

Skin biopsy techniques: a step-by-step guide

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Here is a guide to the various types of skin biopsy technique and their indications and limitations.

Skin biopsy is used to confirm a clinical diagnosis, or help establish one when the clinical diagnosis is unclear. Excision biopsy can also be used to remove a lesion for cosmetic reasons or because of malignancy. A thorough understanding of the indications for skin biopsy, the available techniques and their limitations is essential. In all cases, correlation of clinical and histological findings is mandatory.

Matters to consider

Where should I take the biopsy?

Selection of the biopsy site is important and in the case of a rash may be based on the stage of the eruption. For example, in blistering disorders, early lesions show more typical histology and should be selected preferentially. In most other

eruptions, older, well-developed lesions are usually more typical. The lesions biopsied should be representative of the rash, and ideally untreated. If possible, avoid areas likely to heal poorly (lower legs and over bony prominences) or cosmetically important sites.

Biopsy through the bulk of the tumour is recommended for most skin cancers. For superficial basal cell cancers, biopsy the raised edge, and for large pigmented lesions, biopsy the thickest or most abnormal area (a dermatoscope may be useful).

Do I need to take more than one biopsy?

If a rash is polymorphous or consists of lesions in various stages of evolution, multiple biopsies may be appropriate.

Do I include normal skin?

Generally, normal skin does not need to be included in a biopsy specimen. However, this may be important in some atrophic or ulcerating lesions and in some pigment disorders, where a comparison with normal skin is useful.

How deep a biopsy is required?

Generally, biopsy down to the subcutis is recommended for all but superficial processes. The inclusion of subcutaneous fat is important if trying to diagnose a panniculitis.

What do I put the specimen in?

With rare exceptions, specimens for histology should be fixed immediately in 10% aqueous formalin.

What do I need to include on the pathology form?

Include on the form for the pathology laboratory a brief clinical history, the site of the biopsy, details of previous biopsies and histology numbers, suggested clinical diagnosis and differential diagnoses, and the tests required. The clinical history should include, for both rashes and tumours, the duration, site, description and previous treatment.

Patient and site preparation

Obtain the patient's consent (verbal or written) for the biopsy, explaining the procedure and risks (pain, bleeding, infection, scarring, etc).

Ideally, the area to be biopsied should be marked out prior to infiltration with anaesthetic. This is particularly important for inflammatory conditions and superficial processes where the lesion can 'disappear' with the local anaesthetic's blanching effect. The skin should then be cleaned with antiseptic and the area anaesthetised. Typically lignocaine with adrenaline, 1 in 100,000 (Xylocaine Ampoules [with Adrenaline 1:100,000]), is used for most areas. However, adrenaline should never be used in fingers, toes or the penis – instead use lignocaine alone (Lignocaine Injection, Xylocaine Ampoules [Plain] Injection). Octapressin (also known as felypressin) can be used in patients who are sensitive to adrenaline – the only octapressin-containing formulation available is Citanest with Octapressin [Dental] Injection (which is prilocaine and felypressin). Buffering the solution with sodium bicarbonate (one part sodium bicarbonate 8.4% to nine parts lignocaine 1% with adrenaline) and injecting with a 30-gauge needle significantly reduces the discomfort of the injection.

Equipment required

A standard set of instruments can be used and packaged as a biopsy kit. This usually includes tissue forceps (ideally fine-toothed with 'platform'), needle holder,



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Figure 1. Some of the instruments required to perform skin biopsies. From left to right: iris scissors, suture-cutting scissors, needle holder, fine-toothed forceps and suture.

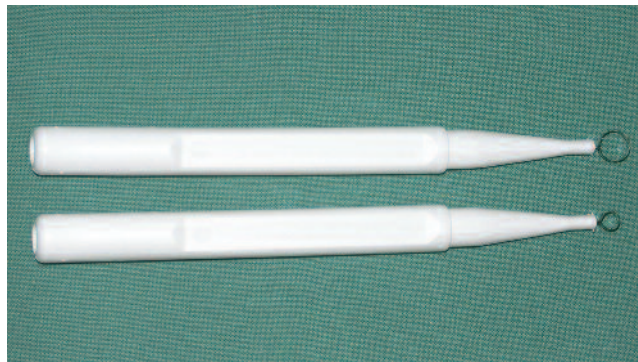


Figure 2. Disposable metal ring curettes – these are available in 4 mm and 7 mm sizes.

tissue scissors (such as iris scissors) and suture-cutting scissors (Figure 1). A scalpel holder and blade is required for excision and incision biopsies.

Appropriate sized nonabsorbable sutures should be chosen for skin wound closure (generally 5/0 or 6/0 for face, 4/0 for trunk and limbs). Absorbable sutures should be used subcutaneously in larger excision biopsies.

Disposable biopsy punches, which consist of a circular cutting metal edge mounted into a handle, range in size from 2 to 8 mm diameter. It is preferable to use at least a 3 mm punch to obtain a satisfactory specimen. Larger punches are often useful to ‘punch excise’ small lesions.

Razor blades are used for shave biopsies and can be obtained cheaply at most supermarkets. They can be individually

sterilised before use.

Disposable or nondisposable metal ring curettes are used for curette biopsies. Disposable curettes are available in 4 mm and 7 mm diameters (Figure 2).

The procedure: which type of biopsy should I do?

The various types of biopsy, their indications, the equipment required and their relative advantages and disadvantages are summarised in the Table.

Shave biopsy

Indication

Shave biopsy is a good technique for assessing superficial lesions that are epidermal or have minimal dermal involvement. This includes cutaneous horns, mollusca contagiosa, seborrhoeic

keratoses, superficial basal cell carcinoma and Bowen’s disease. Shave biopsy is also an effective method of removing benign papular naevi. The main limitation is that the base of the lesion cannot be examined.

Technique

A shave biopsy is best performed with a razor blade, which is more flexible than a scalpel blade and allows adjustment of the width and depth of shave removal. Inject local anaesthetic intradermally under the lesion to raise it (injecting into the subcutis first will reduce the discomfort). Stabilise the surrounding skin by fingertip pressure. Move the blade back and forth with slight downward and forward pressure, to slice through the epidermis and superficial dermis (Figure 3). Haemostasis can be

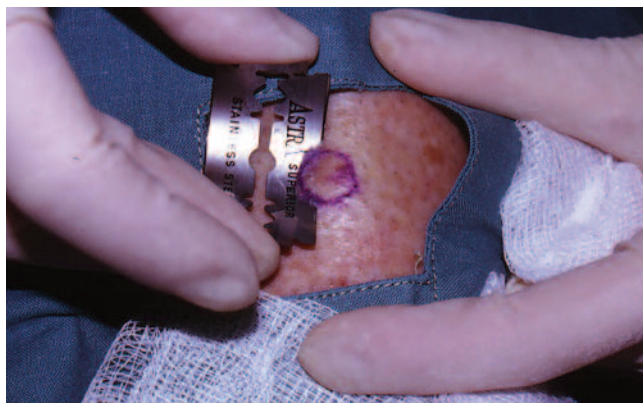


Figure 3. Shave biopsy of a seborrhoeic keratosis.



Figure 4. Applying aluminium chloride (35% in equal parts of alcohol and water) to a shave biopsy site for haemostasis.

achieved by diathermy, although the use of chemical cautery (such as aluminium chloride, 35% in equal parts of alcohol and water) tends to produce less scarring (Figure 4). The superficial wound heals over two to three weeks, usually with a hypopigmented patch.

Punch biopsy

Punch biopsy is one of the commonest and easiest techniques for skin biopsy of epidermis, dermis and some fat.

Indications

Punch biopsy can be used to diagnose

most dermatological conditions. However, for some conditions, such as melanoma, excision biopsy is preferable. Although a punch biopsy specimen contains some fat, this is usually inadequate for the diagnosis of deeper processes such as panniculitis.

Table. Types of skin biopsy

Biopsy type	Equipment required	Indications	Advantages	Disadvantages	Tips
Shave biopsy	Razor blade	Superficial benign nodular or papular lesions, seborrhoeic keratoses, superficial basal cell carcinoma, Bowen's disease	Quick, easy, no suturing required	Base and depth of invasion of the tumour cannot be examined. Whole lesion rarely removed, recurrence can occur (naevi). White scar	To reduce scarring, use chemical cautery (an aluminium chloride-soaked cotton bud rolled over the wound) for haemostasis rather than diathermy
Punch biopsy	Scalpel, fine-toothed forceps, needle holder, scissors, suture	Inflammatory dermatoses, skin cancers	Quick, easy	Unsuitable for deep processes	Stretch skin at right angles to relaxed skin tension lines when taking biopsy to create an oval rather than circular defect
Excision biopsy	Scalpel, fine-toothed forceps, needle holder, scissors, suture	When examination of lesion <i>in toto</i> required (e.g. melanoma)	Allows histological assessment of entire lesion	Time consuming	Place long axis of wound along skin crease lines, making length of excision three times width to avoid 'dog ears'. Evert skin edges
Incision biopsy	Scalpel, fine-toothed forceps, needle holder, scissors, suture	Deep processes such as panniculitis	Provides deep specimen for assessment of fat. When taken across normal and abnormal skin, provides side-by-side comparison	Requires suturing. Time consuming	Perform at right angles through lesion margin to include normal skin. Place long axis of wound along skin crease lines
Curette biopsy	Sharp-edged metal or disposable curette (4 or 7 mm diameter)	Small benign lesions (e.g. wart, seborrhoeic keratosis). More often used in combination with cautery as a therapeutic procedure than as a biopsy technique	Quick, easy, no suturing required	Tissue fragments difficult to interpret histologically. Slow healing. White scar	Shave biopsy can be performed first to obtain better (i.e. less fragmented) specimen for histology. For benign lesions use chemical cautery for haemostasis
Snip biopsy	Fine-toothed forceps, curved iris scissors	Polypoid processes with a narrow stalk, e.g. skin tags	Quick, easy	Limited to polypoid lesions	Use pressure or chemical cautery for haemostasis

continued

Technique

Infiltrate the area to be biopsied with local anaesthetic (Figure 5a). Stretch the skin at right angles to the wrinkle lines or relaxed skin tension lines when taking the biopsy (Figure 5b). Gently push the biopsy punch into the skin and rotate it between the thumb and index finger with a downward twisting movement until a 'give' is felt as it passes into fat. Once the desired depth has been reached, withdraw the punch. Gently lift the specimen with forceps (taking care not to crush the specimen) and cut through the fat at the base with scissors. By stretching the skin as described above, the circular impression of the punch becomes an oval wound when released, with its long axis parallel to the wrinkle lines (Figure 5c). This allows for a simple side-to-side closure without contour deformity ('dog ears') at the ends. Occasionally the biopsy can retract beneath the level of the skin, in which case applying fingertip pressure to either side will 'pop it out'.

Generally, better cosmetic results and

easier wound care are obtained if the defect is sutured (usually a single suture for a 3 mm punch, two sutures for a 4 mm punch, and three for a 6 mm punch) rather than if allowed to heal by secondary intention healing.

Excision and incision biopsy

Indications

Excision biopsy is used when examination of the entire lesion is required. Typically this applies to suspected malignant melanoma, where depth of invasion influences further treatment. It is also used when the diagnosis is clear and removal is performed for therapeutic reasons.

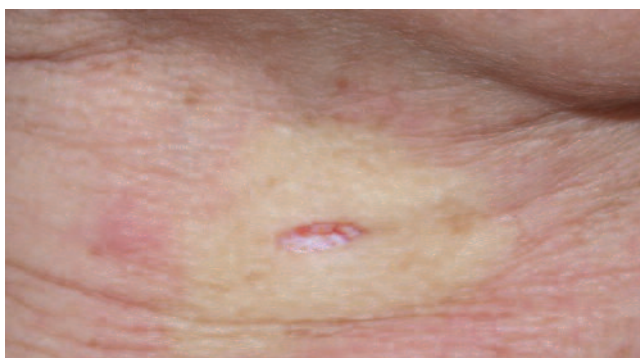
Incision biopsy is normally used for the diagnosis of deeper processes such as panniculitis (for example, erythemanodosum) and deep nodules and tumours, to provide adequate tissue for histological assessment.

Technique

Excision biopsy. Mark the area to be biopsied as an ellipse and infiltrate with local anaes-

thetic. The ellipse should be orientated parallel to, or within, skin creases on the face, or along relaxed skin tension lines. The ellipse length should be about three times the width (ellipse angle about 30°), so that 'dog ears' are not produced at the ends of the wound when sutured (Figure 6). Hold the blade at 90° to the skin (so the sides are vertical) and make the incisions as continuous sweeps rather than a series of small nicks. Incise down to fat. Using forceps to hold the tip of the specimen, cut through the fat at the base with scissors and remove the entire lesion. Achieve haemostasis with diathermy and close the wound with both subcutaneous (absorbable) and skin (nonabsorbable) sutures. It is essential that the skin edges be everted, to achieve the best cosmetic result.

Incision biopsy. The technique is similar to that for an excision biopsy but the biopsy should be performed through the lesion, the incision should be deep enough to include fat, and only part of the lesion is taken. All inflammatory



Figures 5a to c. Punch biopsy of a possible basal cell carcinoma on the left side of the neck. a (above left). Area to be biopsied after infiltration with local anaesthetic (note the blanching). b (above). Taking the biopsy, with the skin gently stretched at right angles to the wrinkle or relaxed skin tension lines. c (left). The oval wound before suturing.

nodules suspected of being infectious (possibly containing, for example, atypical mycobacteria or deep fungal infections), should be bisected, with half sent for histology and half for culture. The specimen for sending for culture should be placed in a sterile container on sterile gauze with a few drops of sterile water.

Curette biopsy

Indications

Curettage is used more often in combination with cautery as a therapeutic procedure for skin cancers than as a means of obtaining a biopsy. Curette biopsy specimens are usually obtained after curettage of benign lesions or curettage and cautery of skin cancers. However, because of their superficial, friable and fragmented nature, such specimens are difficult to interpret histologically.

Technique

Mark out the lesion and infiltrate local anaesthetic, as previously described. Drag the curette through the lesion with slight downward pressure to obtain a specimen and remove it. A metal open ring curette or a disposable curette can be used. Disposable curettes are much sharper than nondisposable ones, so care must be taken when using them because it is easy to perforate the skin down to the fat (particularly in patients with atrophic skin).

Snip excision

Indications

Snip excision is generally used for polypoid processes with a narrow stalk, such as skin tags.

Technique

Prilocaine plus lignocaine (EMLA) or other local anaesthetic may be used. Pick up the lesion with tissue forceps and snip the stalk through at the base. Curved scissors are usually best for this. Haemostasis can be achieved using pressure, chemical cautery or diathermy.

Aftercare

For punch, excision and incision biopsies, apply a nonstick dressing over the biopsy site. The patient can remove this 24 hours later, and quick showers are allowed after this time. Instruct the patient to gently clean the wound or suture line twice daily with saline or salt water (boil one cup of water, add one teaspoon of salt, allow to cool), pat the area dry and apply a thin

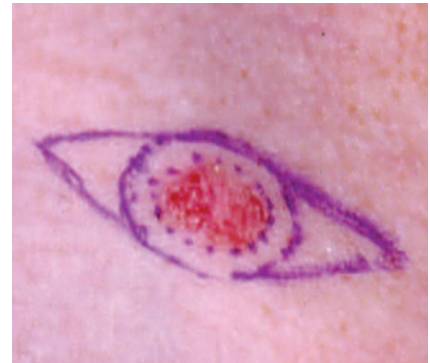


Figure 6. Excision biopsy site marked out as a 3:1 ellipse.

biopsy and curettage will heal with a white scar, and patients should be warned of this. Keloid formation is most common on the 'cape' area of the body (upper trunk, shoulders) and in non-Caucasian patients. Patients should be aware of the risk of stretched, hypertrophic and keloid scars in these areas.

Biopsies on the lower legs of elderly patients and patients with diabetes or peripheral vascular disease can take many weeks to heal (often up to eight weeks for curettes). It is mandatory to use local anaesthetic without adrenaline when biopsying the fingers, toes or penis.

Summary

Skin biopsy is a useful technique for GPs to master and a number of methods can be used. Generally, techniques such as shave and curette biopsy are useful for superficial processes, while incision or excision biopsies provide tissue for assessment of deeper conditions. Punch biopsy is a simple procedure useful for assessment of both superficial and dermal processes.

It is important that the pathology report is interpreted in conjunction with the clinical findings. If the pathology result does not correlate with the clinical picture, it may be best to seek a specialist opinion regarding the diagnosis. **MT**

smear of Vaseline or antibiotic ointment, until the wound has healed. Nonabsorbable facial sutures should be removed at five to seven days, and those in the trunk or limbs at 10 to 14 days.

Shave and curette biopsies and snip excisions heal by secondary intention over a number of weeks and can be cared for in the same way. Alternatively, dressings such as thin Duoderm or Advanced Healing Band-aids can be applied, and are often easier for the patient. These are usually changed every three days or so, until healed.

Precautions

A detailed knowledge of the anatomy of the area of biopsy is essential. Vital structures are sometimes within reach of even a punch biopsy.

Most superficial biopsies such as shave

DECLARATION OF INTEREST: None.