggesting that repeated superficial heating alone is insufficient.¹³ Improved outcomes are more likely to be achieved by increasing penetration depth or enhancing vascular destruction rather than by pulse stacking.

An alternative approach involves frequent, low-fluence treatment using a large spot size.¹⁴ Weekly PDL treatments using a 12 mm spot diameter, pulse duration of 1.5 ms, fluence of 5.5 to 6.5 J/cm², and multiple passes per session have demonstrated promising results. This strategy induces cumulative endothelial injury, triggering progressive apoptosis of endothelial cells and gradual obliteration of malformed capillaries. Over time, repeated treatments lead to sustained lesion lightening and eventual clearance (**Fig. 5**).

Anatomic site is a well-recognized predictor of treatment response. Lateral facial PWCM typically responds better than lesions located in the central face. Histologic studies have shown that vessels in lateral facial regions are primarily confined to the papillary dermis, whereas central facial PWCM



Fig. 4. Comparison of the therapeutic effects of 2 generations of PDL for PWCM on the anterior neck area. Left image before treatment, right image 6 weeks after 1 session of 585 nm PDL and 595 nm PDL treatment.



Fig. 5. A patient with a right mandibular PWCM treated with 10 weekly sessions of PDL (Vbeam; 595 nm, 5.5–6.0 J/cm², 1.5 ms pulse duration, 12 mm spot size). Marked improvement is observed, with near-complete resolution of erythema.

often exhibit deeper and more diffuse vascular involvement extending into the reticular dermis and subcutaneous tissue.¹⁵ Lesions on the neck frequently demonstrate higher clearance rates than facial lesions, reflecting thinner epidermis and more superficial vasculature (**Fig. 6**).¹⁶ Similarly, PWCM located proximally on the limbs tend to respond better than distal lesions, likely due to differences in epidermal thickness and vascular depth.¹⁷

Despite its effectiveness, approximately 15% to 20% of patients show incomplete responses to PDL, particularly those with deep, hypertrophic, or nodular PWCMs. In these cases, alternative wavelengths are valuable. The long-pulsed 1064 nm Nd:YAG laser offers the greatest tissue penetration among vascular lasers and is suitable for targeting larger, deeper vessels in the dermis or subcutaneous tissue (**Fig. 7**). It can safely induce thermocoagulation of deep vasculature and is often combined with PDL in dual-wavelength protocols. In this approach, initial PDL exposure preheats vessels and promotes methemoglobin formation, increasing absorption at 1064 nm and enabling deeper, more effective energy deposition with careful parameter control.

The 755 nm alexandrite laser is a useful option for PDL-resistant PWCM. Although weakly absorbed by oxyhemoglobin, it is more effectively absorbed by deoxygenated hemoglobin and melanin, making it suitable for purple or hypertrophic lesions with larger, deeper vessels. Its long-pulse capability enables effective vascular targeting and it is commonly used as a second-line treatment. Other devices have more specialized roles: the 532 nm KTP/doubled Nd:YAG laser is limited to superficial red components due to shallow penetration, the 577 nm yellow laser offers high vascular selectivity with minimal epidermal injury, and IPL allows flexible treatment of vessels with varying depths and diameters (**Fig. 8**).

PDT represents a distinct treatment modality that has been extensively investigated and has demonstrated efficacy for selected PWCM

subtypes. In contrast to laser therapy, which relies on thermal injury, PDT induces vascular damage through photochemical mechanisms. Following systemic or local administration, photosensitizers preferentially accumulate in abnormal vascular endothelium. Light activation at specific wavelengths in the presence of oxygen generates reactive oxygen species, resulting in endothelial injury, thrombosis, and progressive vessel occlusion. Unlike the instantaneous effects of laser irradiation, PDT produces a sustained biochemical cascade that leads to gradual vascular destruction. Early clinical studies in the 1990s reported favorable outcomes, including high rates of lesion lightning after a single treatment,¹⁸ and subsequent investigations suggested that PDT is at least comparable to PDL, with particular benefit in laser-refractory lesions.

The therapeutic efficacy of PDT depends on 3 key components: photosensitizer, light source, and tissue oxygenation. Photosensitizers such as hematoporphyrin derivatives and hemoporphin (hematoporphyrin monomethyl ether, HMME) selectively accumulate in hyperactive endothelial cells. Comparative studies indicate that HMME is associated with a shorter photosensitivity period and a favorable safety profile and is therefore widely used in contemporary clinical practice¹⁹ (**Fig. 9**). Effective activation requires light sources matched to the absorption spectrum of the photosensitizer, most commonly at wavelengths around 532 nm or 578 nm, which provide sufficient vascular penetration while limiting collateral tissue injury. For deeper vascular lesions, longer wavelengths such as 630 nm may be used. Adequate tissue oxygenation is essential, as oxygen availability directly influences reactive oxygen species generation and overall treatment efficacy.

PDT has shown particular value in PWCM resistant to multiple PDL sessions. Clinical studies have shown that among patients with PDL-refractory lesions, nearly half achieved excellent or good improvement, defined as greater than 50% lightning (**Fig. 10**).²⁰ Adverse events were generally

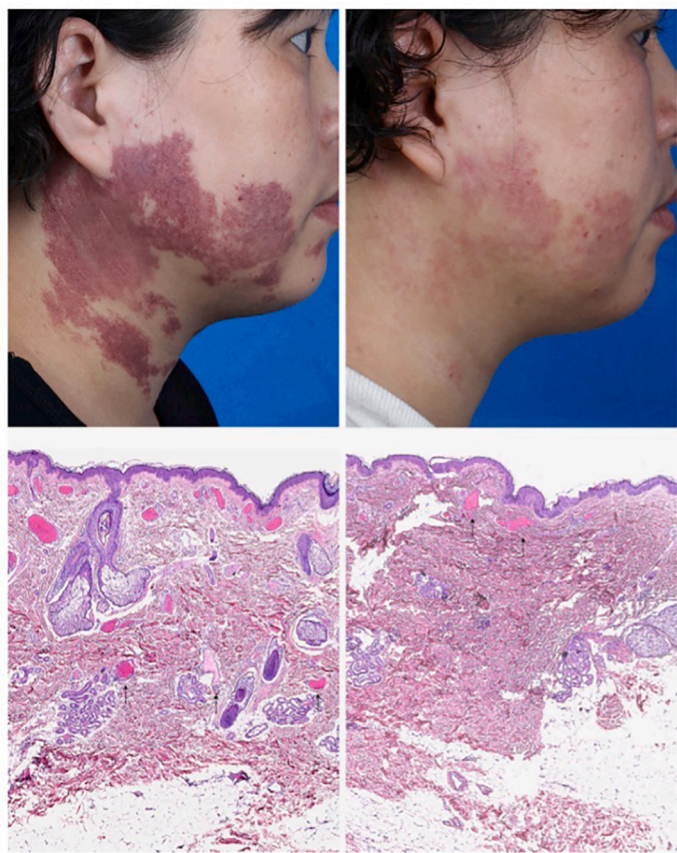


Fig. 6. A patient with facial and neck port-wine capillary malformations treated with 3 sessions of PDL was evaluated 2 months after the final treatment. Clinical images demonstrate greater clearance of the neck lesions compared with the facial lesions (upper left and right). Histologic examination shows that ectatic vessels in facial PWCM extend from the papillary into the reticular dermis (lower left), whereas ectatic capillaries in neck PWCM are predominantly confined to the papillary dermis (lower right). The epidermis is also thinner in neck PWCM than in facial PWCM (hematoxylin–eosin stain; original magnification $\times 40$).

mild, transient, and self-limiting, underscoring the safety and tolerability of this modality (**Fig. 11**).

Venous malformations

VMs typically present as bluish-purple masses or nodules involving the skin or mucosa and are

pathologically characterized by dilated venous channels filled with stagnant blood.²¹ Numerous laser modalities have been reported for the management of superficial VMs, including the Nd:YAG laser, 577-nm laser, dual-wavelength 595- and 1064-nm laser systems, holmium laser, diode



Fig. 7. (A, B) Therapeutic effect of long-pulsed 1064 nm Nd:YAG laser on hypertrophic port-wine capillary malformation. A 45-year-old man presented with a thickened lesion on the right face (A). After 6 sessions of long-pulsed 1064 nm Nd:YAG laser treatment (fluence 90–100 J/cm², double-pulse settings 3/40/5 ms), the lesion showed greater than 95% clearance (B).

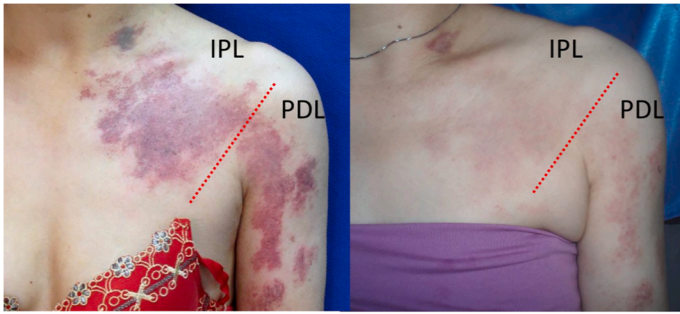


Fig. 8. Self-controlled comparison of intense pulsed light (IPL) and pulsed dye laser (PDL) treatment of PWCM. A 43-year-old woman with a PWCM on the left shoulder was treated with PDL (595 nm, 11 J/cm², 2 ms, 7 mm spot size) and IPL (560 nm, 22 J/cm², 3/30/3 ms). Left: Pretreatment images show comparable lesion color in both treatment areas. Right: After 3 treatment sessions at 6-week intervals, greater color clearance was observed in the IPL-treated area compared with the PDL-treated area.

laser, and CO₂ laser.^{22–24} These laser systems may operate in pulsed, quasi-continuous, continuous, or intralesional configurations. Among them, the LP-Nd:YAG laser is widely recognized as one of the most effective laser modalities for the treatment of superficial vascular malformations.^{2,25}

The LP-Nd:YAG laser provides a penetration depth of approximately 4 to 6 mm, allowing effective treatment of moderately deep vascular structures. Hemoglobin serves as the primary target chromophore, with deoxyhemoglobin representing the predominant absorbing species. Upon

laser-induced heating, deoxyhemoglobin can be converted to methemoglobin, which has a markedly higher absorption coefficient for laser energy, thereby enhancing treatment efficacy. To protect the epidermis during LP-Nd:YAG laser treatment, 3 principle cooling methods are commonly used: contact cooling, cryogen spray cooling, and forced-air cooling.

At our center, the primary laser systems used are the Lumenis One and M22 multi-spot LP-Nd:YAG laser handpieces (both Coherent, Inc., Santa Clara, CA, USA). These handpieces share



Fig. 9. (A–D) A 3-year-old patient with an untreated PWCM on the left face (a, frontal view; b, lateral view). After 4 sessions of HMME-mediated photodynamic therapy, the lesion showed near-complete resolution (c, frontal view; d, lateral view).

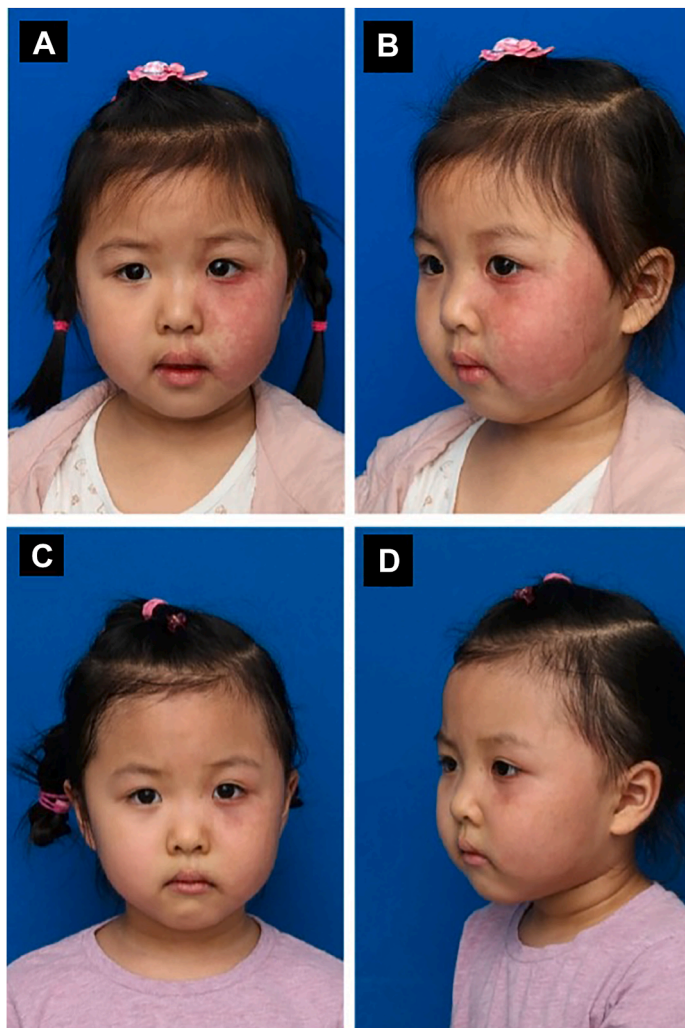


Fig. 10. (A-D) PDL-resistant PWCM after photodynamic therapy (PDT). A 5-year-old girl who had previously undergone 18 sessions of 595-nm PDL without further improvement (a, frontal view; b, lateral view)) and after 3 sessions of PDT (c, frontal view; d, lateral view).

identical technical specifications and operating parameters. The distal end of each handpiece is equipped with a crystal tip that provides contact cooling. Treatment parameters included a circular spot size of 6 mm, fluence ranging from 110 to 120 J/cm²², pulse duration of 10 to 12 ms, double-pulse mode, and an inter-pulse interval of 60 to 80 ms. Before laser delivery, the lesion was fully covered with ultrasound gel, and the crystal tip was gently placed in direct contact with the lesion surface.

Laser treatment of VMs can be associated with significant pain. For lesions located at anatomically sensitive sites, such as the upper lip or glans penis, regional nerve block anesthesia is commonly administered. However, anesthesia can be difficult to perform in other anatomic regions. Local infiltration anesthesia or topical anesthetics may induce tissue swelling, potentially impairing venous blood

flow within the target lesion and thereby reducing treatment efficacy.

After 1 to 3 treatment sessions, performed at intervals of 1 to 2 months, most lesions achieved complete clinical clearance (**Fig. 12**). The main adverse effects included transient hyperpigmentation, blister formation, and focal tissue necrosis. These complications can be effectively minimized by careful optimization of treatment parameters, including fluence, pulse duration, and pulse number, resulting in an overall favorable safety profile.

Other vascular anomalies

Arteriovenous malformations (AVMs) are high-flow vascular malformations for which laser therapy is not considered first-line treatment. However, several reports have described



Fig. 11. (A-G) Cutaneous responses and photoprotection following photodynamic therapy (PDT). (A) A 5-year-old boy with PDL-resistant PWCM after 17 prior PDL sessions. (B) Localized edema at 1-day post-PDT. (C-D) Resolution of edema with formation of a thin localized scab at 1 and 2 weeks. (E) Transient hyperpigmentation at 3 weeks. (F) Marked improvement after 2 PDT sessions. (G) Use of protective clothing and eyewear to allow safe outdoor activity. Panels (C-E) were provided by a parent via remote follow-up.



Fig. 12. Superficial venous malformations located in various anatomic regions achieved favorable clearance following 1 to 2 laser treatment sessions.

favorable outcomes with multiple PDL sessions in selected cases of CM-AVM, showing meaningful lesion lightning without evidence of progression or recurrence during follow-up.^{26,27} For superficial lymphatic malformation, laser-based treatments, particularly staged CO₂ laser ablation alone or in combination with Nd:YAG laser, can achieve substantial lesion clearance with good cosmetic outcomes and acceptable morbidity.^{28,29} Pyogenic granuloma is an acquired, benign, nodular vascular lesion that may rapidly enlarge and is prone to bleeding or ulceration, particularly following minor trauma. It can arise after trauma or infection and is also commonly observed on the surface of PWCM lesions. Treatment options include PDL, Nd:YAG laser, CO₂ laser, and electrosurgical therapy, with surgical excision remaining an effective definitive option. Verrucous venous malformations (VVMs) are congenital vascular anomalies that progressively develop hyperkeratosis, which complicates treatment over time. Once a thick, verrucous surface has formed, management is often limited to surgical excision, underscoring the importance of early intervention. Before significant hyperkeratosis or crusting develops, laser-based therapies—including PDL, combined PDL–Nd:YAG laser, and ablative lasers—may be effective early treatment options.³⁰

COMPLICATIONS AND SAFETY

Multiple treatment sessions are often required; therefore, therapy is typically performed without general anesthesia. Topical anesthetic creams may be used when necessary; however, caution is advised in very lightly colored erythematous lesions, as topical anesthesia can alter the color of the treated area and surrounding skin, potentially affecting treatment accuracy. Post-treatment care typically includes the application of ice packs to reduce procedural pain and edema; in selected cases, such as PDT, short courses of corticosteroids may be used to further control inflammation. Following certain PDL treatments, a transient purple discoloration of the skin—referred to as the purpura effect—may occur and generally resolves spontaneously without intervention. Post-inflammatory hyperpigmentation is reported in approximately 5% of patients after PDL treatment and usually fades gradually within 6 to 12 months. Scarring is uncommon when laser therapy is performed with appropriate parameters, adequate precautions, and proper post-treatment care. Recurrence of treated lesions is rare. Risk-mitigation strategies include the use of epidermal cooling devices during laser procedures to minimize thermal injury, reduce the risk of scarring, and promote optimal healing.

Strict photoprotection, including regular use of sunscreen, is strongly recommended to prevent pigmentary alterations following treatment.

CLINICS CARE POINT

- Primary indications for laser therapy in infantile hemangioma include superficial lesions in the involuting or involuted phase, as well as ulcerated hemangiomas.

DISCLOSURES

The authors have nothing to disclose.

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