



The Role of Nursing and Radiologic Collaboration in Enhancing Safety and Accuracy During Excisional Biopsy Procedures

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Abstract

Background: An excisional biopsy is a fundamental diagnostic and therapeutic procedure involving the complete removal of a lesion, allowing for comprehensive histopathological evaluation of its architecture and margins. This technique is crucial for diagnosing various cutaneous, subcutaneous, and soft-tissue lesions, particularly when malignancy is suspected.

Aim: This article examines the critical role of interprofessional collaboration, specifically between nursing, radiology, and surgical teams, in enhancing the safety, accuracy, and efficacy of excisional biopsy procedures. It aims to outline a cohesive framework for perioperative management that optimizes patient outcomes.

Methods: The approach is a synthesis of best practices, detailing a collaborative workflow. This includes preoperative planning (e.g., radiological localization, surgical mapping aligned with skin tension lines), meticulous technique (atraumatic tissue handling, layered closure), and comprehensive post-procedure care. The methods emphasize the distinct yet interdependent roles of each team member in ensuring procedural success.

Results: Effective collaboration leads to definitive diagnostic yields, minimizes complications (e.g., bleeding, infection, poor scarring), and often provides curative treatment for small lesions. Key outcomes include accurate lesion removal confirmed via specimen radiology when needed, optimal cosmetic and functional results, and timely, coordinated follow-up based on pathology findings.

Conclusion: The success of an excisional biopsy is contingent upon a synergistic, interprofessional team model. This collaborative approach—integrating the skills of clinicians, nurses, radiologists, and pathologists—ensures procedural precision, enhances patient safety, and facilitates a seamless continuum of care from diagnosis to definitive management.

Keywords: Excisional Biopsy, Interprofessional Collaboration, Nursing, Radiology, Patient Safety, Surgical Margins, Diagnostic Accuracy, Perioperative Care..

1. Introduction

Excisional biopsy is a cornerstone diagnostic and therapeutic procedure in which the **entire** clinically evident lesion is removed and submitted for histopathological examination, in contrast to incisional or core techniques that sample only a fraction of tissue [1]. By yielding a complete specimen, excisional biopsy enables pathologists to evaluate morphology, architecture, and peripheral and deep margins in toto, thereby improving diagnostic certainty and informing subsequent management

decisions such as the need for wider resection, adjuvant therapy, or surveillance intervals [1]. This comprehensive tissue assessment is particularly valuable when clinical or imaging findings are equivocal, when prior needle sampling has been non-diagnostic, or when malignancy is suspected and a definitive diagnosis will immediately alter care pathways [1]. In selected cases—especially small, well-circumscribed lesions—excision is simultaneously diagnostic and therapeutic, obviating further intervention if margins are negative and risk

features are absent [1]. Excisional biopsy is applied across a spectrum of cutaneous, subcutaneous, and deeper soft-tissue or nodal lesions, and is frequently triggered by radiologic detection of suspicious morphology or interval growth. Multidisciplinary coordination is essential from the outset: radiologists delineate lesion extent, proximity to critical structures, vascularity, and the most favorable approach, often using ultrasound or cross-sectional imaging to plan incisions and anticipate intraoperative challenges [1]. Nursing professionals, meanwhile, operationalize patient-centered safety—verifying identity, allergies, anticoagulant use, and informed consent; ensuring appropriate fasting status when sedation is planned; optimizing positioning, antisepsis, and sterile field setup; and initiating perioperative checklists that reduce wrong-site errors and infection risk [1]. This partnership is equally critical post-procedure, when nurses monitor pain, bleeding, and early signs of infection, reinforce wound care instructions, and arrange timely review of pathology results with rapid escalation for malignant diagnoses [1].

Careful preoperative planning reduces complications and maximizes diagnostic yield. Key considerations include lesion location (e.g., facial cosmetic subunits, axilla, groin, or neurovascular corridors), size relative to available skin laxity, patient comorbidities such as diabetes or immunosuppression, and medications that affect hemostasis (antiplatelets, anticoagulants) [1]. The intended definitive treatment must also be anticipated: when melanoma or soft-tissue sarcoma is in the differential, incision placement and orientation should avoid compromising future wide excision or sentinel node mapping, preserving lymphatic drainage patterns and reconstructive options [1]. For breast or calcification-dominant targets, radiologist-guided wire or seed localization can direct a cosmetically favorable excision that still retrieves the full imaging correlate; immediate specimen radiography confirms capture of microcalcifications or clip markers before closure, reducing reoperation rates [1]. Technical execution prioritizes atraumatic handling, meticulous hemostasis, and margin fidelity. Elliptical or fusiform excisions aligned with relaxed skin tension lines aid closure and cosmetic outcomes; deep margins are oriented and inked, and sutures or colored inks mark anatomic poles for pathologic correlation and potential re-excision mapping [1]. Intraoperative nursing surveillance of vital signs, local anesthetic dosing, and blood loss supports safety, while instrument counts and specimen labeling accuracy prevent never-events [1]. Where available, intraoperative imaging can verify complete removal of radiologically defined targets, and frozen section may assist in select scenarios—though final paraffin histology remains the gold standard for margin assessment and tumor subtype classification [1].

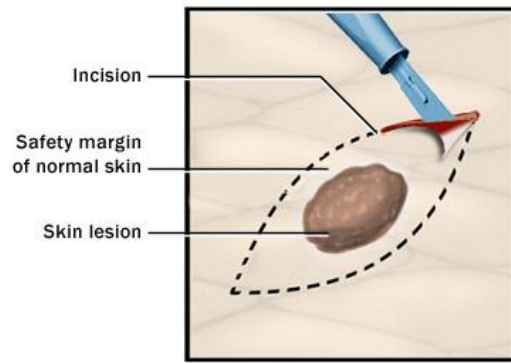


Figure-1: Excisional Biopsy.

Postoperative management couples complication prevention with efficient information flow. Nursing teams assess pain control, reinforce elevation and activity restrictions, evaluate dressings for hematoma or seroma formation, and educate patients on warning signs such as progressive swelling, fever, erythema, drainage, or dehiscence, promoting timely return if complications arise [1]. Clear documentation of lesion size, depth, anatomic orientation, and any intraoperative events facilitates high-quality pathology reporting. Radiology–pathology concordance is then reviewed: if the histology does not explain the imaging appearance, additional imaging or re-excision may be indicated to avoid false reassurance [1]. When malignancy is confirmed, rapid referral to tumor board streamlines staging, margin revision, sentinel node procedures, or systemic therapy planning. From a quality perspective, excisional biopsy advances diagnostic accuracy and can shorten the time to treatment, but it must be judiciously selected. Overuse in lesions better suited to needle biopsy may increase morbidity, while underuse in heterogeneous or margin-critical pathology risks sampling error and misclassification [1]. Thus, the optimal application resides in an integrated workflow wherein radiologists define the target and approach, surgeons or proceduralists execute tissue removal with margin intent, and nurses ensure safety, education, and continuity across the perioperative continuum [1]. Anchored in this interdisciplinary framework, excisional biopsy functions not only as a means to a diagnosis but as a patient-centered episode of care that anticipates definitive management, minimizes complications, and aligns procedural choices with the individual’s clinical trajectory [1].

Anatomy and Physiology

A detailed understanding of skin anatomy and physiology is essential for clinicians performing excisional biopsies, as these principles underpin both functional and cosmetic outcomes. The skin, the largest organ of the human body, consists of three primary layers: the epidermis, dermis, and subcutaneous tissue. Each layer contributes to the integrity, elasticity, and healing potential of the surgical site. The epidermis, primarily composed of

keratinocytes, serves as a protective barrier against microbial invasion and fluid loss, while the dermis provides tensile strength and vascular support through its dense connective tissue, composed of collagen and elastin fibers. Below the dermis, the subcutaneous tissue—comprising adipose tissue, blood vessels, and nerves—facilitates thermoregulation and acts as a cushion between the skin and underlying structures [2]. During excisional biopsy, attention to these anatomical layers is crucial. The incision typically extends through the full thickness of the skin, reaching the subcutaneous fat to ensure complete removal of the lesion. A proper understanding of vascular anatomy ensures adequate hemostasis while minimizing tissue trauma. The dermal plexus and subdermal vascular network supply essential nutrients for wound healing; thus, excessive cautery or blunt dissection can compromise perfusion and delay recovery. Similarly, awareness of nerve distribution—particularly in the face, neck, and extremities—is critical to prevent postoperative sensory loss or neuropathic pain [2][3].

From a physiological perspective, skin tension and collagen orientation are paramount in achieving optimal cosmetic outcomes. The relaxed skin tension lines (RSTLs) represent the natural alignment of dermal collagen and elastic fibers. Incisions placed parallel to these lines experience less mechanical stress during wound contraction and healing, resulting in thinner, more inconspicuous scars. Identification of RSTLs can be achieved by applying gentle manual compression and observing wrinkle formation or by analyzing natural skin movement, such as joint flexion or facial expressions [2]. In contrast, incisions perpendicular to these lines risk widening scars due to increased tension across the wound. In addition to collagen architecture, cutaneous units and landmarks—such as facial aesthetic subunits (nasal, periorbital, or perioral regions)—should be respected. Aligning incisions within these natural boundaries conceals scars along shadowed or transitional zones, improving both appearance and function. Understanding the biomechanics of wound healing further informs perioperative decision-making. The inflammatory, proliferative, and remodeling phases rely heavily on adequate vascular supply, oxygenation, and mechanical stability, all of which depend on precise surgical technique. Thus, mastery of skin anatomy and physiology enables clinicians to perform excisional biopsies that not only achieve accurate diagnostic results but also optimize cosmetic and functional outcomes for the patient [3].

Indications

Excisional biopsy is indicated in a variety of clinical situations that require a definitive diagnosis and comprehensive histopathologic evaluation. Its primary advantage lies in the ability to remove the entire lesion, permitting detailed microscopic assessment of tissue architecture, cellular morphology, and margin status. This complete analysis allows for a more accurate and conclusive diagnosis compared to

partial sampling techniques such as shave, punch, or incisional biopsies. Excisional biopsies are particularly valuable for lesions where architectural features are essential to determine the pathology, such as suspicious pigmented lesions, atypical neoplasms, or complex inflammatory dermatoses [4][5]. In these contexts, full-thickness excision enables evaluation of the lesion's depth, margins, and relationship to surrounding tissues—factors critical for establishing both diagnosis and prognosis. A major indication for excisional biopsy is the evaluation of pigmented skin lesions suspicious for melanoma. In cases where melanoma is suspected, excisional biopsy is considered the gold standard for initial diagnostic assessment [4][6]. Unlike superficial shave or punch biopsies, which risk incomplete sampling and inaccurate depth measurement, excision allows for precise determination of Breslow thickness—the single most important prognostic indicator in melanoma staging [5][7]. Accurate measurement of Breslow depth guides decisions regarding the need for sentinel lymph node biopsy, determines surgical margin width for definitive excision, and influences eligibility for adjuvant therapy or clinical trials [8]. For this reason, guidelines universally recommend an elliptical excision with narrow clinical margins (typically 1–3 mm) for initial diagnosis, ensuring adequate histologic evaluation while preserving tissue for possible re-excision.

Beyond melanoma, excisional biopsy is also indicated for cutaneous and subcutaneous masses where malignancy is possible or where the lesion's heterogeneity could yield false negatives with smaller samples. Lesions such as basal cell carcinoma, squamous cell carcinoma, adnexal tumors, and atypical fibroxanthomas often warrant complete excision when their clinical or dermoscopic features are ambiguous. Inflammatory or granulomatous conditions, such as cutaneous sarcoidosis or panniculitis, may also require excisional sampling when the full depth and architectural context are necessary for differentiation from neoplastic processes. Furthermore, excisional biopsy serves both diagnostic and therapeutic purposes in certain small, benign lesions—such as epidermoid cysts, lipomas, and nevi—where complete removal provides symptom relief or cosmetic benefit. It is also indicated in cases where previous incisional or needle biopsies have yielded inconclusive results, or when there is discordance between clinical, radiologic, and histopathologic findings. Radiologists play a vital role in guiding these decisions by correlating imaging features with clinical presentation, identifying lesions requiring full excision due to deep or irregular margins. In summary, the indications for excisional biopsy encompass a broad range of dermatologic, soft-tissue, and subcutaneous conditions where complete tissue evaluation is necessary. The technique provides the most reliable means of achieving diagnostic accuracy, defining lesion margins, and guiding

individualized treatment planning. When performed with appropriate preoperative assessment and multidisciplinary coordination, excisional biopsy not only ensures diagnostic precision but also offers the potential for definitive management of small, localized lesions, ultimately improving patient outcomes [4][5][6][7][8].

Contraindications

Although excisional biopsy remains one of the most definitive diagnostic techniques for evaluating suspicious lesions, its use must be guided by a thorough understanding of contraindications to avoid preventable complications and to optimize patient outcomes. Contraindications to excisional biopsy can be broadly classified into patient-related, lesion-related, and procedural factors. Evaluating these elements before surgery ensures the safety of the procedure, minimizes risk, and enhances both functional and cosmetic results [2][9]. Patient-related contraindications primarily involve conditions that increase the likelihood of adverse outcomes such as bleeding, delayed wound healing, or infection. Patients with coagulopathies—whether congenital (e.g., hemophilia, von Willebrand disease) or acquired (from anticoagulant or antiplatelet therapy)—are at an elevated risk of postoperative hemorrhage. In such cases, clinicians must correct coagulation abnormalities preoperatively or temporarily withhold anticoagulant therapy when safe to do so. Likewise, patients with uncontrolled diabetes mellitus or immunosuppression (from corticosteroids, chemotherapy, or HIV infection) exhibit impaired wound healing and higher infection risk due to poor tissue perfusion and compromised immune defense. Local skin infections, such as cellulitis or abscesses at or near the proposed biopsy site, are also contraindications, as incision through infected tissue can promote bacterial dissemination and wound dehiscence [9]. Additionally, patients with severe cardiopulmonary disease or those unable to tolerate local anesthesia due to hypersensitivity or anxiety may require alternative diagnostic methods or specialized anesthetic management.

Lesion-related contraindications pertain to characteristics that render excision technically challenging or cosmetically disadvantageous. Large, deep, or poorly defined lesions that extend into vital anatomical regions—such as near major vessels, nerves, or tendons—may carry excessive risk of functional impairment. Similarly, lesions in cosmetically sensitive areas like the periorbital region, nasal alae, lips, or ears warrant careful consideration because excision can lead to visible scarring or distortion. In these situations, incisional, punch, or image-guided core biopsies may be more appropriate, providing diagnostic information while minimizing aesthetic compromise. Lesions with suspected aggressive malignancy or uncertain margins may also be deferred for excision until imaging or mapping

defines the extent of disease, preventing incomplete resection and the potential for local recurrence [2]. Procedural contraindications relate to situational and logistical factors that can influence decision-making. For example, in cases requiring rapid diagnostic confirmation, a smaller and less invasive punch or needle biopsy might be preferred to expedite results and initiate treatment. Similarly, lesions located in inaccessible regions—such as deep visceral masses or intramuscular lesions—may necessitate radiologically guided core biopsies rather than open excision due to surgical complexity or morbidity. Furthermore, excisional biopsy should be avoided in patients with extensive lesions that exceed the boundaries of primary closure, as this could necessitate grafting or flap reconstruction and increase recovery time [9].

The choice of biopsy site significantly influences both healing and cosmetic outcomes. Excisional biopsies are ideally performed on the trunk or proximal extremities, where skin laxity allows for tension-free closure. However, certain locations carry greater risks. Sites below the knee, the central face, and the ventral forearm are associated with poorer wound healing, increased infection rates, and a greater likelihood of hypertrophic scarring due to limited vascular supply and tension across the wound [9]. The back, though commonly used, is prone to wound stretching because of the skin's thicker collagen bundles and mechanical stress from movement. Proper incision planning along relaxed skin tension lines (RSTLs) can help minimize these risks and produce more favorable aesthetic results. Modern innovations, such as Mohs micrographic surgery, have redefined the boundaries of excisional biopsy, particularly for cutaneous malignancies. This technique allows for precise, layer-by-layer excision with immediate histologic margin evaluation, thereby minimizing tissue removal while ensuring complete tumor clearance [10]. It exemplifies how careful patient selection and procedural planning can transform traditional excisional methods into safer, more effective interventions. In conclusion, contraindications to excisional biopsy must always be evaluated within the context of individual patient factors, lesion characteristics, and procedural feasibility. By considering these elements—while leveraging multidisciplinary input from surgeons, radiologists, nurses, and dermatologists—clinicians can ensure optimal diagnostic accuracy, patient safety, and cosmetic outcomes. Thorough preoperative assessment, adherence to anatomical principles, and judicious procedural selection ultimately determine the success of this invaluable diagnostic tool [2][9][10].

Equipment

Performing an excisional biopsy demands meticulous preparation and the use of properly selected equipment to ensure both diagnostic accuracy and procedural safety. Each instrument serves a

specific purpose that contributes to minimizing complications, achieving hemostasis, and promoting favorable wound healing and cosmetic outcomes. Proper organization of all necessary tools before the procedure not only streamlines workflow but also enhances sterility and reduces operative time, leading to improved patient comfort and overall clinical efficiency. The procedure begins with ensuring the sterile field is adequately prepared. Essential items include sterile drapes, gloves, and gauze, which are critical for maintaining aseptic technique and preventing postoperative infection. The marking pen is used preoperatively to delineate the lesion margins and plan the incision line, ideally along the relaxed skin tension lines (RSTLs) to minimize visible scarring and tension during closure. The scalpel—typically a No. 15 blade for precise control in small areas or a No. 10 blade for larger lesions—is the principal cutting instrument, allowing smooth, controlled incisions through the epidermis, dermis, and subcutaneous tissue. Surgical scissors are utilized for gentle tissue dissection, trimming of irregular edges, or releasing tissue planes when sharp dissection is preferable to blunt separation. Tissue forceps, commonly Adson forceps, provide delicate handling and stabilization of skin edges without excessive trauma, preserving tissue integrity and preventing crush artifacts that may compromise histopathologic interpretation [9][10].

Hemostats are indispensable for achieving hemostasis by clamping small blood vessels and controlling bleeding, which ensures a clear operative field and reduces the risk of postoperative hematoma. Additional hemostatic tools, such as electrocautery units or silver nitrate sticks, can be employed for coagulating small capillaries and achieving meticulous bleeding control, especially in vascular or inflamed lesions. The local anesthetic, such as 1% or 2% lidocaine with or without epinephrine, is administered using syringes fitted with fine 25- to 30-gauge needles to achieve effective regional anesthesia with minimal discomfort. Epinephrine's vasoconstrictive properties help prolong anesthesia and reduce intraoperative bleeding. The nurse or assistant should verify the absence of allergy to anesthetic agents before injection. For wound closure, sutures and needles are selected based on tissue type, lesion size, and desired cosmetic outcome. Nonabsorbable sutures such as nylon or polypropylene are often used for epidermal closure, whereas absorbable sutures like polyglactin or poliglecaprone are preferred for deep dermal layers. The needle holder aids in precise suture placement, ensuring optimal wound edge approximation. A specimen container, properly labeled with patient identifiers, site location, and date, is critical for accurate pathology processing. The specimen should be placed in an appropriate fixative, usually 10% buffered formalin, immediately after removal to prevent tissue degradation. Finally, sterile bandages or dressings are applied to protect the wound and absorb

any postoperative drainage. Together, these instruments and materials form the essential foundation for performing an excisional biopsy safely and effectively. Proper handling, sterility maintenance, and teamwork between nursing, surgical, and pathology personnel are vital for ensuring diagnostic precision, minimizing complications, and achieving satisfactory cosmetic and functional results for the patient [9][10].

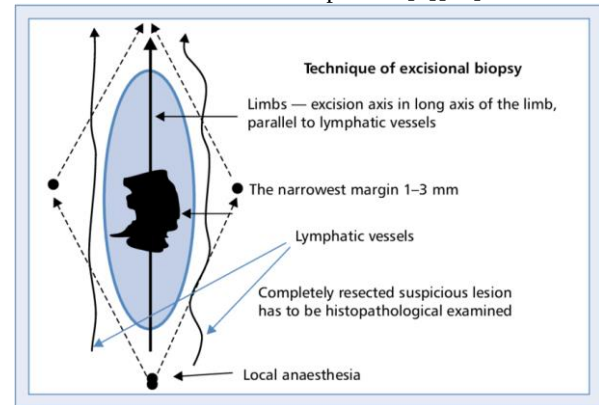


Figure-2: Excisional Biopsy.

Personnel

The successful performance of an excisional biopsy depends not only on technical precision and proper instrumentation but also on the coordinated efforts of a skilled and attentive healthcare team. While many excisional biopsies—especially those involving small, superficial lesions—can be effectively conducted by a single qualified clinician, the inclusion of additional personnel significantly enhances procedural efficiency, patient safety, and overall outcomes. The primary operator, typically a dermatologist, surgeon, or radiologist, is responsible for planning the procedure, ensuring accurate lesion localization, obtaining informed consent, administering anesthesia, and performing the excision with meticulous technique to ensure complete lesion removal while preserving surrounding healthy tissue. A surgical assistant or nurse plays a crucial role in maintaining procedural flow and aseptic conditions. The assistant prepares the sterile field, arranges instruments, and provides necessary materials throughout the procedure, thereby allowing the clinician to focus on precision and speed. During closure, the assistant may cut sutures, manage suction, and assist with wound dressing, minimizing operative time and improving patient comfort. The circulating nurse also ensures that sterile technique is maintained, monitors the patient's vital signs, and documents procedural details, including anesthesia administration, specimen labeling, and the patient's response to treatment [11].

In more complex cases—such as when lesions are large, located near critical anatomical structures, or exhibit features suspicious for malignancy—multidisciplinary collaboration is invaluable. In such settings, teamwork among

surgeons, radiologists, and dermatopathologists enhances diagnostic accuracy and intraoperative decision-making. For example, in Mohs micrographic surgery, the presence of a dermatopathologist allows for immediate histopathological evaluation of excised margins, guiding additional tissue removal if necessary and ensuring complete excision while conserving healthy tissue. This real-time pathology feedback minimizes recurrence and optimizes cosmetic outcomes. In academic and hospital environments, additional personnel may include anesthesiologists for sedation cases and pathology technicians who handle specimen processing and labeling to prevent diagnostic errors. Ultimately, effective communication, clear role delineation, and teamwork among all involved personnel—clinician, assistant, nurse, and pathologist—ensure that the excisional biopsy is performed efficiently, safely, and with the highest diagnostic and aesthetic standards [11].

Preparation

Thorough preparation is the foundation of a safe, efficient, and diagnostically valuable excisional biopsy. Preparation begins well before the first incision, with a structured preoperative assessment that clarifies the indication, confirms that excision (rather than a more limited sampling) is the appropriate technique, and anticipates technical and postoperative needs. Clinicians should review the lesion's clinical history (onset, growth kinetics, symptoms, prior trauma or biopsy), relevant imaging or dermoscopic features, medication use (especially antiplatelets, anticoagulants, and immunosuppressants), allergies, and comorbidities that may influence healing or bleeding risk. Informed consent should explicitly address the dual diagnostic and potentially therapeutic intent of excisional biopsy, possible alternatives, expected scar length and orientation, risks of bleeding, infection, wound dehiscence, sensory change, and the possibility of re-excision if margins are involved or a malignancy is confirmed. Surgical mapping translates this planning into a precise cutaneous design. After identifying the lesion of interest, the clinician outlines the lesion and marks an appropriate clinical margin around it to ensure complete removal, balancing diagnostic needs with tissue conservation. As described, two small orientation triangles are drawn at pole of the intended excision; when these are connected, the operative design forms an elliptical template with an ideal length-to-width ratio of approximately 3:1 [10]. This geometry is not cosmetic trivia; it is a mechanical solution that distributes closing tension evenly along the long axis and prevents "dog-ear" (standing cone) formation at the apices. The resulting scar is planned to be long, thin, and linear, and—crucially—aligned with the skin's natural contours to improve both appearance and function. Where possible, the ellipse should follow relaxed skin tension lines or be

concealed within boundaries of cosmetic units and resting creases. For lesions that may require subsequent wider resection (e.g., suspected melanoma), the ellipse is oriented to avoid jeopardizing lymphatic mapping or reconstructive options during definitive surgery [10].

Local anesthesia is the dominant modality for cutaneous excisional biopsies, and its delivery is often the most anxiety-provoking moment for patients. A gentle, methodical approach reduces discomfort and fosters trust. Lidocaine, with or without epinephrine, is most commonly used in dermatologic surgery. Epinephrine's vasoconstrictive effect reduces bleeding, prolongs anesthesia, and consequently decreases systemic anesthetic exposure—benefits that simplify dissection and enhance hemostasis. Pain during infiltration can be minimized by buffering the anesthetic with sodium bicarbonate (commonly 1 part bicarbonate to 9 parts lidocaine), which neutralizes the acidic solution and diminishes the burning sensation on injection [11]. Additional techniques include using small-gauge needles (25–30G), gently pinching or pressing the skin near the insertion point to exploit gate-control analgesia, beginning injection in the intradermal/subdermal plane with a slow, steady rate, and advancing within the already anesthetized track to limit repeated epidermal passes. Although lidocaine's analgesia is almost immediate, clinicians should recognize that full epinephrine-mediated vasoconstriction may take up to 10–15 minutes and plan the operative timeline accordingly for optimal hemostasis [11]. Dose limits (e.g., lidocaine without epinephrine vs. with epinephrine) should be respected, with special caution in children, frail older adults, and patients with hepatic dysfunction or significant cardiac disease; when using vasoconstrictor-containing solutions, practitioners should use clinical judgment in end-arterial territories and in those with severe peripheral vascular disease.

Once anesthesia is administered, positioning and environment are refined to support precision and safety. The patient should be placed comfortably on a stable surface with the target field at the operator's natural working height, supported by good surgical lighting and, where beneficial, loupes. For scalp, beard, or other hair-bearing regions, the field is prepared by clipping (not shaving) hair and securing remaining strands with sterile clips, rubber bands, or adhesive drapes to prevent contamination and improve access. The skin is then cleansed with an antiseptic agent, most commonly povidone-iodine or chlorhexidine, applied in expanding concentric circles and allowed adequate contact time to maximize microbial kill before sterile draping. Hand preparation should be pragmatic and evidence-based. The surgeon washes and dries hands thoroughly; for minor cutaneous procedures, a formal surgical scrub is not strictly necessary if careful hand antisepsis is performed. Masks may be worn as personal protective

equipment but are not mandatory for routine dermatologic surgery. Surgical gloves are worn and kept clean throughout the procedure. Of note, recent literature has reported no significant difference in surgical site infection rates when comparing sterile versus clean (non-sterile) surgical gloves for dermatologic procedures, supporting a context-specific approach that emphasizes overall technique, field preparation, and case selection [12]. Regardless of glove type, meticulous aseptic technique, a well-maintained sterile field, and minimal tissue trauma are the principal determinants of infection prevention.

Before incision, a team time-out verifies the patient's identity, the lesion and side, the planned orientation of the ellipse, and the availability of all required equipment, including hemostatic devices (electrocautery or silver nitrate), suture materials, and a properly labeled specimen container with fixative. The lesion photograph (with a scale) may be obtained to document baseline appearance and location. The marking pen is used to reaffirm the ellipse after the skin has been prepped, since antiseptics can fade earlier marks; if necessary, marks are gently refreshed to maintain accuracy. In sites with high mechanical stress—such as the back, shoulders, and over joints—strategic alignment with skin tension vectors and thoughtful selection of closure technique (deep dermal support sutures, appropriate bite size, and spacing) are especially important to mitigate scar spreading. Equipment layout should mirror the planned sequence of steps for efficiency and safety. The scalpel (often a No. 15 blade) is positioned for primary incision; Adson forceps enable delicate tissue handling; Metzenbaum or iris scissors facilitate sharp dissection and contouring; hemostats and electrocautery are ready for prompt control of bleeding; suture materials (absorbable for deep dermis, non-absorbable for epidermis) and the needle holder are organized by size and function; sterile gauze and bandages are prepared for hemostasis and dressing; and the specimen container sits within reach to minimize ischemic time and reduce the risk of labeling errors. The circulating assistant can implement a simple instrument and sharp count to prevent retention or misplacement events and to maintain a tidy operative field.

For nonpalpable or radiographically defined targets (e.g., certain breast, soft tissue, or calcification-dominant lesions), preoperative radiologic localization with wire or seed can guide a minimal-margin excision that still captures the entire imaging correlate. Immediate specimen radiography or ultrasound can confirm retrieval of microcalcifications or clip markers prior to closure, reducing reoperation rates and aligning with the overarching diagnostic objective. In the cutaneous setting, dermoscopy-guided mapping enhances clinical correlation and assists in choosing the line of excision that best encapsulates the full lesion while preserving surrounding cosmetic units. Specimen stewardship is an integral part of preparation. The team should pre-

label containers with two patient identifiers, the exact anatomic site, and the date/time, and have ink available for margin orientation when required by the pathologist. Small orientation sutures (e.g., a long suture at the superior pole, a short suture lateral) can accompany the specimen, and the orientation is documented in the operative note to support precise pathology reporting and facilitate targeted re-excision if necessary. The container should contain 10% neutral buffered formalin in adequate volume (ideally at least 10:1 fixative to tissue ratio) to ensure high-quality histopathology. Patient comfort and safety measures are part of the preparatory checklist. Anxiety reduction—through clear explanations, expectation setting about the buzzing of cautery or transient fullness of tumescent anesthesia, and the offer of topical anesthetic before injection—can improve cooperation and reduce procedural pain. For patients with vasovagal tendencies, supine positioning, slow anesthetic infiltration, and pre-procedural hydration help avert syncope. Blood pressure, heart rate, and oxygen saturation monitoring are prudent in patients with significant comorbidities or when larger volumes of anesthetic with epinephrine are anticipated. Where anticoagulants are used for compelling indications (e.g., mechanical valves, recent thromboembolism), the plan should emphasize local hemostatic strategy rather than interruption; layered closure, judicious electrocautery, and compression dressings often suffice [11].

Antibiotic prophylaxis is not routinely indicated for clean, uncomplicated cutaneous excisions; however, preparation should include a contingency for selective prophylaxis in patients with high-risk cardiac conditions requiring endocarditis prophylaxis under contemporary criteria, in immunocompromised hosts with extensive dissection, or in contaminated fields. Similarly, special populations merit tailored preparation: in diabetes, pre-procedure glucose assessment and careful antisepsis reduce infection risk; in pregnancy, epinephrine-containing anesthetics can be used judiciously, with preference for the lowest effective dose and attention to positioning comfort; in pediatric or cognitively impaired patients, additional measures for anxiolysis and caregiver participation facilitate smooth conduct. Finally, the preparatory phase ends with a brief rehearsal of postoperative instructions and logistics. Before draping, the clinician confirms that the patient (and caregiver, when relevant) understands wound care basics, activity restrictions, and the timeline for results and follow-up. Supplies for dressing changes, written instructions, and a direct contact pathway for urgent concerns are assembled in advance so that recovery begins seamlessly the moment the dressing is applied. In aggregate, these preparatory steps—meticulous mapping of a 3:1 ellipse with orientation markers, thoughtful anesthesia selection and buffered infiltration, deliberate timing to leverage epinephrine vasoconstriction, disciplined

field preparation and glove strategy, careful equipment staging, and robust communication—create the conditions for an excisional biopsy that is technically precise, diagnostically reliable, and cosmetically judicious [10][11][12].

Technique or Treatment

A meticulous, stepwise approach to the excisional biopsy maximizes diagnostic yield, reduces complications, and optimizes cosmetic and functional results. After final surgical mapping of a fusiform ellipse with an approximately 3:1 length-to-width ratio and confirmation of side and site, the skin is placed under gentle traction with the nondominant hand to stabilize the field and flatten natural undulations. The incision begins with the point (tip) of the scalpel contacting the apex of the ellipse. This punctate initiation fixes the starting point and prevents wandering. The operator then transitions to the belly of the blade to carry the cut in one smooth, continuous arc along the inked line, maintaining a constant depth through the dermis into the superficial subcutis. The same maneuver is repeated along the contralateral arc to complete the skin incision, again using steady traction to minimize chatter and epidermal “railroad tracking.” The goal is a clean, sharply incised ellipse with parallel, beveled edges that will evert well at closure and minimize tissue crush artifact for histopathology [10]. Specimen orientation and margin fidelity are foundational to the pathology report. Before elevating the specimen, the surgeon identifies a fixed anatomic landmark (e.g., superior pole) and marks the tissue with a nonabsorbable orientation suture or a small ink nick at a pre-specified location. This step can be performed in situ or immediately after specimen removal, but it must be documented in the operative note to enable precise correlation of any positive or close margin to the patient’s anatomy, streamlining re-excision planning if needed [10]. Using toothed forceps to grasp the dermal edge at the apex, the operator gently elevates the specimen and begins the deep dissection in the subcutis. A scalpel or blunt-tipped scissors—often Metzenbaum or iris scissors—are used to develop a consistent plane beneath the lesion. The instrument should advance with short, deliberate strokes, maintaining an even depth to create a defect with a smooth base and uniform walls, thereby preventing partial-thickness skiving that could leave residual disease and confound histologic margin assessment [10].

Hemostasis is maintained throughout to preserve a clear field and to avoid hematoma formation, which can predispose to infection and wound dehiscence. Direct pressure with sterile gauze often suffices for small oozers. Electrocautery is highly effective for pinpoint hemostasis, but its physics matter: heat cautery (thermal pens) can work in a moist field, whereas monopolar electric cautery requires a dry field to be efficient and to avoid arcing; thus the assistant should blot the area with gauze or a

cotton-tipped applicator before activating the electrode [2]. Larger subdermal vessels that retract and spurt may require suture ligation with an absorbable suture (e.g., 3-0 or 4-0 polyglactin). Cautery near cutaneous nerves should be judicious to reduce the risk of postoperative paresthesia. When the lesion has been fully released, the specimen is lifted en bloc, briefly inspected to confirm completeness, and immediately placed into a pre-labeled container with adequate formalin to prevent autolysis and preserve architecture [10]. With the specimen secured, attention turns to defect preparation and tension management. Undermining the wound edges in the immediately subdermal plane can improve mobility, decrease closure tension, and reduce the risk of widened scars. The technique can be sharp (scissor spreading) or blunt (scissor tips closed and swept), depending on vascularity and regional anatomy. The operator must remain mindful of named vessels and nerves—particularly in the face, neck, and distal extremities—to avoid functional injury. If significant skin excess creates a standing cone (“dog ear”) at one or both apices, it can be corrected by extending the excision in the direction of the cone’s base or by triangulation excision (a small Burow’s triangle) to recontour the edge while keeping the ellipse aligned with relaxed skin tension lines [10]. Saline irrigation clears debris and coagulum, and a final hemostasis check is performed before closure.

A layered closure is the standard for most excisional biopsies because it restores dermal integrity, obliterates dead space, and reduces surface tension. The deep dermal/subcuticular layer is placed first using absorbable sutures (e.g., 3-0 to 5-0 polyglactin or poliglecaprone), with the needle traveling from deep to superficial in the dermis on each side to capture robust collagen while avoiding the epidermis. The initial suture strategy depends on tension distribution. When tension is minimal, the first deep suture is often placed at the midpoint of the wound to align the edges, followed by additional deep sutures placed halfway between the central stitch and each apex, progressively halving the remaining intervals to distribute load evenly [2]. When tension is high, initial deep sutures are placed at the apices to recruit the most resistant tissue first, then placed progressively toward the center, gradually relaxing the wound until the edges rest with modest eversion [2]. This “tension to the ends” approach prevents tissue tearing and edge ischemia centrally, where perfusion can be most tenuous. Among deep techniques, buried vertical mattress sutures are commonly used to achieve edge eversion and precise vertical alignment. The far-far, near-near path of this pattern restores dermal thickness and avoids surface punctures. Buried horizontal mattress sutures can span broader defects and distribute load across a wider dermal platform, particularly useful where tissue is fragile or tension vectors are multidirectional [10]. Knots must lie deep,

well away from the epidermis, to minimize palpable suture tracts and spitting. The spacing of deep sutures is tailored to the wound's width and curvature; as a rule of thumb, deeper, wider bites are used where tension is highest, tapering to smaller, closer bites near the ends.

Once the deep layer yields a low-tension, well-opposed wound with slight eversion, the epidermal approximation proceeds. Nonabsorbable sutures (e.g., nylon or polypropylene) placed with a simple interrupted or running technique provide crisp edge alignment and predictable removal at 5–7 days on the face, 7–10 days on the trunk and upper extremities, and 10–14 days on the lower extremities, where tension and vascularity differ. A running locked pattern may be chosen for hemostasis along long wounds, though each lock adds focal tension and should be used judiciously. In meticulously selected low-tension wounds with excellent dermal support and perfusion, skin adhesives or adhesive strips can replace epidermal sutures, reducing track marks and simplifying aftercare, especially in cosmetically sensitive areas [10][13]. Regardless of technique, the epidermal bites should be symmetric and equidistant from the wound edge to avoid step-offs and to ensure a hairline, linear scar. Throughout closure, the operator continually reassesses for bleeding and tissue blanching. Over-tightening can strangulate edges and predispose to necrosis; intentional eversion (a slight ridge) anticipates the natural inversion that occurs during remodeling as collagen contracts. At completion, a thin layer of petrolatum or antibiotic ointment is applied, followed by a nonadherent dressing and a compressive outer layer to reduce dead space and shear. Where undermining is extensive or oozing persists, a pressure dressing for 24–48 hours is helpful. Patients on anticoagulants may benefit from prolonged compression and more frequent early checks for hematoma.

Technique refinements for special sites enhance safety. On the face, respect for aesthetic subunits guides incision placement and closure. Scalp excisions require secure hemostasis of galeal vessels and often benefit from staples for epidermal approximation after a robust deep layer. In the ear and nose, cartilage preservation and perichondrial integrity are paramount; buried absorbable sutures reapproximate soft tissue over a protected framework, and bolster dressings may prevent hematoma. On the back and shoulder girdle, where mechanical stress is high, generous undermining and strong, spaced deep sutures prevent scar widening. On the lower leg, compromised perfusion and higher tension lengthen healing times, so wider undermining, more numerous deep sutures, and longer external suture retention are prudent. For periarticular lesions, orienting the ellipse parallel to lines of motion and advising joint rest reduces dehiscence risk [10]. Intraoperative pitfalls are avoided with vigilance and systematic checks. Specimen loss or mislabeling is prevented by

maintaining a clean “specimen-only” zone on the field, immediate placement into fixative, and a time-out confirming the two patient identifiers and anatomic site on the label before addressing the next step. Thermal artifact from aggressive cautery at margins can obscure histologic interpretation; using gentle, brief touches away from the exact edge preserves readability [2]. Dog-ear management is ideally performed with the patient in a neutral, gravity-independent position to avoid under- or over-resection that only becomes apparent once the patient sits or stands. If a standing cone persists, a small triangular excision oriented along the wound axis typically smooths the contour, though subtle de-bulking of the surrounding subcutaneous fat can also help.

Post-closure, a concise operative record captures the lesion dimensions, exact site and laterality, ellipse length, undermining plane, hemostatic methods, orientation marks, suture materials and sizes, dressing type, and any intraoperative events. This documentation supports pathology interpretation and guides any needed re-excision should margins be positive. The team ensures that the specimen requisition includes lesion history, prior biopsies, differential diagnosis, and whether special studies (e.g., immunohistochemistry) are anticipated, which can expedite complex workups. Immediate postoperative instructions begin chairside. Patients are counseled to keep the dressing dry for 24–48 hours, then to perform gentle daily cleansing and to reapply petrolatum and a clean dressing. They are advised to avoid strenuous activity, stretching, or soaking that might stress the closure, particularly over the back, shoulder, or lower leg. Clear warning signs—expanding bruising or swelling suggestive of hematoma, pulsatile bleeding, fever, purulent drainage, increasing pain after day two, spreading erythema, or separation of edges—are reviewed along with the plan for urgent contact. A specific date for suture removal is provided based on anatomic site, and a timeline is set for pathology result disclosure, with the understanding that discordance between clinical/imaging features and histology may necessitate additional sampling or re-excision to ensure that the imaging correlate has been fully addressed [10][13].

For lesions suspected to be melanoma or other margin-critical malignancies, the technique incorporates oncologic foresight: narrow diagnostic margins for the initial excision, careful avoidance of excessive cautery at the deep edge, and precise orientation markers. If the diagnosis returns malignant, the biopsy site can then be used as a roadmap for definitive wide local excision and potential sentinel lymph node mapping without compromising lymphatic drainage patterns. In settings where Mohs micrographic surgery is preferred for certain nonmelanoma skin cancers, the initial excision principles—atraumatic handling, margin respect, hemostasis, and layered closure—still apply; however,

tissue is processed for staged frozen-section margin control, and closures may be delayed until clearance is confirmed [10]. In sum, the technique of excisional biopsy is not a single act of cutting and sewing; it is a coordinated sequence that begins with principled mapping and orientation, proceeds through tissue-sparing dissection on a uniform subcutaneous plane, and culminates in thoughtful, tension-managed layered closure that respects local anatomy and future oncologic steps. Mastery of hemostasis—from gauze pressure and dry-field electrocautery to selective ligation—prevents hematoma and supports clean histology [2]. Deliberate selection of buried vertical and horizontal mattress sutures restores dermal strength and creates lasting eversion, while judicious use of nonabsorbable skin sutures or tissue adhesives completes an apposition that heals predictably with minimal track marks [10][13]. When performed with this level of precision and foresight, excisional biopsy reliably delivers the dual goals for which it is esteemed: diagnostic certainty and patient-centered outcomes that honor both function and form.

Complications

Although excisional biopsy is generally safe and well tolerated, clinicians must anticipate, prevent, and promptly manage potential complications to protect diagnostic integrity and cosmetic outcome. Complications arise from patient-related factors (e.g., anticoagulation, diabetes, immunosuppression), lesion characteristics (size, depth, anatomic location), and technical variables (hemostasis, tissue handling, closure strategy). A structured perioperative plan—covering risk stratification, meticulous technique, and clear aftercare—substantially reduces morbidity and supports optimal healing. Bleeding is the most frequent intraoperative concern and, if inadequate hemostasis persists, can progress to post-operative oozing or frank hemorrhage. Minor capillary bleeding is typically controlled with direct pressure and spot electrocautery; because monopolar electrosurgery functions best in a dry field, methodical blotting with gauze or cotton-tipped applicators improves efficiency and prevents arcing. Larger subdermal vessels may retract and require suture ligation with absorbable material to prevent delayed bleeding after vasodilation and activity resume [14]. Prevention begins before the first incision: identifying antiplatelet or anticoagulant use, correcting reversible coagulopathies when clinically safe, and planning deeper, tension-reducing closures that minimize shear at the wound bed. After closure, a snug pressure dressing and patient counseling to avoid strenuous activity reduce the risk of recurrent bleeding. Persistent or pulsatile bleeding mandates re-evaluation for a missed vessel, hematoma evacuation, targeted cautery, or suture ligation, as indicated [14].

Hematoma formation represents the sequela of uncontrolled intraoperative or delayed postoperative bleeding. Blood that accumulates

beneath the flap edges can increase pain, compromise perfusion, create dead space susceptible to bacterial growth, and ultimately distort the scar. Meticulous hemostasis, judicious undermining in the correct plane, and layered closure that obliterates dead space are the most effective prophylactic strategies. Postoperatively, compression for 24–48 hours, limb elevation when applicable, and activity restriction are useful adjuncts. If a clinically significant hematoma develops, timely evacuation and re-establishment of hemostasis prevents infection, skin edge necrosis, and widened scarring. The risk of hematoma is higher in vascular regions (scalp, face), in patients on anticoagulants, and in sites under mechanical stress (back, shoulders), reinforcing the need for careful technique and tailored aftercare [14]. Surgical-site infection (SSI) after cutaneous excision is uncommon but clinically meaningful when it occurs. The probability of SSI is influenced by host factors (e.g., diabetes, immunosuppression), wound environment (tension, hematoma, devitalized tissue), and postoperative care. For most clean excisions, routine prophylactic antibiotics are not indicated; instead, prevention relies on meticulous asepsis, gentle tissue handling, and effective hemostasis. Notably, contemporary data suggest no clinically important difference in SSI rates between sterile and clean gloves in minor dermatologic surgery, emphasizing that global technique and field preparation are more consequential than glove sterility class [12]. When risk is elevated—extensive undermining in a frail host, contaminated fields, specific cardiac indications—selective prophylaxis may be reasonable. Patient education is pivotal: daily gentle cleansing after the initial 24–48 hours, liberal petrolatum to maintain a moist healing environment, timely dressing changes, and attention to warning signs (spreading erythema, increasing pain after day two, purulent drainage, fever). Early recognition and prompt treatment—typically with incision and drainage for abscess, culture-directed antibiotics when warranted, and pressure control for coexisting hematoma—limit progression and preserve cosmetic results [12].

Nerve injury can occur when excisions traverse areas rich in superficial sensory branches or near motor nerves. Sensory neuropraxia—manifesting as numbness, paresthesia, or dysesthesia—is generally more common than motor deficit and often improves over weeks to months as neurapraxic changes resolve. Risks rise with deep dissection beyond the subdermal plane, aggressive cautery, or wide undermining in anatomically dense corridors (mandibular margin, periorbital region, dorsum of the hand, medial ankle). Prevention depends on preoperative mapping of regional neurovascular anatomy, maintaining dissection in an appropriate subcutaneous plane, and limiting cautery near known nerve paths. When nerve injury is suspected, documentation of the distribution and severity guides prognosis; persistent or

functionally significant deficits may merit referral for electrodiagnostic testing and, rarely, surgical evaluation. Wound dehiscence and delayed healing reflect mechanical and biological stressors at the closure site. Excessive tension, inadequate deep support sutures, premature suture removal, or postoperative strain (stretching across the back and shoulders; motion over joints) predispose to edge separation. Comorbidities—poorly controlled diabetes, smoking, malnutrition, immunosuppression—and distal locations with reduced perfusion (anterior tibia) lengthen healing times. Prevention hinges on wide but judicious undermining, robust layered closure with well-planned suture spacing, intentional edge eversion, and explicit activity restrictions. If dehiscence occurs, early intervention—reinforcement sutures, tape support, or secondary closure—can restore stability and improve scarring. Cosmetic complications include hypertrophic scarring, keloids, contour irregularities, and dog-ear (standing cone) deformities. Risk is heightened in high-tension zones, along incisions misaligned with relaxed skin tension lines, and in patients with keloid-prone phenotypes. Prevention begins with preoperative planning (3:1 ellipse, alignment to relaxed tension lines), tension distribution with deep sutures, and intraoperative dog-ear management by triangulation or limited extension of the ellipse. Postoperative strategies—silicone gel sheeting, pressure therapy, and, where appropriate, intralesional corticosteroids—can modulate pathologic scar remodeling. Patient counseling about realistic cosmetic expectations and the timeline of scar maturation (up to a year) aligns outcomes with goals [12].

Skin edge ischemia and necrosis are uncommon but serious, usually stemming from excessive cautery, overly tight closure, or compromised perfusion (e.g., tight dressings, vasoconstrictors in end-arterial locations). Conservative management—loosened dressings, warm compresses, topical wound care—suffices for superficial changes; deeper necrosis may require debridement and delayed closure. Allergic and foreign-body reactions may follow exposure to antiseptics (e.g., chlorhexidine), adhesives, or suture materials. Contact dermatitis presents with pruritus and erythema around the dressing; treatment involves removing the offending agent and applying topical corticosteroids. “Spitting sutures” (extrusion of absorbable material) are managed by gentle removal at the surface and local care. Pre-procedure screening for known sensitivities and selecting hypoallergenic dressings avert many events. Anesthetic-related events include vasovagal syncope, systemic toxicity, and, rarely, epinephrine-related palpitations or blanching. Buffering lidocaine with sodium bicarbonate, slow infiltration with fine-gauge needles, and patient reassurance reduce injection pain and anxiety. Observing standard maximum dose limits and

allowing adequate time for epinephrine-mediated vasoconstriction enhance safety, while supine positioning and hydration mitigate presyncope. Any signs of local anesthetic systemic toxicity (peri-oral numbness, tinnitus, agitation, seizures) warrant immediate cessation, airway support, and lipid emulsion therapy per protocol [12].

Pigmentary changes—post-inflammatory hyperpigmentation or hypopigmentation—may follow inflammation, suturing, or surface adhesives, particularly in darker phototypes. Sun protection and gentle wound care reduce the risk; persistent dyschromia may respond to topical agents or procedural dermatology after full healing. Positive or uncertain margins represent a diagnostic-therapeutic complication with implications for recurrence. Thermal artifact at the margin from aggressive cautery can obscure histologic interpretation, while incomplete excision may leave residual lesion. Best practice is tissue-sparing dissection with minimal thermal injury at the edge, precise orientation sutures or inks for the pathologist, and clear communication on the requisition. When margins are positive, timely re-excision or referral for margin-controlled techniques (e.g., Mohs surgery for select non-melanoma skin cancers) reduces recurrence risk and preserves tissue. Specimen mishandling—mislabeling, delayed fixation, or desiccation—threatens diagnostic accuracy. Rigid protocols for two patient identifiers, immediate placement in 10% buffered formalin with adequate volume, and explicit site orientation are essential safeguards. In settings where imaging guided the excision, radiology–pathology correlation should confirm that the histology explains the imaging target; discordance prompts additional imaging or re-excision to avoid false reassurance [12].

Ultimately, minimizing complications is a shared responsibility. The clinician’s role is to execute an atraumatic technique with deliberate hemostasis, layered closure, and precise documentation; the nursing team reinforces asepsis, dressing integrity, symptom surveillance, and patient education; and the patient contributes through adherence to aftercare instructions—compression, activity restriction, hygiene, and early reporting of warning signs. Evidence-based nuances—such as appreciating that clean gloves may be acceptable for many dermatologic excisions without increasing infection risk [12], and that rigorous intraoperative hemostasis plus postoperative compression is the most effective hedge against hematoma [14]—translate directly into safer procedures. With these perioperative strategies and clear communication, the already low rate of complications after excisional biopsy can be driven even lower, ensuring that the diagnostic benefits are delivered with minimal morbidity and with results that honor both function and form.

Clinical Significance

Excisional biopsy represents a fundamental procedure across dermatology, oncology, and general surgery due to its unparalleled ability to yield complete and definitive histopathologic information. The procedure's clinical significance extends beyond simple tissue sampling—it serves as both a diagnostic and therapeutic intervention, ensuring accuracy in disease identification while often providing curative removal of localized lesions. Unlike incisional or core biopsies, which only provide partial tissue samples, excisional biopsy involves the complete removal of the lesion, allowing for comprehensive analysis of the lesion's morphology, architecture, and margins. This comprehensive evaluation enables pathologists to provide precise diagnoses that directly inform treatment plans and long-term patient management. In oncology, excisional biopsy is indispensable for diagnosing and staging malignancies. For cutaneous cancers such as melanoma, the excised specimen allows for measurement of the Breslow thickness, which quantifies the vertical depth of tumor invasion—a critical determinant of prognosis and surgical margin planning. Additional histologic parameters such as ulceration, mitotic rate, and lymphovascular invasion can only be accurately evaluated when the entire lesion is available for analysis. The results of excisional biopsy also inform decisions about sentinel lymph node biopsy, adjuvant immunotherapy, and surveillance strategies, thereby establishing it as a pivotal step in the multidisciplinary management of melanoma and other skin cancers. Similarly, in soft-tissue and subcutaneous neoplasms, excisional biopsy provides architectural clarity, enabling differentiation between benign and malignant tumors and allowing for targeted oncologic treatment based on histologic subtype and molecular features [14][15].

Beyond cancer, excisional biopsy has significant diagnostic and therapeutic value in nonmalignant conditions. It is frequently employed in evaluating inflammatory dermatoses, granulomatous diseases, and autoimmune conditions that require assessment of full-thickness skin involvement. Conditions such as panniculitis, sarcoidosis, and lupus erythematosus benefit from excisional rather than superficial biopsies because the complete specimen preserves the tissue's inflammatory gradient from the epidermis to the subcutis. Additionally, excisional biopsy is critical for the evaluation of atypical or indeterminate lesions where smaller biopsies have been non-diagnostic or where histologic heterogeneity may obscure key diagnostic features. From a therapeutic standpoint, excisional biopsy frequently provides definitive treatment by completely removing benign or precancerous lesions. Examples include dysplastic nevi, epidermoid cysts, lipomas, and actinic keratoses that have failed less invasive management. In such cases, the biopsy eliminates the lesion while

simultaneously confirming its benign nature, thus sparing patients additional procedures. Furthermore, excisional biopsies can be used to alleviate symptoms caused by pain, irritation, or cosmetic disfigurement associated with localized skin or subcutaneous masses [15].

Excisional biopsy also plays a crucial role in personalized medicine, as it allows for the collection of sufficient tissue for immunohistochemical, molecular, and genetic testing. These advanced analyses are now central to the diagnosis and targeted management of complex diseases, including cutaneous lymphomas and soft-tissue sarcomas. Molecular profiling can identify actionable mutations or specific immunophenotypic markers, enabling clinicians to tailor therapies—such as targeted kinase inhibitors or monoclonal antibodies—to individual tumor biology. Thus, excisional biopsy not only supports histopathologic diagnosis but also serves as a gateway to precision oncology and translational research. Clinically, excisional biopsy is considered a safe, efficient, and cost-effective diagnostic tool when performed with proper technique and aseptic precautions. Complication rates are low, and most adverse events—such as bleeding, infection, or scarring—can be minimized through appropriate perioperative management. The procedure can be performed in outpatient settings under local anesthesia, reducing healthcare costs while maintaining high diagnostic accuracy. Its versatility makes it suitable for a range of specialties, including dermatology, surgery, radiology, and pathology, where collaboration ensures comprehensive patient care. In summary, the clinical significance of excisional biopsy lies in its ability to integrate diagnosis and treatment within a single, minimally invasive procedure. By providing complete tissue architecture, enabling molecular testing, and often achieving therapeutic excision, it remains the gold standard for evaluating both benign and malignant lesions. When performed with precision, adherence to anatomical principles, and multidisciplinary collaboration, excisional biopsy not only ensures diagnostic certainty but also directly improves patient outcomes and supports evidence-based, personalized treatment planning [15].

Enhancing Healthcare Team Outcomes

The success of an excisional biopsy extends well beyond the technical act of tissue removal; it relies on a collaborative, multidisciplinary approach that integrates the expertise of physicians, nurses, pharmacists, pathologists, and other allied health professionals. Each team member contributes a distinct yet interdependent role that supports patient-centered care, procedural safety, diagnostic accuracy, and optimal recovery. This synergy exemplifies the broader principle of interprofessional collaboration in modern healthcare—where coordinated communication and shared accountability improve

outcomes and enhance the patient experience. The clinician or surgeon performing the excision is primarily responsible for accurate diagnosis, precise execution, and overall coordination of the procedure. Their role begins with preoperative assessment—evaluating lesion characteristics, reviewing patient history, identifying potential contraindications, and selecting the most appropriate biopsy site and incision orientation. Technical proficiency in incision, tissue handling, and layered closure directly affects the quality of the histopathologic specimen and the cosmetic result. Clinicians also guide postoperative management, including wound assessment, suture removal, and the interpretation of pathology results. However, even the most skilled surgeon depends heavily on an engaged and coordinated healthcare team to achieve consistent excellence [16].

Nurses are indispensable in both the perioperative and postoperative phases. They prepare the patient physically and emotionally, ensure proper consent and procedural readiness, and maintain strict aseptic technique throughout the procedure. During surgery, nurses assist by handing instruments, monitoring vital signs, and ensuring the sterile field remains uncompromised. Postoperatively, they play a crucial role in wound management—cleaning, dressing, and monitoring for signs of infection or dehiscence. Equally important, nurses provide patient education, instructing individuals on wound care, hygiene, activity limitations, and red flags that warrant medical attention. Their continuous patient interaction builds trust and reinforces adherence to care instructions, reducing complications and hospital revisits. Pharmacists enhance safety and comfort through evidence-based medication management. Their input ensures the selection of the most appropriate local anesthetic, considering patient comorbidities and potential drug interactions. For high-risk patients—such as those with prosthetic heart valves, immunosuppression, or diabetes—pharmacists may recommend prophylactic antibiotics to prevent infection. Postoperatively, they provide guidance on pain control, typically through non-opioid analgesics, and counsel patients on medication use, potential side effects, and interactions. Their vigilance in reviewing medications—especially anticoagulants and antiplatelets—helps reduce perioperative bleeding risks while maintaining therapeutic balance for chronic conditions [16].

Pathologists play an equally vital role once the specimen is excised. Their precise histopathologic analysis determines the final diagnosis, guides staging in malignancies, and influences further management. Close collaboration between the operating clinician and pathologist ensures accurate labeling, orientation, and interpretation of the tissue. For example, margin inks and orientation sutures placed during surgery allow pathologists to assess whether the lesion has been completely excised or if residual disease remains. In complex or ambiguous cases, direct communication

between the surgeon and pathologist can clarify findings and prevent diagnostic errors, facilitating timely decision-making for re-excision or adjuvant therapy. Beyond individual roles, the cornerstone of success in excisional biopsy lies in effective interprofessional communication. Clear, timely, and structured communication channels ensure that every team member operates with a shared understanding of the patient's condition, procedure plan, and potential risks. For instance, discussing lesion characteristics and patient-specific considerations during preoperative huddles allows the team to anticipate complications and assign responsibilities efficiently. Likewise, accurate intraoperative documentation—detailing site, margin orientation, anesthetic type, and specimen handling—supports downstream coordination with pathology and nursing teams [16].

Documentation and information-sharing through the medical record serve as the backbone of continuity. Each provider documents their findings, interventions, and recommendations, allowing others to respond appropriately. If unexpected complications arise—such as persistent bleeding, suspected infection, or an adverse drug reaction—real-time updates in the record and direct communication between team members expedite intervention. In this context, the importance of closed-loop communication cannot be overstated: messages should not only be sent but also acknowledged and acted upon, ensuring that no critical information is lost. Another crucial aspect of enhancing team outcomes is patient-centered communication. Educating patients about the procedure, anticipated outcomes, and warning signs of complications fosters a sense of shared responsibility. When patients understand their care plan and feel empowered to participate in decision-making, adherence improves, complications decrease, and satisfaction rises. Nurses, pharmacists, and clinicians collectively reinforce this communication at every stage, tailoring their messages to the patient's literacy level and cultural context [16].

Team-based postoperative follow-up further underscores the value of interprofessional collaboration. Nurses often conduct initial wound assessments and relay any concerning findings to the clinician. Pharmacists review ongoing medications to prevent contraindicated drug combinations during recovery. Physicians interpret pathology results and communicate these findings directly to the patient, outlining next steps in care. This unified approach minimizes delays in diagnosis disclosure and ensures that patients receive coordinated recommendations rather than fragmented advice. In addition, fostering an environment of mutual respect and shared decision-making strengthens team dynamics. Each discipline contributes expertise that complements others: the clinician's surgical precision, the nurse's vigilance in patient care, the pharmacist's pharmacologic insight, and the pathologist's diagnostic acumen. Structured interdisciplinary meetings and debriefings promote

reflection and continuous improvement. They allow the team to analyze complications, review best practices, and implement process changes that enhance safety and efficiency for future procedures [16].

Ultimately, the excisional biopsy exemplifies how interprofessional collaboration translates directly into improved patient outcomes. When each team member fulfills their specialized role within an integrated care framework, the procedure proceeds smoothly, specimens are accurately processed, and patients experience fewer complications and better cosmetic and functional results. Consistent communication, mutual accountability, and patient engagement transform what could be a routine minor surgery into a model of coordinated, high-quality care. In summary, optimizing outcomes in excisional biopsy requires more than surgical skill—it demands the synchronization of an entire healthcare team guided by shared goals of safety, precision, and compassion. Through strategic preoperative planning, disciplined communication, and comprehensive postoperative support, clinicians, nurses, pharmacists, and pathologists collectively uphold the highest standards of evidence-based practice. This collaborative model not only enhances procedural efficiency and diagnostic accuracy but also strengthens the trust and satisfaction that define exceptional, patient-centered healthcare [16].

Nursing, Allied Health, and Interprofessional Team Interventions

Nursing and allied healthcare professionals are central to the safe, patient-centered delivery of excisional biopsy care, from preprocedure preparation through recovery. Effective nursing interventions begin with tailored education that explains the procedure, expected sensations during local anesthesia, and the rationale for a fusiform incision and layered closure. Clear, plain-language guidance on wound care—how to keep the site clean and moist with petrolatum, when to remove the pressure dressing, and how often to change subsequent dressings—reduces preventable complications and empowers self-management. Nurses also coach patients to recognize early warning signs of infection or dehiscence, including increasing pain after day two, spreading redness, warmth, purulent drainage, fever, or separation of wound edges, and to seek care promptly if these occur. Because a portion of patients present with anxiety about a possible cancer diagnosis, nurses assess psychological distress, provide empathetic support, and, when appropriate, arrange referral to counseling or oncology navigation services to reduce fear and improve adherence to follow-up. Allied health professionals extend the team's capacity to deliver nuanced, individualized care. Certified wound and ostomy nurses can be consulted for high-tension sites, compromised perfusion (e.g., lower leg), or patients with diabetes or immunosuppression; they

optimize dressing selection, compression strategies, and off-loading to promote timely granulation and epithelialization. Pharmacists review medication lists to anticipate bleeding risk or drug–drug interactions, advise on local anesthetic selection and dose limits, and recommend non-opioid analgesic regimens that balance comfort with safety. Physical or occupational therapists may contribute activity-modification plans for periarticular excisions to protect closures without sacrificing function. Medical assistants and care coordinators ensure accurate labeling of specimens, complete requisitions with clinical context, and confirm that follow-up appointments and suture removal are scheduled before discharge [16].

Interprofessional collaboration is the thread that ties these interventions together. Real-time communication between the proceduralist and pathologist about orientation marks, suspected diagnosis, and margin priorities improves the interpretability of histopathology and shortens time to a definitive plan. Nurses relay changes in symptoms, vital signs, or wound appearance to the clinician, enabling rapid intervention for hematoma, infection, or adverse reactions. Shared electronic documentation of operative details, dressing instructions, and return-precautions ensures consistent messaging, reduces confusion, and supports patient engagement. By integrating technical skill, education, psychosocial support, and coordinated logistics, the team reduces complications, limits scarring, and improves the overall experience and outcomes of patients undergoing excisional biopsy [16].

Nursing, Allied Health, and Interprofessional Team Monitoring

Postprocedure monitoring safeguards healing, detects complications at a reversible stage, and ensures that biopsy results are acted upon without delay. Nurses lead bedside and outpatient surveillance, beginning with immediate assessment of hemostasis and comfort, followed by checks for evolving hematoma, excessive drainage, or worsening pain that may signal inadequate hemostasis or infection. Over the first 24–48 hours, they confirm that compression remains intact where prescribed, that the dressing is clean and dry, and that the patient can competently perform wound care at home. Daily, patients should be guided to observe for redness that expands beyond the margin, increasing warmth, swelling, or purulent exudate. In higher-risk populations—people with diabetes, immunosuppression, or lower-extremity closures—monitoring is more intensive and may include earlier follow-up contact, targeted glucose control review, and reinforcement of limb elevation and activity restrictions to minimize edema and tension on the repair. Allied team members contribute targeted surveillance that complements nursing assessment. Pharmacists monitor analgesic efficacy and tolerability, check for overuse of nonsteroidal agents in patients with bleeding risk, and advise on

antibiotic stewardship when infection is suspected. Wound care specialists reassess dressing strategy if maceration, friction, or delayed epithelialization appears, and they recommend silicone gel sheets or taping protocols as healing progresses to mitigate hypertrophic responses. When dysesthesia or numbness is reported, clinicians document the sensory territory and trend recovery, engaging specialists if deficits persist [16].

Equally vital to monitoring is the closed-loop management of diagnostic information. The pathologist's report must be integrated into care rapidly and accurately. The interprofessional team establishes a clear pathway for results: the pathology department flags critical or malignant findings, the proceduralist or primary clinician contacts the patient directly with results and next steps, and nursing staff confirm understanding, reinforce care instructions, and schedule definitive treatment or surveillance. For malignancies, coordination extends to tumor board referral, staging investigations, and timely re-excision or sentinel node evaluation when indicated. When histology is discordant with preprocedure imaging or dermoscopic features, the radiologist and clinician confer to determine whether re-imaging, specimen radiography review, or re-biopsy is warranted, preventing false reassurance and missed disease. Documentation binds the monitoring process together. Each contact—clinic visit, phone call, or telehealth check-in—records wound appearance, pain scores, temperature, dressing status, activity level, and any new symptoms, alongside precise plans for next evaluation or suture removal timing by anatomic site. Patients receive consistent, reinforced messages about sun protection for scar maturation, gradual return to activity, and immediate reporting of red-flag symptoms such as rapidly expanding bruising, febrile illness, or separation of edges. By maintaining vigilant, coordinated, and patient-centric monitoring, the interprofessional team shortens time to intervention when problems arise, reduces the likelihood of infections or poor cosmetic outcomes, and ensures that diagnostic findings translate into timely, effective care [16].

Conclusion:

In conclusion, the excisional biopsy transcends a mere technical act of tissue removal; it represents a comprehensive, patient-centered episode of care whose success is fundamentally dependent on robust interprofessional collaboration. The procedure's dual diagnostic and therapeutic potential can only be fully realized through the seamless integration of diverse expertise. Clinicians provide the surgical precision for complete lesion removal with optimal cosmetic foresight, while radiologists are indispensable in pre-operative planning and intraoperative confirmation of target retrieval, especially for non-palpable lesions. The nursing role is pivotal across the entire continuum, from patient preparation and education to maintaining aseptic

technique, assisting in hemostasis, and providing critical post-procedure monitoring and support. This synergistic model ensures that every aspect of the procedure—from meticulous preoperative mapping and atraumatic surgical technique to accurate specimen handling and vigilant post-operative care—is executed to the highest standard. The result is a significant enhancement in patient safety, a reduction in complications such as infection or hematoma, and improved diagnostic accuracy through optimal specimen quality. Furthermore, clear communication and shared accountability among the team facilitate efficient management of pathology results and timely escalation of care when malignancy is confirmed. Ultimately, by uniting the skills of clinicians, nurses, radiologists, and pathologists within a coordinated framework, the healthcare team can deliver a standard of care that not only achieves diagnostic certainty but also prioritizes the patient's functional, cosmetic, and psychological well-being.

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