

**Flap reconstruction for facial keloid in an area previously
affected by herpes zoster: a case report**

**Reconstrucción con colgajo para queleide facial en zona
previamente afectada por herpes zóster: reporte de caso**

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Abstract

Introduction: The development of keloids following herpes zoster (HZ)
infection is a rare occurrence. As a result, the management of such cases
remains poorly described, particularly in tropical countries with high rates

of herpes zoster infection. Surgical flap procedures are one of the treatment options for keloid management. These techniques involve the use of local, regional, distant, or free flaps to achieve appropriate wound closure after keloid excision.

Case presentation: A 4-year-old girl was brought by her guardian to a plastic surgery clinic in Purwokerto, Indonesia, with multiple keloid scars on the left side of her face. One year earlier, she had developed HZ in the facial region, initially presenting as a sore under the nose. The infection progressed, leading to unilateral facial weakness and hearing loss. After receiving dermatological care, the lesions healed; however, they left residual keloid scars. Surgical management consisted of partial keloid excision with reconstruction using a nasolabial pedicled flap, elevated in the subcutaneous plane while preserving perforators of the angular artery. A controlled resection of the fibrotic core and tension-free flap inset were performed, and subcutaneous sutures were avoided to reduce recurrence risk. Postoperative evolution showed stable vascularity, adequate contour restoration, and improved esthetic integration.

Conclusion: Keloids caused by infectious diseases, particularly HZ, are rare. This case report presents a surgical approach for managing keloids that develop in previously untreated, damaged skin. Treating facial keloids can be particularly challenging; therefore, further research is

required to clarify the mechanisms of keloid formation in this context and to establish optimal treatment strategies.

Keywords: Nasolabial Fold; Plastic Surgery Procedures; Keloid; Cicatrix, Hypertrophic; Herpes Zoster.

Resumen

Introducción. La formación de queloides como secuela de una infección por herpes zóster (HZ) es una complicación infrecuente. Debido a su baja incidencia, el consenso sobre su abordaje terapéutico es limitado, particularmente en localización facial, donde los objetivos funcionales y estéticos representan un desafío reconstructivo. El uso de colgajos (locales, regionales, a distancia o libres) constituye una alternativa quirúrgica que permite lograr un cierre adecuado de la herida tras la escisión del queloide y optimizar el resultado estético.

Presentación del caso. Niña de 4 años de edad, quien fue llevada a consulta de cirugía plástica en una institución de salud de Purwokerto, Indonesia, por múltiples cicatrices queloides en el lado izquierdo de la cara desarrolladas tras un episodio previo clínicamente compatible con HZ facial. Según el relato del cuidador, la sintomatología inicial incluyó lesión vesicular dolorosa bajo la nariz, que progresó y produjo debilidad facial unilateral y pérdida auditiva, síntomas compatibles con neuropatía del nervio facial secundaria a HZ. Tras recibir manejo dermatológico, las

lesiones cicatrizaron, pero dejaron cicatrices queloides residuales. Se realizó un abordaje quirúrgico mediante la escisión parcial del queloide con reconstrucción mediante un colgajo nasolabial pediculado, elevado en el plano subcutáneo, preservando las perforantes de la arteria angular. El cierre se efectuó sin tensión y se evitaron las suturas subcutáneas para reducir el riesgo de recurrencia. La evolución posoperatoria fue satisfactoria, con adecuada vascularidad, restauración del contorno e integración estética favorable.

Conclusión. Los queloides faciales posteriores a lesiones compatibles con HZ son poco frecuentes y representan un reto terapéutico. El manejo de queloides faciales puede ser particularmente complejo, en especial en climas cálidos, donde las temperaturas elevadas pueden dificultar la recuperación posoperatoria y los procedimientos quirúrgicos basados en colgajos. Este reporte destaca la viabilidad de la reconstrucción con colgajos pediculados en piel previamente comprometida.

Palabras clave: Surco Nasolabial; Procedimientos de Cirugía Plástica; Queloide; Cicatriz Hipertrófica; Herpes Zóster

Introduction

Keloids are abnormal scars that develop as a result of past skin trauma or inflammation (1-3). The nodules are solid and rubbery, often protruding above the skin with a narrow base. Keloids can form in several

areas, with the most frequently affected sites being the deltoid, pre-sternal chest, upper back, and ear. Uncommon sites for these growths are eyelids, genitalia, palms, and soles. Elevated stress within a wound can also lead to the development of keloids (1,2).

Keloids have been rarely reported in areas previously affected by herpes zoster, which occurs due to the reactivation of the Varicella Zoster virus (VZV) that remains dormant in sensory nerve ganglia after causing chickenpox (3). Keloids develop when fibroblasts continue making collagen beyond the boundaries of the original wound, resulting in excessive growth. Keloids following HZ are an uncommon occurrence, and the precise mechanism of keloid formation after HZ is yet unexplained (3). Prior studies show that keloid scar development is more prevalent in individuals of African, Asian, and, to a lesser degree, Latin American or Mediterranean ancestry, due to the dark pigmentation factor (3).

Wolf's isotopic reaction (WIR) denotes the emergence of a novel, unrelated cutaneous condition at the location of a previously resolved dermatological lesion, typically after HZ infection. HZ, resulting from the reactivation of the VZV, is the most documented antecedent for WIR, with diverse secondary dermatoses including granulomatous responses, lichen planus, and neoplasms appearing at the site of resolution (4). Among uncommon cases, WIR may manifest as atypical scar formation, such as

keloids, especially in persons susceptible to irregular wound healing. Keloid formation in the facial area resulting from HZ is rare but has been recorded, indicating that the inflammatory and immunological changes after VZV infection may interfere with normal dermal repair processes and lead to excessive collagen accumulation (5).

For the treatment of keloids in the facial area, the use of facial reconstruction techniques with flaps has been documented. This approach uses adjacent tissue to restore skin and soft tissues affected by skincancer or other types of damage, and it can be classified into local or free flaps, depending on whether the tissue remains attached to its original blood supply or requires microvascular reanastomosis. Local flaps are frequently utilized in facial reconstruction because of their ability to provide a close color and texture match, and their reduced likelihood of causing scar contracture, which can alter facial appearance (6).

Flap-based procedures have also been used in the management of facial keloids. In this technique, the keloid mass is partially resected and the overlying skin—including keloid skin when viable—is preserved as a skin flap to repair the defect with minimal wound closure tension (6). This case report discussed the extended application of the flap method for treating keloids caused by HZ infection.

Case presentation

A 4-year-old girl, accompanied by her guardian, presented to a plastic surgery clinic in 2023, in the city of Purwokerto, Indonesia, due to several keloid scars on the left side of her face. According to the guardian's report, the patient had experienced a facial herpes zoster-like episode approximately one year earlier, but due to the absence of medical records, it was not possible to verify prior varicella infection, vaccination status, or immunological evaluation. The condition reportedly began as a small sore under the nose and progressed to a vesicular eruption on the left side of the face (Figure 1). Although no medical records or confirmatory diagnostic tests were available, the guardian described transient facial weakness and hearing loss during that episode, raising clinical suspicion of a possible —but unconfirmed— Ramsay Hunt syndrome.

Sixty days after symptom onset, the patient was evaluated by a dermatologist in an outpatient setting. According to the guardian's report, the patient received systemic antiviral therapy and topical treatment. However, no intralesional corticosteroids, pressure therapy, laser therapy, or silicone-based scar modulation were administered at that stage. After complete epithelialization (the wound showed progressive improvement and eventually healed after 3 months but left a keloid on the face as a sequela), no additional dermatologic scar-directed therapy was initiated prior to referral to plastic surgery. Therefore, the keloid

developed and remained untreated for approximately 9 months before surgical consultation.



Figure 1. Skin abnormalities that arise during HZ infection. Hyperpigmented plaques are seen accompanied by ulcers with necrotizing areas.

Source: Primarily data from the patient.

During the consultation with the plastic surgery service, the surgical plan was defined, and the procedure for keloid excision was scheduled for 1 week after the initial evaluation.

During the procedure, the keloid was excised after careful delineation of its anatomical margins. Following the surgical design, a nasolabial

pedicled skin flap was elevated by dissecting in the subdermal plane, ensuring preservation of the angular artery perforators and the dominant vascular pedicle supplying the nasolabial region.

A partial resection of the fibrotic core of the keloid was performed, preserving sufficient dermal and subdermal tissue to maintain the integrity of the vascular plexus. The resection was carried out under direct visualization with meticulous hemostasis using bipolar electrocautery.

The resulting defect was repaired by advancing the pedicled flap, achieving tension-free closure. Subcutaneous sutures were intentionally avoided to minimize the risk of secondary keloid formation; wound approximation was achieved with precise dermal sutures and proper edge alignment. The skin was closed with 6-0 nylon interrupted sutures. Figure 2 summarizes the design and excision technique. Immediate and late postoperative results are shown in Figure 3.

Versión preliminar. Puede sufrir cambios antes de su publicación definitiva



Figure 2. Preoperative assessment of patient. The round line marking with broken lines visible in the image is the keloid excision area. Meanwhile, flapping the skin underneath is done in a linear line below the area.

Source: Image obtained while conducting the study.



Figure 3. Postoperative image of the patient showing the surgically removed keloid and the resulting linear incision, designed to conceal the excised area.

Source: Image obtained while conducting the study.

The patient tolerated the procedure well without intraoperative complications. She was monitored overnight for flap viability, during which the flap remained well perfused with no evidence of congestion or hematoma, and only mild edema was noted. She was discharged on postoperative day 3 with instructions for daily gentle wound cleansing with saline, application of a thin layer of antibiotic ointment, a short prophylactic course of oral antibiotics, NSAIDs as needed for analgesia, and antihistamines to reduce pruritus. She was advised to avoid tension across the operative site for 7–10 days, limit sun exposure, and initiate silicone gel or silicone sheeting once epithelialization was complete.

Follow-up appointments were scheduled for postoperative days 3, 7, and 14, followed by monthly visits for three months. At each follow-up, the flap remained viable with no signs of infection, dehiscence, or vascular compromise. Sutures were removed between postoperative days 7 and 10. Long-term evaluations at 1, 3, and 6 months demonstrated a favorable outcome, with stable flap contour, good color match, no keloid

recurrence, and high patient satisfaction with both functional and aesthetic results.

Discussion

Keloid formation following a HZ infection is uncommon and has been reported in case descriptions and in reviews addressing Wolf's isotopic response (4,5). The proposed mechanisms include local neuroimmunological and fibroproliferative alterations, but these remain hypotheses without causal confirmation (4). Nevertheless, this case may represent a possible example of WIR occurring in a post-herpetic location, particularly in cosmetically sensitive regions such as the face. This interpretation remains hypothetical and should be considered with caution, as current literature does not yet support a definitive mechanistic association.

One of the treatments used for the management of keloids is the flap method. This procedure has been described as an effective approach in selected cases (7,8). Techniques such as the keloid fillet flap are recognized for meeting the criteria of "5 As and one B" which includes asepsis, atraumatic method, absence of raw surface, avoidance of tension, exact approximation of wound edge, and perfect bleeding control, potentially reducing relapse rates (7). Although these techniques

demonstrate favorable outcomes in specific scenarios, the approach used in the present case differed substantially in both purpose and design.

A study by Liu *et al.* (8) of a case series with 45 patients with face keloids from January 2013 to January 2016 demonstrated that using the flap method on facial keloids resulted in cosmetically pleasing outcomes after excising the underlying fibrotic tissue. Their technique involved elevating the keloid skin on pedicles and using it to resurface the defect. While valuable in certain facial regions, this method was not applicable to the current case, where the keloid skin was not preserved for resurfacing and a different reconstructive strategy was required based on lesion characteristics and local anatomy.

In the present case, a nasolabial pedicled flap was selected due to its predictable vascularity, color and texture match, and reliable mobility within the perinasal and medial cheek region.

According to Rao and Shende (6), an absorbable suspension suture may be used to restore the natural concavity of the nasofacial sulcus, although this is not standardized in all cases.

Several supplementary methods have been identified to prevent recurrence after surgical excision, including intralesional steroids, pressure, imiquimod, interferon alfa-2b injection, laser treatment, and

radiotherapy (7,8). However, in the present case no adjuvant therapy was administered.

The nasolabial flap procedure considers various parameters, including the anatomical characteristics of the keloid-affected area. The angular artery and its perforating branches provide blood flow to the medial paranasal cheek area. Perforating branches of the internal maxillary artery and transverse facial branches of the superficial temporal artery supply the central cheek region. The nasolabial flap can be elevated as an axial-pattern flap or a random-pattern flap. Random-pattern flaps receive their vascular supply primarily from the subdermal and dermal plexus, whereas axial-pattern flaps are based on a named artery. The suitable dissection plane is the subcutaneous fat layer (9).

Dermal substitutes such as acellular dermal matrices (e.g., AlloDerm®), Integra® Dermal Regeneration Template, and other bilayer dermal scaffolds have been described as useful adjuncts in scar reconstruction, particularly in cases with significant dermal deficiency or large defects. These materials may facilitate dermal regeneration and assist in tension modulation; however, their role in reducing keloid recurrence remains insufficiently established in the literature (10,11).

In the present case, the use of a dermal substitute was not indicated for several reasons. Adequate adjacent tissue was available, allowing

reconstruction with a well-vascularized nasolabial pedicled flap that provided sufficient dermal thickness, reliable perfusion, and optimal color and texture match. Furthermore, the defect size following intralesional excision was moderate and could be closed without excessive tension. The pediatric setting and resource limitations were additional practical considerations.

Given these factors, reconstruction with autologous vascularized local tissue was deemed appropriate. In pediatric facial reconstruction, local flaps are frequently preferred when feasible due to their reliable integration, low infection risk, and avoidance of foreign biomaterials.

The absence of documented virologic confirmation or immunologic evaluation limits any causal inference between the presumed herpes zoster episode and subsequent keloid formation. Therefore, the temporal association observed in this case should be interpreted with caution. The reconstructive strategy was determined primarily by the clinical characteristics of the mature scar.

This case illustrates the rare occurrence of facial keloids following HZ infection and highlights the potential application of nasolabial flap reconstruction for optimal aesthetic outcomes. Given the limited evidence regarding the pathophysiology of keloid formation associated with HZ infection, the proposed mechanisms remain speculative. Surgical

management using well-planned flap techniques, combined with vigilant postoperative care, may provide effective functional and cosmetic results.

Conclusion

Keloids develop because of excessive collagen production by the body during the wound-healing process, resulting in scars that extend beyond the original wound boundaries. Keloids associated with infectious disorders, particularly HZ, are uncommon. This case report elucidates a surgical approach using a nasolabial flap for the management of facial keloids following HZ infection. Further research is required to clarify the mechanisms of keloid formation in this context and to establish optimal treatment strategies.

Ethical considerations

This case report was executed in compliance with the ethical requirements of the institutional and national research committees, as well as the Helsinki Declaration and its subsequent amendments. Informed written approval was acquired from the patient for the publication of this case report and associated pictures. Identifying information has been obscured to safeguard the patient's confidentiality.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this case report.

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