

Conservative Thickness Layers to Preserve Tattoo Appearance During Excisional Procedures

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Cutaneous surgery may need to be performed in areas of the skin that are tattooed, specifically for treatment of cutaneous malignancies with Mohs micrographic surgery (MMS) or excision of allergenic tattoo pigment in cases of chronic inflammatory tattoo reactions. We propose a technique that utilizes conservative thickness layers (CTL) when performing these procedures to minimize disruption to the appearance of the tattoo.

Practice Gap

Tattoos have become increasingly prevalent in Western culture, with approximately 1 in 4 Americans having at least 1 tattoo. Individuals invest money, time, and even pain in getting tattoos, many of which hold special personal, family, or religious significance.¹ Various cutaneous pathologies may arise in areas of the skin with tattoos, including malignancies and inflammatory reactions to tattoo pigment, and in these cases, surgical management may be indicated.^{2,3}

Nonmelanoma skin cancers (NMSCs) such as superficial basal cell carcinomas on broadly sun-damaged areas (eg, trunk, torso), squamous cell carcinomas, reactive keratoacanthomas, and reactive pseudoepitheliomatous squamous hyperplasia diagnosed as squamous cell carcinoma have been reported to occur in or near areas of the skin with tattoos.² Mohs micrographic surgery (MMS) is the standard of care for removing NMSCs, particularly when they manifest in cosmetically sensitive areas.⁴ This treatment option allows for careful guided resection of tumors to minimize the risk for recurrence; it also preserves healthy tissue, which typically results in a smaller radial defect after the procedure is complete.

Chronic reactions to tattoo pigment may include granulomatous tattoo reactions and pseudolymphomas.³ Treatment options may include immunosuppressives such

as intralesional triamcinolone as well as pigment destruction via lasers⁵; however, not all tattoos are responsive to these treatments. Surgical excision is an effective and definitive treatment in this context, as tattoo pigment resides in or above the mid dermis to a depth of approximately 400 μm . Intradermal excision effectively removes the antigenic pigment.⁵

In these clinical scenarios, patients may be hesitant to pursue surgical treatment due to concerns that it may alter tattoo appearance. Many clinicians and surgeons may consider definitive treatment and tattoo preservation to be mutually exclusive, but this is not always the case. We propose a technique that utilizes conservative thickness layers (CTL) to minimize disruption to the appearance of tattoos in MMS for treatment of cutaneous malignancies as well as intradermal excision of tattoo pigment in the setting of chronic inflammatory tattoo reactions.

The Technique

In the appropriate clinical context, CTL can effectively result in defects that heal well by secondary intention and minimize collateral tissue distortion.⁴ Lesions manifesting in or near tattooed skin often are responsive to treatment with CTL; furthermore, CTL may preserve some deeper tattoo pigment, resulting in only partial loss of the tattooed skin.

Conservative thickness layers are performed intradermally, similar to removing traditional layers in MMS. For treatment of NMSCs, a margin is scored around the lesion, and then the blade is passed carefully under the lesion nearly parallel to the skin through an intradermal plane. It is important to avoid entering the subcuticular fat (Figure 1). The tissue then is processed normally in the Mohs laboratory for complete circumferential margin evaluation. If necessary and possible, subsequent layers also can

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be performed in the intradermal plane. Once total circumferential margin control is obtained, the wound is allowed to granulate and heal by secondary intention. As these processes occur, we have found that wound contraction is less likely with the dermis intact, resulting in less impact on the overall appearance of the tattoo (Figures 1 and 2). For very thin lesions, resultant defects may retain some residual tattoo pigment. The residual scars also may be responsive to tattoo revision, although a period of monitoring for recurrence should be considered if there is concern that revising the tattoo could obscure early recurrent tumors. From our experience, utilizing CTL for NMSCs that arise within or near tattoos results in favorable preservation of the tattoo appearance and high patient satisfaction.

The procedure is performed similarly for removal of allergenic tattoo pigment, with careful excision to the mid dermis. Since the areas affected by the cutaneous reaction may be relatively large, surgical precision is required to maintain a uniform depth to remove the tattoo pigment and preserve the deep dermis (Figure 2). Once removed, the defect can be left to granulate and heal by secondary intention. If the patient wants to have the tattoo revised in the future, it would be prudent to utilize pigment that the patient has responded favorably to. In our experience, this approach is effective and yields high patient satisfaction and minimizes morbidity.

Practice Implications

Tattoos often hold special meaning for patients; therefore, treatment of pathologies arising in or near tattooed skin should emphasize maintaining the appearance of the tattoo while still being effective. Conservative thickness layers in MMS and intradermal excisions for allergic reactions to tattoo pigment are an effective treatment strategy that clinicians may consider.

One shortcoming of using CTL for MMS is the need for subsequent layers to clear the tumor; however, data suggest that first-stage cure rates are extremely high even with CTL for appropriately selected patients, with clearance of nearly 80% of tumors on the first stage. Tumors that may be most responsive to CTL include exophytic



FIGURE 2. A and B, Intradermal excision of allergenic tattoo pigment before and after conservative thickness layers technique for a floral tattoo on the dorsal foot.

NMSCs and those arising in areas with a thicker dermis, including the back, legs, and scalp, although other locations including the face, hands, shins, ankles, and feet also may be well suited for CTL.⁴ Another shortcoming of CTL is that skin cancers arising in tattoos may not be considered appropriate for MMS based on the 2012 Appropriate Use Criteria, which consider factors such as location, type of cancer, size of the lesion, and patient characteristics to determine whether a skin cancer is appropriate for treatment with MMS.⁶ When the Appropriate Use Criteria categorizes a cancer as uncertain or inappropriate for MMS, the clinician must use their clinical judgment to determine whether MMS is the preferred treatment approach.⁷ Given the cosmetic significance of tattoos, location of a skin cancer near a tattoo could be taken into account for skin cancers that might otherwise not meet Appropriate Use Criteria.

Conservative thickness layers in MMS and intradermal excisions of tattoo pigment are both effective techniques of minimizing disruption of tattoos while effectively treating patients.

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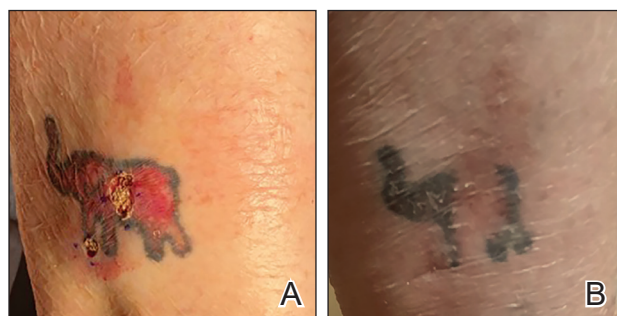


FIGURE 1. A and B, Conservative thickness layer technique employed during Mohs micrographic surgery and the final cosmetic result from a skin cancer involving a large tattoo on the upper back and posterior neck.