Surgical technique for optimal outcomes

Part I. Cutting tissue: Incising, excising, and undermining

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Learning objectives
After completing this learning activity, participants should be able to describe common errors during the removal of tissue that lead to unaesthetic scars and delineate the steps for proficient fusiform excisions.

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Sound surgical technique is necessary to achieve excellent surgical outcomes. Despite the fact that dermatologists perform more office-based cutaneous surgery than any other specialty, few dermatologists have opportunities for practical instruction to improve surgical technique after residency and fellowship. This 2-part continuing medical education article will address key principles of surgical technique at each step of cutaneous reconstruction. Part I reviews incising, excising, and undermining. Objective quality control questions are proposed to provide a framework for self-assessment and continuous quality improvement. (J Am Acad Dermatol 2015;72:377-87.)

Key words: excise; excision; incise; skin; surgery; suture; technique; undermine.

INTRODUCTION

Surgeons influence the aesthetics of scars from cutaneous surgery in 2 ways: (1) surgical design and (2) surgical technique. The principles of aesthetic surgical design are universally accepted, and include preserving and restoring free margins (eg, eyelids, nasal tip and ala, lips, and helical rim), preserving and restoring contour, and placing scars in cosmetic subunit junction lines.[1] Placing scars along relaxed skin tension lines is also desirable, but is less important compared to the aforementioned principles.[2] For example, it is undesirable to conform to the horizontal relaxed skin tension lines on the forehead if elevation of the ipsilateral eyebrow creates asymmetry.

While surgeons nearly universally adhere to the core principles of aesthetic surgical design, surgical technique varies markedly. These variations can confuse surgical trainees, who are left to struggle by trial and error through numerous potential approaches to execute the same surgical technique.[3,4] Only after months to years of independent practice and observation of their own postoperative outcomes do most surgeons refine their own surgical technique and achieve reproducibly excellent results.[5] Many practitioners desire additional surgical coaching after their formal training.[6] This 2-part continuing medical education article proposes quality control questions for each step of cutaneous reconstruction and provides a

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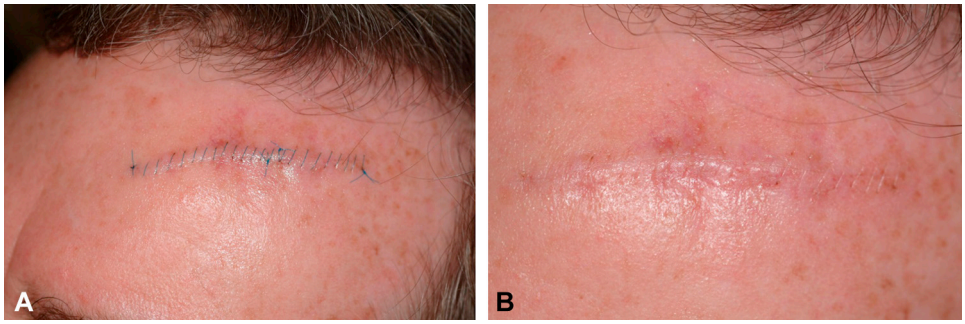

Fig 1. **A**, Ideal appearance of a wound on the forehead 1 week postsurgery, with sutures still in place. There is minimal erythema. **B**, Appearance of the same wound on the forehead immediately after removing the sutures. Precise approximation of the wound edges and minimal inflammation reflect sound surgical technique and portend a minimally apparent scar.

framework for self-assessment and continuous quality improvement.

STEPS OF SURGICAL RECONSTRUCTION

Surgical techniques fall into 2 broad categories: cutting and suturing. Cutting techniques include incising, excising, and undermining. Suturing techniques include placing deep and top sutures. Most reconstructive surgery involves the stepwise execution of these cutting and suturing techniques. Each step influences the success of subsequent steps; errors early in the process make the precise execution of subsequent steps either more difficult or impossible.

Scars heal with a shiny texture that reflects light more brightly than the textured, normal surrounding skin. Sound surgical technique must therefore aim to diminish the contrast between scar and normal skin by minimizing the breadth of the scar.[7-9] Precise, tension-free approximation of the skin edges allows for prompt reepithelialization and a barely visible scar.[10,11] The appearance of scars often improves with time, helping to disguise minor technical deficiencies.[12] The appearance of the wound 1 week after surgery gives an honest assessment of the precision of the surgical technique. Completely reepithelialized scars with minimal to no inflammation signify meticulous surgical technique (Fig 1). Wounds with prominent inflammation and focal inversion or separation of wound edges usually result from suboptimal surgical technique (Fig 2). In these continuing medical education articles, we analyze each step of cutting and suturing and propose quality control checkpoints for objective self-evaluation. Part I reviews cutting techniques, including incising, excising, and undermining. Part II reviews suturing techniques, including placing deep and top sutures. Space precludes a comprehensive coverage of surgical techniques; we therefore focus on core techniques that apply broadly to any surgeon performing surgery of the skin.

CUTTING TECHNIQUE: INCISING

Key points

- **The incision aims to achieve uniform release of the entire skin edge to the desired anatomic depth**
- **The ideal depth of the incision varies according to the anatomic location and intent of the procedure**
- **The incised wound edges should be smooth and sharply perpendicular to the skin surface**
- **Beveling of the dermis or fat toward the center of the wound impedes the precise approximation of wound edges**

The goal of the incision is to achieve uniform release of the entire skin edge to the desired anatomic depth and to create smooth and perpendicular wound edges without a bevel.[13] Before beginning the procedure, the surgeon should have a clear plan for the anatomic depth of the incision. The desired anatomic depth will vary based on the location and intent of the procedure. In most cases, the depth of the incision will correspond to the intended anatomic plane for the subsequent steps of excision and undermining. The skin should be released to a uniform depth along the entire incision (Fig 3).

The incision should create wound edges that are sharply perpendicular to the skin surface, because any bevel of the dermis or fat will impede the direct apposition of the epidermal edges during suturing (Fig 4). Beveled wound edges will force the surgeon to place excessive tension on the sutures, a practice that increases the risk of leaving suture marks on

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