PRACTICAL
Skin Cancer Surgery

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The intent of this text is to detail and teach operations that can be done in a doctor’s clinic under local anaesthetic but that can account for most of all skin cancer cases.

Skin cancer surgery is unique in that a hole remains where the cancer has been excised and, somehow, this defect then has to be closed and the wound sutured together without tension. This text details not only how to do so but how to do it best.

The operations described in this book are well within the capabilities of any medical practitioner given the progressive training systematised in this text.

Skin cancer is the fastest growing medical epidemic of Caucasians. Once melanoma or keratinocytic (basal and squamous cell) cancers have invaded by penetrating through the basement membrane, surgery is the definitive treatment. All else is blind, questionable or palliative.

The text moves in a logical advancement from basic, simple, straight-line excisions to more complex flaps in step-by-step, methodical, teaching sequences. Absolute surgical basics, too often glossed over, are documented to provide the basis for progressive improvement, upgrading and advances as well as best possible cosmetic results. No one likes or deserves an ugly scar.

Researched world’s best evidence is provided as to margins along with slow Mohs technique, which affords the best results.

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The cyst, the whole cyst and nothing but the cyst.  

* * *  

Cysts

**EPIDERMOID CYSTS**

An epidermoid cyst may also be known as a sebaceous cyst, follicular infundibular cyst, epidermal cyst, epidermal inclusion cyst, keratinous cyst, milia, pilar cyst, wen or steatocystoma.

- **Epidermoid cyst** is now arguably the best term as most originate from the follicular infundibulum. They contain a cheesy keratin and fat and have a central punctum. They are the most common cutaneous cysts and may occur anywhere on the body but most frequently on the face, scalp, neck and trunk.

- **Epidermal inclusion cyst** refers specifically to an epidermoid cyst that is the result of the implantation of epidermal elements deeper in the dermis.

- **Sebaceous cyst** is a term that should be avoided because it implies that the cyst is of sebaceous origin. They are not filled with sebum but keratin.

- **‘Infected sebaceous cyst’** is not infected but, rather, it is where keratin has extruded, usually due to it being squeezed, resulting in the surrounding tissues being inflamed (not infected). Antibiotics are not indicated. They settle with time and with not being touched.

- **Milia** are very small, superficial epidermoid cysts. These 1–2 mm lesions can arise spontaneously or can be caused by trauma. A small nick in the epidermis with a no. 11 blade or a 23G needle allows expression of the keratinaceous white kernel or, often, a surprisingly long ‘worm’ of keratin.

**Other epithelial cysts**

- **Pilar** or **trichilemmal cyst (wen)** occurs predominantly on the scalp, is odourless and has less fat and more keratin than epidermoid cysts. They are very amenable to removal by the minimal excision technique. They do not have a punctum like epidermoid cysts. They are smooth, mobile, asymptomatic swellings, often in the scalp. Overlying hair loss may be noted and multiple cysts may be present.

- **Steatocystoma multiplex** are multiple, small, yellow, cystic nodules (a few millimetres in diameter) that can be found on the trunk, upper arms, axillae and thighs. The multitude of lesions may preclude cyst removal.

- **Favre–Racouchot syndrome (nodular cystic elastosis)** [1, 2] is characterised by multiple lesions, most usually on the periorbital and temporal areas, resulting from profound sun and probably smoking damage [3] that results in severely photo-damaged skin with, atrophy, wrinkles and furrows. The pilosebaceous openings stretch and the orifices fill with keratin material, producing multiple open and closed comedones and cysts with yellowish discolouration, yellowish nodules but with no inflammation, unlike the comedones seen with acne.

- **Dermoid cysts** are congenital cysts with a pungent, rancid odour. They occur in the lines of cleavage around the eyes and on the base of the nose and sublingually. They can extend intracranially, and a CAT scan/MRI is necessary.

**TREATMENT**

There are many surgical approaches to epidermoid cysts. Although complete surgical excision can ensure removal of the sac and prevent recurrence, this technique is time-consuming and requires suture closure. The minimal excision technique has been proposed as a less invasive and successful intervention and does not require suture.
closure. The procedure is easy to learn, and most doctors experienced in skin surgery can perform the procedure after three to five teaching sessions. It involves making a 2–3-mm incision, expressing the cyst contents through compression and extracting the cyst wall through the incision. The punch external extrusion excision is a variation.

There are six main techniques: slit incision, normal incision, traditional wide excision, minimal incision, punch biopsy excision and punch external extrusion excision (PEEE).

**Slit incision**

Refer to Figure 10.1.

**Normal incision**

**Removal of the whole cyst intact**

Very often the fibrous capsule (especially of pilar cysts) is thick enough so that the cyst can easily be removed intact via blunt dissection without expression of the contents. Drape, prep and anaesthetise the area with local anaesthetic with adrenaline and bicarb. Anaesthetise the surface, sides and beneath the cyst (if possible) using a long 30G needle. This applies to all techniques. Make a superficial linear incision to expose but not cut into the capsule (i.e. just to expose the cyst superior surface, without cutting into it). Small artery clamps (curved are preferable to follow the curved lateral walls of the cyst) can be inserted, closed, into the centre of the incision between the outer cyst wall and surrounding tissue to do this efficiently and quickly by opening them up to effect this blunt dissection separation. Otherwise an assistant can retract the skin with skin hooks.

This is the preferred method as, if the whole intact cyst is removed, there will be no recurrence (see Figures 10.2 and 10.3).

*Note*: incision into the cyst does not matter as long as the whole cyst is extracted.

See also the section below, ‘Punch external extrusion excision’.

**Towel clamp retractor**

The towel clamp is a locking clamp with two sharp points separated by 60° [4]. For the excision of epidermoid cysts it can provide a useful, secure/non-slip retractor, especially for the unassisted surgeon [5, 6].

The clamp is locked into the tissue a little away from the distal (to the surgeon) incision end. The security and lack of slippage thus provided allows this end to be moved in any direction to provide excellent retraction either unassisted (non-dominant hand) or assisted.

**Traditional wide excision**

This method – involving dissection and removal of the cyst completely from the surrounding tissue through an elliptical incision – is considered the gold standard of treatment. This time-consuming endeavour frequently leads to significant scarring in comparison with minimal excision or punch biopsy, but has almost no recurrence when the cyst wall is entirely removed [7]. If the cyst ruptures accidentally during the procedure, remove the remaining contents and wall with a curette. The technique is essentially the same as above. Some surgeons use curved artery clamps to blunt dissect as the curve follows the cyst wall and the blunt instrument is less likely to puncture the cyst wall. In the hands of ‘experts’ this can be a tour-de-force and very quick, especially for wens.

**Minimal incision and punch biopsy excision**

These techniques are purported to produce minimal bleeding, have faster healing times and produce less scarring because of the small opening through which the cysts are removed [7]. Though both techniques offer a shorter procedural time, they appear to have a slightly higher rate of recurrence. This was first described by Danna in 1945 [8]. Mehrabi later concluded the punch incision technique, when properly performed, is a satisfactory removal method with a recurrence rate of 8.3% [7]. He analysed and provided data demonstrating that the removal of keratinous and pilar cysts by the punch incision technique is a viable option with an acceptably low recurrence rate and that the removal of keratinous and pilar cysts by the punch incision technique is an alternative to traditional excision methods. It is easy to perform with commonly available instruments, and quick.

Subanalysis revealed a trend showing that inflamed cysts had a lower recurrence rate. Another trend was that cysts removed from the back and ear had the highest recurrence rates (13.8 and 13.0%, respectively) compared to those removed from other locations. Most cysts (54.5%) recurred within the first year after punch incision removal [7].

**Recurrence**

- 55% recur within the first year
- Ear = 13% 
- Back = 14%
- Elsewhere = 8%

**Minimal incision technique**

This involves a 2–3-mm incision, expression of the cyst contents and extraction of the cyst wall through the incision. Vigorous finger compression and kneading is used to express the cyst contents and loosen the cyst wall from the surrounding tissues to facilitate removal of the sac. The tiny wound can be closed with a single suture, although it is most often left. Expression of the cyst contents through the small opening can cause the sebaceous material to spray across the surgery room. Gauze should be used to cover the area as compression is applied. (splatter shields are also available). Following expulsion of the cyst contents, the loosened capsule is delivered
through the small opening. Closure with suture is optional [9].

**Punch biopsy excision technique**
This was apparently first described by Danna in New Orleans in 1945 [8]. A punch biopsy instrument is used to create the opening into the cyst except that the incision is made using a single-use disposable dermal punch. Expulsion of the cyst contents, with cyst wall, is achieved via lateral pressure [7].

One small randomised study compared traditional wide excision with punch biopsy [8]. They found punch
biopsy to be less time-consuming and to offer superior cosmetic results. However, cysts larger than 2 cm took longer with the punch biopsy technique. Of the 31 patients randomised to the punch biopsy technique, there was 1 recurrence in the 16 months of follow-up compared with none in the wide excision arm.

Study results indicated [7]:
- recurrence rate = 8%
- less pain
- better cosmesis (small scar)
- less bruising.

**Technique**
1. Prep skin and anaesthetise with 1% lignocaine with adrenaline ring block.
2. Single-use, disposable 3-, 4- and 5-mm dermal punch biopsy; 4-mm most used. Twist as if performing a biopsy.
3. Make a round incision in cyst middle (over the punctum if identified).
4. Apply lateral pressure at the base of the cyst to express and deliver the contents of the cyst, including part of the cyst wall.
5. The greyish cyst wall can then be identified.
6. Tease out remnants through the punch opening.
7. Carefully inspect the wound to ensure complete removal of the capsule to prevent recurrence. Wound closure usually requires only one or two sutures.
Figure 10.3 Removal of a large epidermoid cyst in the forehead hairline

a The site has been clipped, not shaved. b A very narrow ellipse facilitated exposure, retraction of the skin and dissection. A straight incision was considered but the ellipse removed some of the stretched skin so as to minimise any residual loose skin. c ‘The cyst, the whole cyst and nothing but the cyst.’ d 8 days later at ROS. Although the patient’s hair is silver the blue sutures still make them easier to see to remove. e 6 weeks postoperatively. No scar is visible and there is no deformity or loose skin. Skin not only stretches but, as here, can also take up. The patient’s (and his family’s) only regret was that he had waited so long.
8 The entire extracted cyst wall, as well as the cyst contents, is sent for pathological examination.

**Punch external extrusion excision (PEEE)**
This is a variation on the previous two techniques, but not all cyst contents are expressed and blunt dissection is used. This may facilitate better identification and removal of the entire sac.

A 4-mm (or larger) punch is used to remove the skin over the punctum or apex.

**Technique**
1. Once the cyst roof is identified, puncture it and expel enough of the contents to deflate it somewhat.
2. Initial dissection of the top rim of the cyst sac may have to be done with scissors as the cyst wall is most adherent here. But once this first 1 mm or so is free, blunt dissection is then possible and preferable.
3. Secure the edge of the opening and carry out blunt dissection. Curved artery clamps are ideal for most smaller to medium-sized lesions but larger curved clamps or even the needle holder is used for wens and such. Insert the closed end of the clamp curving around the cyst and then open it, breaking down the adhesions.
4. The deflated cyst allows purchase of the rim with the needle holder or such and facilitates manoeuvring the sac to make dissection easier. Continuous traction finally frees the half-filled cyst, which is then delivered effectively in toto (only the ‘lid’ having also been removed).
5. The punch hole, as with normal biopsies, can be left to heal.

This technique has the advantages of ensuring complete removal and therefore preventing recurrences, being one stage, quick and without the expense and bother of sutures.

**Resume incision with expression of the contents**
1. Cover the incision with a gauze to prevent the contents spurring.
2. Over the centre of the cyst, to include the punctum, make a small linear incision, an elliptical excision or a 4–8 mm punch (biopsy). A number 11 blade to stab or a 4-mm punch biopsy twisted in is most often used. The punch has the advantage of removing the punctum.
3. Insert a small (straight) artery clamp into the cyst and open/spread the tips.
4. Remove it and express the contents of the cyst by evenly, gradually increasing finger/thumb pressure or by bilateral squeezing. The artery clamp can be reinserted, if needed, to assist with passage of the sebaceous material.

**Note:** the contents are foul-smelling.

5. After complete expression all attempts should be made to remove the entire sac:
   A. The clamp is reintroduced into the cyst and the sac at the base is grasped and pulled/teased out.
   or
   B. Grasp the edge of the cyst with forceps and separate the cyst via blunt dissection.

   Complications: the sac may break, and several pieces may need to be removed. If the intact sac cannot be removed/identified, use a curette against the inner wall and move it back and forth to dislodge the capsule from the surrounding tissue. If any remnants remain recurrence can occur.

6. Most small incisions do not require suture closure. Punch excisions >4 mm usually do need a suture.

7. Dress with a gauze pad.
   - Instruct the patient to maintain direct pressure (using the gauze pad supplied) on the site for 1–2 hours (longer if bleeding is suspected) or apply a pressure bandage if possible.

**Comparison of techniques**
Any technique that does not provide visual confirmation of complete removal of the cyst/sac is fraught with the potential for recurrence. In a randomised study comparing punch incision to elliptical excision, epidermal inclusion cysts measuring 1–2 cm that are located on the face or in an area of cosmetic concern were best treated with punch incision. The mean lengths of the wounds in the punch incision and elliptical excision groups were 0.73 and 2.34 cm, respectively. Mean operative time was significantly shorter in the punch group (12.7 minutes) as compared with the surgical group (21.6 minutes). No complication occurred in the punch incision group. There was no significant difference in the recurrence rate [8].

**‘Infected’ (inflamed) cysts**
Epidermoid cysts are benign lesions that rarely require intervention but are excised for cosmetic reasons or because they are inflamed or grow so large as to be a problem [10]. Rarely are these cysts truly infected. The inflammation is secondary to cyst wall rupture with leakage of cyst contents, which elicits the inflammatory response [11]. Infamed cysts should be allowed to settle prior to attempted removal. Excision of an inflamed cyst is not recommended as the inflamed cyst wall is more friable and therefore more difficult to remove completely [12], which may lead to a higher rate of recurrence. Kitamura et al. (1994) [13] suggest primary resection, wound lavage and primary suture without drainage for infected epidermal cysts.
NOTE
Do not excise inflamed cysts; let them settle.

RECOMMENDATIONS
- For small cysts (3–4 cm) that have never become inflamed or ruptured: normal straight incision minimal excision technique is recommended because it's likely that the entire capsule can be dissected out and the whole cyst removed with minimal scarring and faster healing time. Also, for cysts on the face, this method produces a better cosmetic result because of the significantly smaller scar.
- For large lesions >5 cm: traditional wide excision is faster than the minimal or punch techniques.
- Ruptured, previously expressed or recurrent: wide excision may be best. In these scenarios, it is extremely time-consuming and often impossible to remove the entire capsule using the minimal excision technique.

EQUIPMENT

Anaesthesia
- Non-sterile gloves
- Mask, glasses; shield may be circumspect
- Site prep
- Gauze squares
- 5-mL syringe
- 23G draw-up needle
- 30G 30-mm needle
- Lignocaine with adrenaline; bicarb

Sterile tray for the procedure
- Sterile gloves
- Fenestrated disposable drape
- Three small mosquito curved clamps
- No. 11 blade/4-mm punch
- Needle holder for suturing (if needed)
- Iris scissors
- Adson forceps
- Sterile gauze swabs
- Skin hooks
- Curved and straight artery clamps
- Suture materials (if needed)
- Splatter control shield (if desired)

Non-sterile technique
As noted elsewhere, non-sterile gloves do not seem to result in more infections than sterile gloves for such skin surgery.

COMPLICATIONS AND DIFFICULTIES
- Content spurt: the cyst contents can burst across the room with no or even with the most gentle pressure. Strong pressure can also precipitate this without warning. Hold gauze loosely over the site to prevent this. Protective splatter masks and eye protection are available.
- Cyst wall can't be extruded: the most common cause is that not enough pressure is applied. Very often great pressure with thumbs is needed and can be quite exhausting.
- Adhesions from previous rupture: previously ruptured or inflamed cysts may have significant fibrous adhesions. Scarring may preclude removal with the minimal excision technique and a wide excision will be needed. Most of these can be avoided by a careful history and examination to ensure mobility. Caution: wide excisions always take longer than estimated.
- Cyst wall breakage: pressure, kneading and careful blunt dissection minimises this complication. If breakage occurs, inspection and curettage to try and remove the entire capsule should be done.
- Bleeding: control the bleeding, especially to prevent a residual haematoma, by direct pressure applied to the site with gauze and possible cautery.
- Haematoma: major bleeding is rare. Haematomas can be avoided by having the patient apply firm pressure, with a gauze pad, to the surgical site after the procedure for 2–4 hours if oozing or bleeding is suspected or applying a pressure bandage if possible. The old surgical axiom that bleeding occurs at 6 and 48 hours may need to be remembered for those patients who seem to bleed or are on anticoagulants. Direct pressure can also express any clot that forms via the original incision.
- Incorrect diagnosis: what appears a typical cyst may be solid when cut into. Remove a solid cyst by a formal surgical excision and send for histological evaluation.

PATHOLOGY
Because malignancy is rarely associated with a cyst it is not necessary to send all epidermoid cyst walls for histological evaluation, but any lesion that appears atypical or one that is associated with a palpable irregularity in the cyst wall should be sent for histological analysis.
If a solid tumour is discovered at the time of the procedure, obtain a biopsy. Incisional biopsy can be performed for very large lesions, and excisional biopsy for the smaller lesions. Pilar tumours of the scalp are often confused with epidermoid cysts and may require wide excision because they can erode into the skull.
Lipoma

The techniques are essentially the same as for cysts. The punch biopsy technique takes more time but offers a smaller scar and better cosmetic result (Figure 10.4). It is then a question as to whether the patient wants this and the extra costs involved for the extra time. It is also somewhat alarming to the patient with the amount of pressure that is needed to extrude the fat. Quite large lipoma can be removed via an 8–12-mm punch biopsy hole but then require a great deal of pressure and extensive exploration and breaking down, inserting and twisting the punch biopsy or scalpel to the far margins of the lipoma.

**WARNING**

If the diagnosis is in doubt, an ultrasound, CT scan or even an MRI will help diagnose and define. The traps are those lipoma on the back that may go deep into the muscle and are not amenable to this technique but need to be followed with full exploration to be excised, usually in a hospital. If in doubt get radiological help.

*Figure 10.4* Punch biopsy to remove a lipoma

- **a** A relatively small lipoma on L scapula. But lipomata can occur elsewhere. A field block is done by inserting a 25G 32-mm needle with lignocaine and adrenaline at 9 o’clock and injecting to 12 o’clock, then to 6 o’clock by pulling back but without withdrawing the needle. This is then repeated from the opposite side (3 to 12 o’clock, pull back, don’t take the needle out but inject to 6 o’clock). This reduces the injections to two. In the end a square of anaesthesia encloses the lipoma.
- **b** An 8-mm punch is placed in the centre.
- **c** And twisted to the hilt/shoulder.
- **d** The plug of skin and attached fat is withdrawn.
Pushing and squeezing around the lipoma circumference extrudes more fat but then the organised septa have to be broken down with the punch or the scalpel. The septa may be extremely tough. Be brave: keep making sweeps with a scalpel to the marked margins if this is the case. This is continued plus the squeezing until all fat has been cleaned out. Pulling, twisting and levering the fat out with artery forceps may also be necessary. The jars are sent to pathology – in this case two such full jars. Close with an ‘X’ stitch or interrupted.

REFERENCES


