

## Intralesional cryosurgery in the treatment of refractory keloids

*Criocirurgia intralesional no tratamento de quelóide refratário*

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### ABSTRACT

Keloids are a benign fibroproliferative response of scar tissue that extends beyond the boundaries of the original wound, characterized by a high recurrence rate despite the various available treatments, including combination therapy. We report the case of a female patient with multiple spontaneous keloids, refractory to surgical excision and intralesional corticosteroid injections, with a significant impact on quality of life. A combined approach consisting of surgical excision and intralesional cryosurgery was performed. After one year, sustained regression, volumetric reduction, and no recurrence were observed. This case highlights intralesional cryosurgery as an effective strategy in the combined management of refractory keloids.

**Keywords:** Keloid; Cicatrix, Hypertrophic; Cryotherapy; Cryosurgery

### RESUMO

O quelóide é uma resposta fibroproliferativa benigna do tecido cicatricial que ultrapassa os limites da ferida inicial, caracterizado por elevada taxa de recidiva apesar dos diversos tratamentos disponíveis, inclusive procedimentos combinados. Relata-se paciente do sexo feminino com quelóides múltiplos e espontâneos, refratários à cirurgia e a infiltrações intralesionais de corticoides, com grande impacto na qualidade de vida. Realizou-se abordagem combinada com ressecção cirúrgica e criocirurgia intralesional. Após um ano, observou-se regressão sustentada, com redução volumétrica, estabilidade clínica e ausência de recidiva. O relato reforça essa técnica como estratégia eficaz em terapias combinadas no manejo de quelóides refratários.

**Palavras-chave:** Quelóide; Cicatriz Hipertrofica; Crioterapia; Criocirurgia

## Case Report

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## INTRODUCTION

Keloids are benign fibroproliferative disorders characterized by growth extending beyond the boundaries of the original lesion, resulting from dysregulated wound healing and leading to excessive collagen deposition. Unlike hypertrophic scars, they do not undergo spontaneous regression and are often associated with pruritus, pain, and substantial aesthetic impact, in addition to high recurrence rates.<sup>1,2</sup>

Several therapeutic approaches have been used to treat these lesions, including intralesional corticosteroid injections, laser therapy, surgical excision, and silicone sheets. However, no single approach has shown fully satisfactory efficacy, and combinations of different therapeutic modalities are often necessary.<sup>2,3</sup>

In this context, therapeutic algorithms have been proposed to guide the sequential selection of treatments. ASAP (Assessment, Soften, Approach, Prevent) proposes a stepwise approach based on lesion assessment, scar tissue softening, targeted treatment, and recurrence prevention.<sup>4</sup>

Intralesional cryosurgery has emerged as a promising alternative because it promotes the selective destruction of fibroproliferative tissue through controlled thermal injury, followed by collagen remodeling.<sup>3,5</sup>

We report the case of a patient with multiple refractory keloids treated with surgical excision and intralesional cryosurgery, with a favorable clinical outcome. The patient agreed to the procedure and subsequent publication and signed an informed consent form. The authors followed the Declaration of Helsinki.

## CASE REPORT

A 26-year-old woman had developed multiple keloids since the age of 8, initially after bilateral ear piercing, with progressive involvement of other regions in the absence of further trauma. On examination, she had lesions on the earlobes, suprapubic region, vulva, right arm, and right thigh, associated with pruritus and a substantial impact on quality of life (Figures 1–4).

Over 12 years, she underwent multiple surgical excisions and intralesional injections of triamcinolone and 5-fluorouracil, with recurrence following all treatments. Given the persistence of the condition, partial resection of the suprapubic keloid was performed, followed by primary closure with a continuous anchored suture (Figure 5). Histopathological examination revealed a proliferation of thick bundles of hyalinized collagen arranged in a disorganized pattern in the dermis, confirming the diagnosis of keloid. After suture removal, intralesional cryosurgery of the suprapubic lesion, which had the greatest impact on the patient, was initiated.

Intralesional cryosurgery was performed under infiltrative anesthesia with lidocaine associated with a vasoconstrictor, following antisepsis with aqueous chlorhexidine. A sterile bone biopsy needle (NEO OXUS®, Medax), 11 G × 100 mm, was inserted along the longest axis of the keloid until it completely traversed the lesion, with its distal end left exposed to reduce the risk of subcutaneous emphysema. Connected to the liquid nitrogen cryotherapy device via silicone tubing, the needle allowed progressive freezing of the keloid tissue from the center toward the periphery (Figure 6).



**FIGURE 1:** Multiple keloids on the right thigh



**FIGURE 2:** Keloids on the right arm



**FIGURE 3:** Right earlobe: keloid resulting from previous piercing



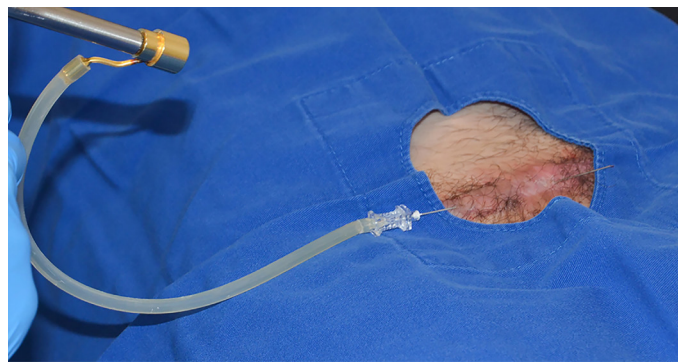
**FIGURE 5:** Clinical appearance of the surgical wound immediately after partial resection of the suprapubic keloid, followed by primary closure with a continuous anchored suture



**FIGURE 4:** Suprapubic and vulvar regions: extensive linear and nodular keloid

Two sessions of intralesional cryosurgery were performed at a 1-month interval. During each session, 2 60-second freezing cycles were performed, interspersed with complete thawing of the tissue. Freezing time was counted after complete freezing of the keloid, respecting its clinical boundaries and avoiding the propagation of freezing to the adjacent skin.

At the end of the procedure, a dressing with sterile gauze and Vaseline was applied and maintained for 48 hours, followed



**FIGURE 6:** Intralesional cryosurgery technique. Connection of the sterile bone biopsy needle (NEO OXUS®, Medax), 11 G × 100 mm, to the liquid nitrogen cryotherapy device via silicone tubing. Insertion of the needle to completely traverse the keloid, allowing the passage of cooled gas through the needle lumen and progressive freezing of the lesion from the center toward the periphery while preserving adjacent tissues

by daily Vaseline dressings until complete healing by secondary intention. After re-epithelialization, continuous use of silicone sheets was resumed as adjuvant therapy (Figure 7).

One month after the final session, significant volumetric reduction and clinical and quality-of-life improvements were observed. During follow-up, after confirmation of a new pregnancy, invasive therapies were discontinued, and only conservative measures and use of silicone sheets were maintained. After 1 year of follow-up, the patient remained stable, with no recurrence of the treated lesions or development of new keloids (Figure 8).

## DISCUSSION

Keloid management remains challenging, particularly in patients with multiple lesions, early onset, and recurrent disease. The pathophysiology involves fibroblast hyperproliferation, excessive production of type III collagen, and alterations in cytokine and growth factor signaling, resulting in persistent growth beyond the boundaries of the original lesion.<sup>1</sup> The tendency toward recurrence after isolated therapeutic interventions is one of the main obstacles to treatment.

The literature indicates that surgical excision alone is associated with high recurrence rates, often exceeding 50% and potentially reaching even higher rates in predisposed individuals.<sup>2,3</sup>

Likewise, widely used intralesional corticosteroid injections have variable results and depend on adherence to multiple treatment sessions, as well as possible local adverse effects such as skin atrophy and telangiectasias.<sup>1,3</sup>

In this setting, cryosurgery has become an important therapeutic modality for the treatment of hypertrophic scars and keloids.<sup>6,7</sup> Its mechanism of action is based on the formation of intracellular ice crystals, disruption of cell membranes, secondary vascular injury with microthrombosis, and subsequent tissue necrosis, ultimately leading to collagen remodeling.<sup>6,7</sup> In addition, freezing reduces fibroblast activity and local vascularity, factors that contribute to controlling scar growth.<sup>8</sup>

Intralesional cryosurgery represents a technical advance, promoting the selective destruction of fibroproliferative tissue while relatively preserving the adjacent epidermis.<sup>6</sup>

A systematic review conducted by van Leeuwen et al.<sup>6</sup> found significant volumetric reductions following intralesional cryotherapy, with recurrence rates lower than those observed with surgical excision alone. Khattab et al.<sup>8</sup> corroborated these findings by demonstrating marked clinical reduction associated with decreased vascular density and reorganization of collagen fibers after treatment.

The literature emphasizes better outcomes when cryosurgery is used as part of a multimodal approach.<sup>3,6</sup> In the present



**FIGURE 7:** Immediate postoperative clinical appearance following the first session of intralesional cryosurgery, performed after partial surgical resection of the suprapubic keloid. Mild edema and erythema of the treated lesion were observed, consistent with the immediate effects of freezing, with preservation of the adjacent tissues and no immediate complications.



**FIGURE 8:** Surgical wound after approximately 1 year of follow-up. Following partial surgical resection, two sessions of intralesional cryosurgery, and continuous use of silicone sheets, sustained volumetric reduction and a stable scar were observed, with no clinical signs of recurrence or development of new lesions in the treated area.

case, the patient underwent partial resection of the suprapubic lesion, intralesional cryosurgery, and use of silicone sheets. Although the clinical outcome was favorable, it is not possible to determine the individual contribution of each therapeutic modality or to attribute the observed results exclusively to intralesional cryosurgery.

Reported adverse events include transient pain, edema, erythema, and pigmentary changes.<sup>6,7</sup> Severe complications are rare when the technique is performed correctly. In the present case, no relevant adverse effects were observed, reinforcing the safety and applicability of the method even in a sensitive anatomical area.

The favorable clinical outcome, with progressive volumetric reduction and no recurrence, highlights the importance of longitudinal follow-up in patients with a history of multiple recurrences. Lesion stability, even after the temporary discontinuation of invasive therapies during pregnancy, suggests a sustained therapeutic response to date.

Although this case report does not allow broad generalization, its relevance lies in documenting therapeutic strategies applied to unusual clinical presentations. In this case, the development of multiple spontaneous keloids since childhood, without

a consistent association with further trauma, is noteworthy. This rare feature suggests an individual predisposition and a more aggressive fibroproliferative behavior, possibly associated with genetic factors. This profile may account for the high recurrence rate and refractoriness observed, adding to the clinical interest of the case.

Nevertheless, gaps remain in the literature regarding the standardization of the optimal freezing time, number of sessions, and intervals between applications.<sup>6</sup> The heterogeneity of the available studies highlights the need for controlled clinical trials and greater methodological uniformity to establish optimized protocols. Even so, current evidence supports intralesional cryosurgery as a promising alternative when employed as part of a multimodal therapeutic strategy for refractory keloids.

## CONCLUSION

This report presents a simple technique combining partial surgical resection, intralesional cryosurgery, and use of silicone sheets, resulting in significant improvement, clinical stability, and no recurrence during the follow-up period, without serious adverse effects. This approach represents a feasible alternative for the management of complex cases of multiple refractory keloids. ●

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