

VIDEOS IN CLINICAL MEDICINE  
SUMMARY POINTS

# How to Perform a Punch Biopsy of the Skin

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*The following text summarizes information provided in the video.*

## OVERVIEW

A punch biopsy allows for the diagnosis of skin conditions by means of histologic examination of a sample of the full thickness of the skin. The procedure is easy to master and has a low risk of adverse events and complications.

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## INDICATIONS

Punch biopsies aid in the diagnosis of many different types of skin disorders, including pigmented lesions, suspected skin cancers, generalized skin eruptions, blistering diseases, and vasculitides. Although panniculitides may be assessed with the use of a punch biopsy, the preferred technique at some institutions is the wedge biopsy, which ensures adequate sampling of the fat in such lesions.

### *Pigmented Lesions*

Whenever feasible, a punch biopsy of a pigmented lesion should include 1 to 2 mm of the surrounding normal skin to ensure histologic examination of the entire lesion.

### *Inflammatory Eruptions*

For inflammatory eruptions, the punch-biopsy sample should measure at least 3 mm in diameter to minimize sampling error and to provide sufficient tissue for any special staining that may be required.

## CONTRAINDICATIONS

There are few absolute contraindications to a punch biopsy. Neither anticoagulation nor even severe thrombocytopenia is a contraindication; however, to anticipate bleeding complications, it is important to determine whether the patient has a bleeding disorder or is taking any medications known to interfere with hemostasis, such as warfarin or aspirin.

Any history of allergic reactions to local anesthetics, antiseptics, topical antibiotics, or adhesive tapes should alert the provider to seek alternative options. Although a true allergy to lidocaine is rare, for patients who do have this allergy, a nonamide (ester) anesthetic such as tetracaine may be used. More often, patients will report adverse reactions to epinephrine, which is routinely added to lidocaine to hasten the onset of anesthesia and to decrease bleeding during the procedure. A plain lidocaine solution without epinephrine should be used for pregnant women and for patients in whom epinephrine has unacceptable side effects.

## PREPARATION

### *Selection of the Biopsy Site*

Unless the biopsy is being performed on a particular lesion, a site that will provide the greatest yield for diagnostic purposes and will minimize the aesthetic conse-

quences should be selected. “Fresh” lesions that have not been excoriated or subjected to secondary infection tend to provide the best diagnostic information. A specimen taken from dependent parts of the body, such as the lower legs, which are subject to venous stasis, may confound the histologic picture. In addition, the legs are typically susceptible to poorer wound healing and to infection. It is best to avoid punch biopsies of the legs, if possible. Biopsies performed on the back can have poor aesthetic results because the scars are often subject to stretching. Performing biopsies on the face should be avoided whenever possible. Should it be necessary to obtain a specimen from the face, remember that scars behind the ears, under the jaw, and at the hairline are the least visible. Never plunge a biopsy punch deep into the temple, the jaw, or the finger, since substantial injury to a nerve or artery could result.

#### *Other Considerations*

It is possible to “lose” the biopsy site once it heals. This becomes problematic if further treatment is needed. Taking a photograph of the marked biopsy site, with the patient’s consent, is recommended.

If you handle any nonsterile items, wash your hands and put on new gloves before performing the biopsy. The patient should be in a stable, reclining position on the examination table. You should have good visibility of the site and easy access to it.

#### **EQUIPMENT**

A standing tray should be prepared with a clean disposable cover. It is important to exercise clean technique, but it is not necessary to maintain a sterile field. You will need alcohol pads, a local anesthetic, gloves, toothed forceps, short scissors, suture material, gauze, a needle driver, the punch instrument, and a specimen bottle that contains formalin and has been properly labeled with the patient’s name, the patient’s identification number, the biopsy site, and the date (Fig. 1).

For a punch biopsy in which the area sampled is 2 to 3 mm in diameter, it is acceptable to use a hemostatic agent such as Monsel’s solution (also known as ferric subsulfate solution), which can obviate the need to suture the defect. Although Monsel’s solution is an excellent hemostatic agent, it may tattoo the skin, causing long-lasting hyperpigmentation. Consequently, some practitioners prefer to use aluminum chloride (usually a 35% solution) to achieve hemostasis. The aesthetic outcome can be satisfactory to excellent when either of these hemostatic agents is used for a small wound (<3 mm in diameter) left to heal by secondary intention (i.e., without suturing). This option also has the added benefit of not requiring the patient to return for suture removal.

For punch biopsies of larger areas of skin, the wound should be closed with a nonabsorbable suture, such as nylon or polypropylene. In general, for thick skin, such as the skin on the back or volar skin, it is advisable to use a 3.0 reverse cutting suture. A 5.0 suture is recommended for the face, and a 4.0 suture for the rest of the body. The vast majority of skin biopsy samples are transported in formalin in preparation for routine staining with hematoxylin and eosin.

If a tissue culture is needed, sterile technique should be used. The specimen must be placed inside a sterile cup (such as a urine sample container) on a piece of sterile gauze that measures 2 in. by 2 in. and has been premoistened with 10 cc of normal (nonbacteriostatic) saline. For immunofluorescence studies of biopsy specimens, Michel’s solution, which contains ammonium sulfate, is used as transport medium. For electron-microscopical studies, glutaraldehyde is used as transport medium.



**Figure 1.** Basic Equipment Needed to Perform a Punch Biopsy.

**PROCEDURE***Obtaining Informed Consent*

When performing any medical procedure, it is important to inform the patient about its indications, risks, and benefits. After answering any questions or concerns the patient has, you must obtain formal written consent. Follow the standard preoperative “time-out” protocol, and verify the side and site of the biopsy with the patient.

*Performing the Biopsy*

Begin the procedure by cleaning the area with an alcohol swab. If the lesion is poorly demarcated, it can be outlined with a skin-marking pen. Anesthetize the area by inserting the needle parallel to the lesion and slowly raising an intradermal bleb beneath it. If necessary, while the needle is still in the skin, partially withdraw it and reset the angle of the tip to anesthetize the area more widely and deeply. The effects of lidocaine are almost instantaneous. In highly vascular areas, such as the scalp, lidocaine with epinephrine should be used. When using lidocaine with epinephrine, it is prudent to wait several minutes before proceeding, to allow the epinephrine to exert its full vasoconstrictive effects, which minimize intraoperative bleeding.

For the biopsy of pigmented lesions, it is important to center the punch over the lesion; this will help you secure a complete sample. The back of the punch can be used to make an imprint around the lesion that will serve as a guide when you perform the biopsy.

Start by stretching the skin at an angle that is perpendicular to the skin tension lines. Doing so will create a wound that is elliptical, which will minimize puckering once the wound is sutured. Holding the punch in your hand and placing the fifth finger of that hand adjacent to the lesion for stability, position the punch over the biopsy site. For pigmented lesions, use your imprint as a guide. Gently apply rotational and downward pressure on the punch instrument until you feel the “give” as it enters the layer of subcutaneous fat (Fig. 2). Withdraw the punch and blot any bleeding with gauze. Use toothed forceps to lightly grasp and lift the specimen, taking special care not to crush it. The fat layer is often loose, and you may be able to remove the specimen without cutting the base. If necessary, use scissors to cut the base of the specimen at the level of the fat (Fig. 3). Place the specimen in a labeled receptacle that contains the appropriate transport medium. Confirm that no tissue has been inadvertently left in the punch instrument. You should be able to see through the entire hollow tube inside the instrument.

*Suturing the Biopsy Site*

When the specimen has been obtained, the wound may be sutured. Sutures should be placed perpendicular to the long axis of the punch defect or perpendicular to the skin tension lines. Begin by placing the needle through the edge of the wound. Release the needle while keeping your palm down, and grasp the point with the needle driver. The wrist curves naturally and will direct the blunt end of the needle toward your forceps. Reload the needle driver before the opposite edge of the wound is pierced. When the needle emerges from the skin, grasp the needle point with your palm down and direct its blunt end toward your index finger and thumb. Circle the suture around the needle driver twice before resting the driver on your thumbnail to prevent the suture from slipping. Pull up on the thread until the free end of the suture is short, and secure it with the needle driver. Next, spool the suture. Secure the first part of the knot, using gauze to absorb excess bleeding. Circle the suture once in the opposite direction, and cinch a square knot. Repeat these



**Figure 2.** Positioning of the Punch Instrument.



**Figure 3.** The Use of Scissors to Remove the Specimen from the Biopsy Site.

steps three times, and then cut the suture at about 1 cm. If a second suture is needed, you can pierce the entire wound without going through the center.

Place one, two, or three simple interrupted stitches, depending on the size and the location of the defect. For an area measuring less than 3 mm in diameter, a single stitch is sufficient. For an area measuring 4 to 5 mm, place two simple interrupted stitches. Place one more stitch for every 1-mm increase in size thereafter.

#### **SPECIAL SITUATIONS**

Although complications from a punch biopsy are rare, it is important to monitor the patient for bleeding, infection, and scarring. There are a few situations in which the simple suture may fail. The edges of large punch wounds in lax skin may invert with a simple suture; in such cases, a vertical mattress suture is preferred, since it will evert the edges of the wound for better approximation of the skin edges. When performing a punch biopsy on volar skin, the suture material may cut through the tissue; therefore, piercing the skin farther away from the punch defect is necessary. In addition, sutures with a larger caliber, such as a 3-0 nylon suture, will be less likely to cut through tissue than sutures with a smaller caliber.

On the highly vascular scalp, bleeding may be brisk. Therefore, it is important to anticipate and prepare for increased bleeding. An assistant can occlude the punch defect with a cotton-tipped applicator, allowing the surgeon to visualize suture placement. Alternatively, place the corner of a piece of gauze at the punch defect; this will facilitate the absorption of blood through capillary action. The use of gauze allows for the best possible visualization of the biopsy site for effective suture placement. Bleeding is often easily controlled with the local application of pressure and the proper placement of the first suture, as described previously.

In patients with thrombocytopenia or those being treated with anticoagulants, it is typical to place a pressure dressing over the sutured site to prevent late-onset bleeding. The pressure dressing can be removed by the patient 24 hours after the procedure and replaced with a common adhesive bandage.

Remember the anatomy when performing a punch biopsy to avoid damage to major blood vessels and nerves. For example, avoid punch biopsies of medial and lateral digits, and palpate the temporal artery before performing a biopsy near the temple. When performing a punch biopsy on the palm, recall that there is very little subcutaneous fat and that once the entire dermis is breached, the instrument is essentially at the level of the fascia. In such instances, you should refrain from applying too much pressure to the punch. When performing a biopsy of the lip, which is highly vascular and extremely pliable, use a chalazion clamp to allow for easy handling and intraoperative hemostasis. Performing a punch biopsy in infants is fairly easy, since the subcutaneous fat will push the specimen up, making it relatively easy to grasp; you will not need to punch much beyond the dermis.

#### **AFTERCARE**

The application of a topical antibacterial agent after a punch biopsy is discouraged because allergic reactions are common. The biopsy site should be cleaned with soap and water twice a day. After dabbing it dry, the patient should apply petroleum jelly to aid healing.

When sutures have been placed, they should be removed 1 to 2 weeks after the procedure, depending on their location. To minimize the risk of track marks and scarring, sutures placed on the face should be removed in 1 week, and sutures on other parts the body should be removed in 10 to 14 days.

**SUMMARY**

The punch biopsy is the primary technique used for the diagnosis of many dermatologic conditions. Provided that the site of the biopsy is selected judiciously, that hemostasis can be achieved, and that there is a pathologist available who can assess and diagnose histopathological features of the skin, the punch biopsy is a helpful procedure for physicians across a broad spectrum of specialties.

No potential conflict of interest relevant to this article was reported.

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

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