

Primary Care Dermatology Society - Skin Surgery Guidelines

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Disclaimer – This document should act only as a guide and must be read in conjunction with appropriate minor surgery textbooks. Individuals carrying out minor surgery must undertake the relevant training and accreditation. The authors cannot accept responsibility for any misleading or incorrect statements, and the management of individual patients remains the direct responsibility of the individual doctor. We do however hope that any health professionals reading this document can contact us regarding comments that are considered misleading or incorrect so that we can continue to improve the document.

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1) Relevant history and examination

Cardiovascular disease	<ul style="list-style-type: none"> • IHD – Pain & anxiety can exacerbate conditions • Pacemakers & Implantable defibrillators – Bipolar coagulation safe. Monopolar (e.g. Hyfrieicator) probably should be avoided in old pacemakers and all implantable defibrillators • Valvular disease – No evidence that antibiotic prophylaxis needed. Although infected wounds should be treated prior to surgery. • Raynauds disease – Extra care needed with peripheries.
Medications	<ul style="list-style-type: none"> • Warfarin – Ideally INR < 3.5 / Extra attention needed for haemostasis • Aspirin and clopidogrel – Extra attention needed for haemostasis • NSAIDS – No problems
Pregnancy	<ul style="list-style-type: none"> • Skin surgery is best avoided in pregnancy unless the benefits outweigh the risks e.g. skin cancer is suspected. Where possible local anaesthetic should be avoided in the first trimester.
Allergies	<ul style="list-style-type: none"> • Elastoplast • Antibiotics • Latex – Gloves and surgical couch • Antiseptic preparations – Uncommon • Local anaesthetic – Very uncommon
General examination	<ul style="list-style-type: none"> • Patients with pre-malignant lesions or skin cancer must have a thorough examination of the skin.
Patient expectations	<ul style="list-style-type: none"> • Is the surgery necessary? • What outcome is the patient expecting? • Risks vs. benefits

2) Which lesions to treat

It is important to have a clear understanding of the NICE Guidelines on ‘Skin tumours including Melanoma’ - www.nice.org.uk. These guidelines state that:

- All patients with suspected (or proven) cases of melanoma or squamous cell carcinoma of the skin must be referred via the ‘2-week wait’ rule to secondary care.
- Patients with high-risk basal cell carcinoma (as defined by the British Association of Dermatologists guidelines on BCC – www.bad.org.uk), rare skin cancers and lentigo maligna should also be referred to secondary care.
- Cases of low-risk basal cell carcinoma, AK & Bowen’s can be managed in the community by suitably trained professionals who fulfil the criteria as set out by the NICE guidelines.

Competency levels

Skin lesions should only be removed in the community by individuals who have received the appropriate training and are competent to carry out the procedure. The operator should be familiar with common dermatological conditions and have an accurate differential diagnosis of the lesion, which is about to be removed.

3) Risks

The risks of skin surgery include:

Damage to nerves

Significant nerve damage may arise due to poor knowledge of anatomy, anatomical deviation, or poor dissecting technique.

It is quite common for patients to experience minor degrees of altered sensation on or near the scar area, and in some cases this may be permanent.

Haemorrhage

This may arise due to damage of vessels and/or poor haemostatic control. Extra caution is needed in the following situations –

- Lesions on the scalp and face tend to be more vascular
- Larger and deeper lesions
- If there is a PMHx or FHx of bleeding problems - Organise pre-op FBC & clotting studies
- Medications – Warfarin, aspirin & clopidogrel

Failure to achieve wound closure

Most likely to result from poor planning of the procedure or working above level of competency.

Wound infection

Infections occur in about 5% of all cases. Most intra-operative infection tends to become symptomatic within 48 hours of the procedure.

Wound dehiscence

A wound coming open may result from infection, high-wound tension, poor suturing, removal of sutures too early or sometimes it may be the fault of the patient.

Over granulation

This occurs when the wound is over stimulated. It can be treated with 1% silver nitrate twice weekly, although avoid if cosmesis important as this can stain the skin. Other options include dermivate, adcortyl or curettage & cautery.

Incomplete excision rate

Incomplete excisions are more likely to occur in the following circumstances:

- Lesions on the nose and inner canthus
- Certain tumours e.g. morphoeic and other infiltrative BCC, multi-focal BCC or any tumour with ill-defined borders.

Unsatisfactory scar formation

Patients need to be told that scars can take up to 18 months to mature, and scars on the back & scalp areas tend to widen with time.

Hypertrophic and Keloid scars can occur in any individual but are more likely in the following circumstances:

- Lesions on chest above nipple line, upper back, shoulders & upper arms.
- Previous history of keloid scars
- Afro-Caribbean patients
- Younger age
- Female

In at risk patients consider prescribing dermatrix that may reduce the scar size.

Distortion to local anatomy

This can include ectropian, elevation of the eyebrow, and distortion of nostril or lip.

Cryotherapy

Risks include blistering, hypopigmentation, nail dystrophy and rarely damage to extensor tendons of fingers.

4) Problem areas

Face

The SMAS layer (Superficial Musculo-Aponeurotic System) lies below the fat and forms a single discrete, tough white continuous fascial layer that envelops all the muscles of facial expression. Through its numerous connections to the overlying skin, the SMAS amplifies and transmits the muscle contraction into different and diverse facial expression. Nearly all the critical structures on the face lie deep to the SMAS, the only exception being the superficial branch of the temporal artery that sits on top of it. This artery lies in front of the ear and branches across the temple area towards the mid forehead level.

The majority of excisions do not enter the SMAS and so damage to significant facial structures is uncommon, nevertheless extra care is needed in the following circumstances:

- The superficial branches of the temporal artery
- The temporal and marginal mandibular branch of the facial nerve. The temporal branch is found in the temporal area. The marginal mandibular branch is found crossing over the lower border of the mandible where a branch of the facial artery can be felt pulsating. Damage to these nerves can cause significant facial dysfunction.
- The point just below the inferior margin of the ear lobe where the facial nerve exits the scalp and enters the subcutaneous tissue.
- Subfrontalis lipoma - These lesions lie under the frontalis muscle and go very deep, clinically they become less obvious when the eyebrow is raised. Any damage to the temporal branch of the motor nerve, which runs transversely in the forehead, will result in difficulties elevating the eyebrow.

The neck

- In elderly patients the external jugular vein may have little covering platysma and so is more susceptible to damage. Careful blunt dissecting should avoid injuring the vein i.e. using blunt-tip but sharp cutting scissors to advance and dissect the tissue by opening the jaws of scissors from a closed position. If the vein is cut pressure must be put on the wound and the patient must be put head down to prevent an air embolus.
- The accessory nerve at Erbs point, which lies deep to the superficial fascia.

Other areas

- The axilla where nerves arising from parts of the brachial plexus are near the surface.
- The lateral cutaneous nerve of the thigh is easily damaged over the upper outer quadrant of the thigh.
- The lateral side of the popliteal fossa where the common peroneal nerve is situated.
- Outer and lower aspect of shin where the sural nerve (sensory to 4th and 5th nerves and lateral border of foot) is very superficial and is commonly used as a donor nerve graft.
- Avoid excessive skin tension on the pre-tibial surface, which breaks down easily post-op. Skin flaps or graft should be used if lesion is too large for easy direct skin closure.

The following steps will help to reduce the risks of minor surgery:

- Lift the area up with a good (but safe) amount of anaesthesia or normal saline.
- Good light and good visibility - Always be able to see what you are doing.
- Look out for nerves, which are white. Make certain of the local anatomy beforehand.
- If undermining is needed avoid going deeper than the fat layer. Use blunt scissors and open up from a closed position as they are advanced.
- Take care with diathermy i.e. the tips can burn the skin edges.
- Be aware that local anaesthetic takes out sensory function before motor function, so don't panic if the local motor function appears to be affected during surgery – It is probably the anaesthetic!

5) Consent

Always ask - does the procedure need doing and if so by which technique?

The following points need to be clearly explained to the patient and consented for:

- The type of skin surgery and associated risks
- Histology
- Photography

Obviously try to avoid doing skin surgery on exposed areas before any major social occasion.

Consent is best achieved in a written form and then scanned into the patient's notes.

Ask patients to contact you with regards any post-op complications as most such problems can easily be dealt with.

Guidelines for consent can be found at www.doh.gov.uk/consent

6) Infection Control

The following measures will help reduce the infection risk:

- Clean and dedicated surgical area
- Elbow taps
- Clean surgical tops and hats
- Occasional use of masks for surgeon and operating assistant if lesion is sizeable/deep
- Keep nails short and thoroughly scrubbed before each session
- Hibiscrub should be used before each case
- Try to avoid shaving hair-baring areas of the patient
- Sterile covers if a hyfrieator is used

Patients with a history of MRSA:

Patients who have had MRSA in the past but have since had negative swabs **MUST** still be managed as if they have MRSA. False negative swabs are not uncommon.

- Such patients should be operated on at the end of the list
- Remove unnecessary equipment and items beforehand
- The room must be cleaned thoroughly afterwards

7) Local anaesthetic

For most procedures the choice of LA is lidocaine plus adrenaline, however plain lidocaine should be used in the following areas:

- Fingers, toes and penis
- Raynauds phenomenon
- Within 6 months of MI/CABG or if troublesome ongoing cardiac dysrhythmias

Contra-indications to LA - There are very few contra-indications to the use of local anaesthetic although:

- Pregnancy - Avoid where possible in pregnancy, especially the first trimester. Benefits vs. risks need to be weighed up.
- Allergy to lidocaine is unusual; if uncertainty exist then there are 3 options:
 - Most problems are likely to arise from using multi-vials as opposed to single vials, which contain less preservatives
 - Consider using a non-amide preparation such as procaine.
 - If concern exists regarding the severity of previous reaction refer to secondary care

Dose

The maximum safe dose of local anaesthetic has been estimated as follows:

- 1% plain lidocaine – 20mls
- 1% lidocaine + 1:200 000 adrenaline – 50mls
- 2% plain lidocaine – 10mls
- 2% lidocaine + 1:200 000 adrenaline – 25mls
- 2% lidocaine + 1:80 000 adrenaline (dental cartridges) – 25mls

Injection technique

- Use a sterican needle (0.40 by 40mm BL/LB 27G by 1.5 inch)

- Mark out the area to be anaesthetised
- As the needle punctures the skin pinch the skin proximally to reduce the pain
- Advance the needle to the furthest point, then inject slowly as you withdraw the needle backwards
 - This reduces the risk of injecting into vessels.
- Level of injection can be either:
 - Subcutaneous injections are probably best as they are less painful.
 - Intradermal injections however confer benefit to the operator as the injection gives instant anaesthesia and clearly show up as white, the anaesthetised area.

Children

In children use topical creams first. The two main creams are:

- EMLA cream - Takes at least 90 mins to work and the surrounding skin will go white due to vasoconstriction.
- Ametop - Takes only 30 mins to work and does not cause vasoconstriction.

Ring blocks

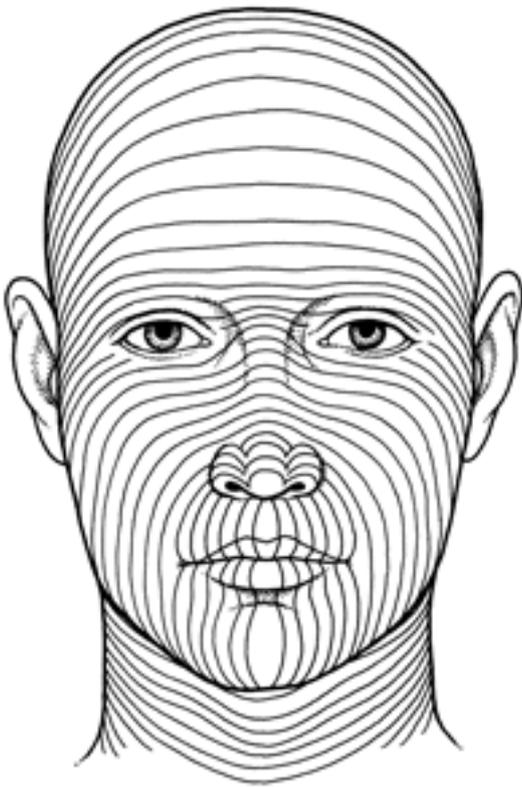
Use 2% plain lidocaine. Avoid using more than 4mls in fingers otherwise compression of vessels may occur. Always time the occlusion period to avoid vascular necrosis.

8) Excision technique

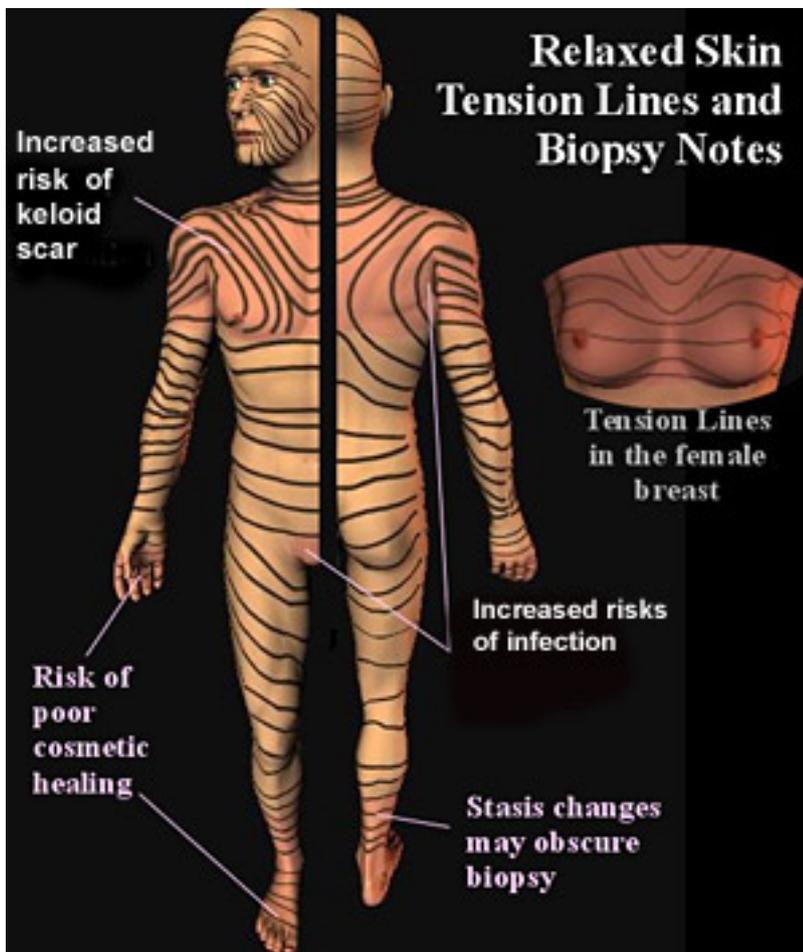
In order to ensure wound closure and good healing the following principles should be adhered to:

Direction of incision

- Transverse in limbs, abdomen and forehead
- Vertical in glabellar area
- AVOID horizontal or vertical sutures on the central area of the cheeks
- If overlying a contour go right angles to the contour to avoid a contour defect
- If uncertain follow the line of the skin wrinkles (least skin tension lines) – see the images below
- Deviation from the above may be necessary depending on which direction the lesion runs.

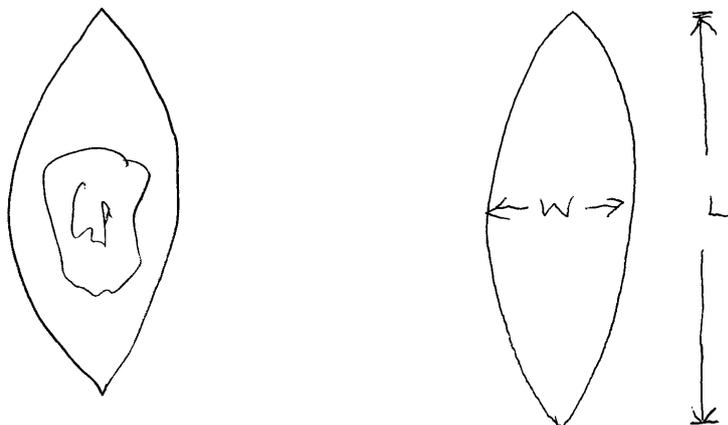


Preferable direction of incision – face



Marking the lesion out

- In general the length of the wound should be 3 times as long as the short axis. A slightly smaller ratio can be used in areas of reduced skin tension. On the other hand the ratio may need to be increased slightly when working over a contour.
- Both sides of the incision should be of equal length
- Deviation from the above is likely to result in the development of a dog-ear.



Initial incision

- Hold the scalpel upright so that the tip of the blade is 90 degrees to the skin.
- Cut into the upper skin with one bold movement to prevent jagged margins. Make sure the scalpel is vertical to the skin at the start and finish and avoid bevelling. At both apexes reverse the blade and cut toward the centre to avoid over-shooting the blade and causing a fish-tail defect.

Tissue dissection

- Avoid excessive handling of wound edges.
- Dissect initially with a scalpel blade to get in to the correct plane and then using blunt scissors open them up to dissect under the lesion.
- Undermining should only be done in areas where high skin tension remains after the ellipse has been removed. It is particularly important if possible to avoid undermining on the lower legs where too much undermining can compromise blood supply to the wound.
- If undermining is necessary use round-ended scissors facing upwards and separate the strands of fatty tissue by repeatedly opening the scissors. If undermining is difficult or results in excessive bleeding this suggests that you are too high in the skin and probably undermining in the dermis. Any undermining should be done at the following levels:
 - Face: Mid fat
 - Scalp: Subgaleal area that sits under the fat and above the periosteum
 - Trunk and limbs: Deep fat
 - Hands: Just below the dermis
- Tissue dissection is a little different for lipoma and epidermoid cysts. Here the skin should only be scored with a scalpel. Tissue dissection should be very careful and is best done by small flat dissecting scissors held at an angle almost parallel to the skin surface. Each layer of fibre should be carefully dissected until the sac becomes visible. From here curved dissecting scissors can dissect around and under the cyst/lipoma.

Haemostasis

- The vasoconstrictor effect of adrenaline takes up to 15 minutes to achieve its effect unlike the local anaesthetic effect, which occurs in the first 2-3 minutes.
- Pressure is always helpful.
- Gentle heat e.g. unipolar hyfrecator or bipolar, should be applied to small blood vessels, taking care to avoid the skin edges.
- Larger vessels (more than 1mm in diameter) can be clamped and tied using dissolvable sutures such as 3/0 or 4/0 vicryl - This will compromise the circulation and should only be used as a last resort.
- After the procedure pressure bandages should be used where post op bleeding is more likely e.g. lipoma on forehead, other deep cysts & lipoma, and patients on warfarin.

9) Suturing

Choice of suture material

Surface sutures:

- Both prolene and ethilon are good choices of non-absorbable sutures.
- Ethilon is easier to work with but may cause slightly more tissue reaction than prolene.
- Vicryl rapid dissolves in the skin over 10-14 days. Scar quality is not as good but it can be useful for behind the ear and on hair bearing areas of the scalp.
- Silk should not be used routinely due to poor scarring and increased risk of infection.

Running Subcuticular (i.e. subepidermal):

- Prolene is a good choice

Subcutaneous

- Monocryl is a common absorbable suture that takes several weeks to dissolve completely - patients may complain about bits of suture protruding from scar. Monocryl does not knot easily, so extra care is needed when tying the knot.
- Vicryl should be avoided on the face as it causes more tissue reaction. It is easier to handle as it knots easily and the knots are less likely to slip.
- PDS monofilament is very strong and maintains its strength for a long time so it can be used over a joint (when the skin is thick enough) or on the back where skin is more likely to be stretch. The suture can take up to 6 months to dissolve completely and as a result is not often used.

Size of suture

As a guide use:

- Face: 5/0 or 6/0
- Body: 5/0 4/0 3/0 - Depends on the skin tension
- Scalp: 3/0 or 4/0

Which suturing technique to use

The interrupted surface suture:

- Is a good starting point when learning to suture

- Is the easiest and quickest method of closing the skin and is particularly useful for operating on thin skin where the use of subcutaneous sutures is difficult.
- Cosmetic results are not as good as with subcutaneous methods and so this technique should be avoided when possible where good cosmetic outcomes are desired or on keloid prone areas.
- Interrupted sutures should not be used on the back without additional subcutaneous sutures as wounds frequently come open in this area after surface sutures are removed.

The surface mattress suture – Is ideal for areas of skin with very high tension such as the lower legs and over joints with thin skin. It tends to leave more stitch marks than interrupted surface sutures, so a combination of the two may be used in such areas.

The running subcuticular suture – This continuous suture runs in the upper dermis. It allows a good cosmetic result but does not provide wound strength. It can be occasionally be used alone in areas of minimal wound tension, but more often that not it is used to supplement the deeper subcutaneous suture (below).

The interrupted subcutaneous suture – This produces good cosmetic results and a strong wound. They can be used on most parts of the body (although difficult to use on thin skin) and are essential when operating on the back and over appropriate joints, otherwise such wounds are likely to open up. In experienced hands no additional sutures are needed but where the skin edges are not well opposed other techniques can be used to complement the subcutaneous sutures such as interrupted surface sutures, a running subcuticular suture or a skin adhesive such as ‘Dermabond’.

Suturing technique

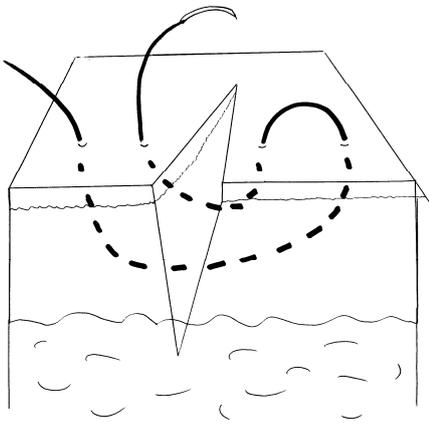
The interrupted surface suture:

- As with any suturing technique, although needle holders can be held in the thumb and ring finger, the palm grip is best for suturing as it enables good control as the wrist is turned.
- The needle is best held away from the tip of needle - at least two-thirds of the way along.
- Sutures should be inserted fairly close to the wound edge, but no more than 2 mm so. They must be equally spaced on each side of the wound.
- The skin must be handled gently and elevated using a skin hook or one edge of a pair of forceps – where possible the skin should not be held between a pair of forceps.
- Insert the needle at 90 degrees to the skin surface and advance the needle using wrist movement.
- The skin on the other side of the wound must be entered at the same level that the needle exits the first side of the wound.
- The square knot must be used (see below - knots).
- It is preferable to do one suture at either end of the wound and work inwards – avoid putting a suture too close to the apex of the wound as it will create a dog-ear.
- Sutures should be equally spaced and use the fewest numbers of sutures to achieve wound closure.
- The thinner the skin the closer together individual sutures should be placed (or alternatively combine with looped mattress sutures).

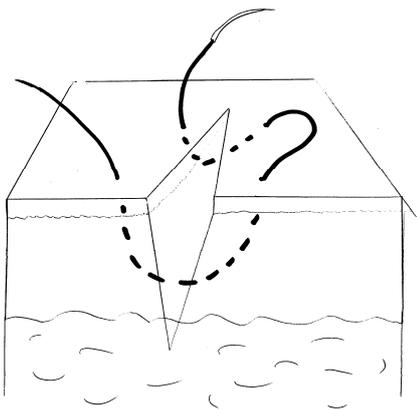
The surface mattress suture:

There are several types of mattress sutures as follows:

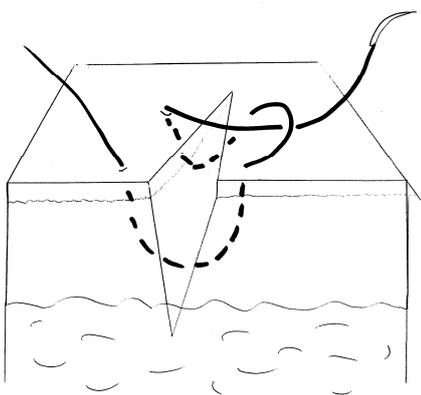
- The vertical mattress (pulley) - Useful in closing dead space e.g. after cyst removal.
- The horizontal mattress - Useful in closing skin which is thin and fragile and has high skin tension.
- The looped mattress (pass the needle through the loop in the horizontal mattress method) – Is preferable to the plain horizontal mattress as it does not evert the wound edges, but does spread the tension across the wound edges.



Vertical mattress suture



Horizontal mattress suture



Loop mattress suture

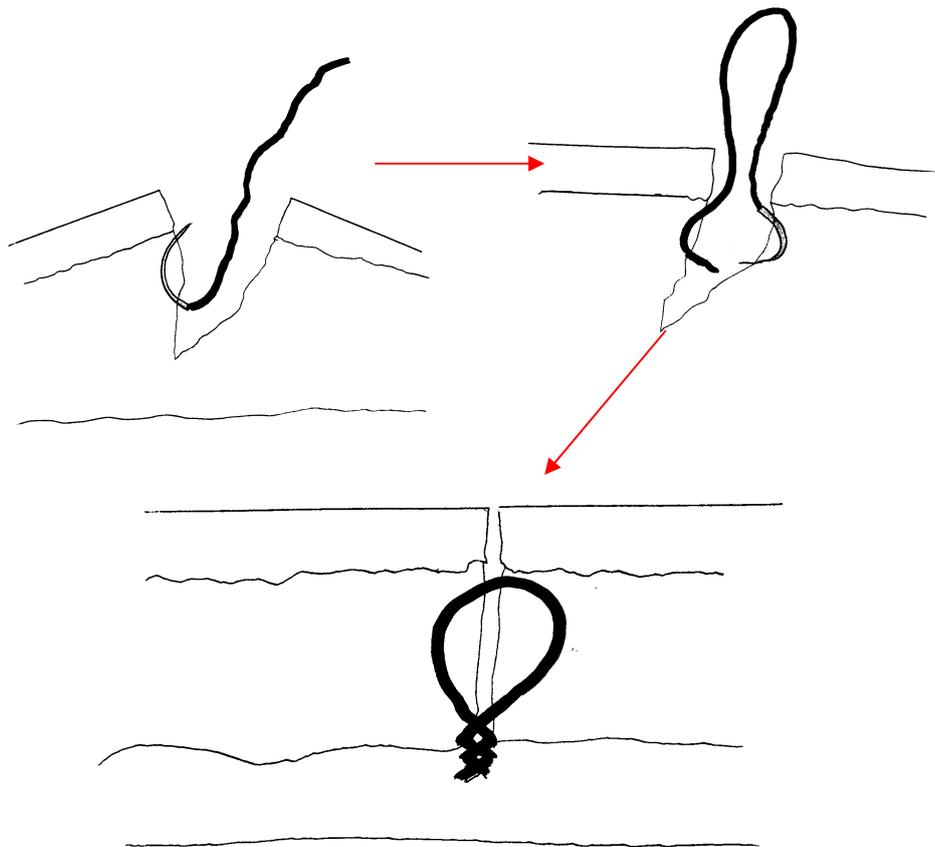
The interrupted subcutaneous suture:

- With the first 'bite' the needle must enter deeper in the dermis (not too deep), and exit in the upper dermis on the same side.
- With the second bite the suture must enter the opposite side in the upper dermis and exit deeper in the dermis - at the same level that the first bite entered the skin.

- This sequence of deep-superficial-superficial-deep will automatically place the knot deep in the wound below all the suture material. The suture should then be tied as a square knot.

Note – If the suture is placed too deep or if large bites take the suture too far from the wound edge the skin will not close nicely.

- The suture should be cut flush with skin surface so that the suture ends do not protrude from the wound.
- It is best to place the first suture in the far end of the wound and then work along the wound towards the operator.
- A ‘double’ subcuticular suture in the centre of the wound can be very helpful in gaining good skin opposition.



Knots

All knots must be tied square, which is as follows:

- 2 slips forward so that hands cross and needle ends up away from you
- 1 slip back so that hands uncross and the needle end up next to you
- 1 slip forward so the needle again ends away from you

When each knot is tied the suture should be gently ‘wriggled’ together as opposed to forcefully pulling together. Just enough tension should be used oppose the skin edges but not too much that will strangulate the wound.

For surface sutures the knots are tied across the wound, whereas with subcuticular sutures the knots are tied along the line of the wound.

Steri-strips

These should be used in addition to sutures on all wounds where practical. Steri-strips should always be applied at 90 degree to the wound direction.

Suture removal

The following is a guide if surface sutures are used:

SITE	SUTURE REMOVAL
Back and joints	14 days
Other trunk	About 10 days
Hands	Up to 14 days
Legs	Mostly 14 days but may get away with less more proximally
Face	5-7 days

The exact duration should be assessed individually and is based on age, health of patient, amount of skin tension and whether or not additional subcutaneous sutures were used. If in doubt leave a bit longer and remove the sutures from the outside in, leaving the central one to last (as opposed to alternate suture removal).

Dog-ears

- The use of good surgical technique by way of making the length to width wound ratio of 3:1, and ensuring that both sides of the wound are of equal length and shape will reduce the likely hood of a dog-ear.
- Most small dog-ears can be left and will settle over a period of 18 months.
- Larger dog-ears should be dealt with at the time of surgery.

10) Other minor surgical procedures

Punch biopsy

Uses

- Mainly used for diagnostic purposes, but occasionally also as a definitive treatment if the lesion is very small.
- If the **lesion is pigmented** a punch biopsy must only be used if the lesion can be safely removed to include 2mm of normal surrounding skin – If not an elliptical excision should be performed.

Technique

- Size of punch biopsies 3-8mm diameter
- Stretching the skin perpendicular to the tension lines as the punch is taken is more likely to leave an elliptical wound, which is then easier to suture.
- As the lesion is removed it must be handled very gently using a skin hook or needle so as not to crush the tissue, which would make accurate histology difficult.
- Small punch biopsies 3-4 mm may not need suturing.

- Larger punch biopsies and those on areas with a good vascular supply (e.g. face) will need suturing.

Incisional biopsy

Uses

- This technique may be considered when a reasonable sized biopsy is needed, and to this end a punch biopsy may not provide enough tissue. Such scenarios are uncommon.
- It should be avoided in pigmented lesions.

Technique

- It is useful to include some normal skin tissue to make histological analysis easier.
- The fact that an incisional biopsy has been carried out must be stated on the pathology form otherwise the lesions may be sectioned the wrong way.
- New 'punch biopsies' are able to provide elliptical incisional samples
- Suturing is usually required afterwards.

Shave excisions

Uses

- The main use of a shave excision is as a treatment for benign proud skin lesions. Although the sample must always be sent for histology the technique should only be carried when the operator is confident that the lesion is benign - If in doubt the lesion must be excised to include a 2 mm margin of normal surrounding skin.

Risks

- Little scarring occurs in 45% of lesions treated on the head and neck and 30% treated on the trunk. In the remainder scars tend to be smaller than the original lesion and often are slightly 'depressed'.
- It is uncommon for a significant scar to result, but when it does it most commonly arises in keloid prone areas.
- If the lesion removed was pigmented then approximately 25% of patients will develop a flat pigmented area.
- Up to 25% of lesion may recur.

Technique

- A good (but safe) amount of anaesthetic should be injected to raise up the lesion and make excision easier. Pinching the lesion between a thumb and finger is of additional benefit.
- A size 10 blade is used for larger lesions and 15 for smaller lesions. An alternative is to use a 'DermaBlade'.
- The blade should be held horizontally to shave off the lesion.
- If afterwards the edges are uneven a curette may be used to tidy this up.
- Bleeding can be stopped as described earlier in 'haemostasis'.
- Lesions must be sent for histology.
- A small amount of bactroban / chloramphenicol ointment can be placed on the wound after the procedure and the patient asked to apply Vaseline BD for a few days to aid in wound healing.

Curettage

Uses

- Curettage gives very good results for treating superficial lesions such as bulky seborrhoeic keratoses and other benign skin lesions that are too thick to respond well to cryotherapy.

Risks

- Similar to shave excision

Technique

- Use the correct side of the curette (there is often one side sharper than the other).
- Curetting should occur deep to the lesion and be done initially in one direction and then afterwards perpendicular to it. For benign lesion try and avoid going into the fat otherwise healing will take longer and the cosmetic result may not be as good.
- When normal skin is reached a scrapping noise can be heard. Diseased skin is 'mushy'.
- Gentle cautery may be needed to stop bleeding. Cautery also contracts the wound and makes it smaller than the original defect.
- Aftercare as with shave excision & warn the patient that initially it will look like a cigarette burn.

Curettage and skin cancer

- Can occasionally be used to manage low-risk skin cancer.
- This should only be done by individuals trained in the management of skin cancer and who are part of a MDT.
- It can be used in two ways:
 - To debulk a nodular BCC prior to the use of imiquimod or photodynamic therapy in patients too frail for surgical excision.
 - As a lone treatment for small BCC and SCC. This should not be seen as a first line treatment as recurrence rates are higher than for other techniques. If used lesions must be small (<1cm), well-defined primary tumours in lower-risk sites. At least 4 mm of normal surrounding skin need to be curetted along with the tumour, hyfrieation must be destructive (electro-desiccation) and the procedure must be done twice.

Cryosurgery

This guidance should be read in conjunction with the 'Cryosurgery in General Practice' power point tutorial on the website.

Uses

Cryosurgery is used for managing numerous conditions such as warts, seborrhoeic keratoses and AK. Treatment must only be given if the lesion can confidently be diagnosed as benign, if not a biopsy will be need for histological purposes.

Risks

- Blistering.
- Pain for up to 48 hrs later.
- Hypopigmentation of the skin - This is particularly so on dark skin.
- Treating nail margins can cause permanent nail dystrophy.
- Damage to tendons and eventual rupture – This can occur, albeit rarely, to the extensor tendons of the fingers. The highest risk areas are the dorsal aspects of the MCP and DIP joints.

- Hypertrophic or keloid scars are very rare.
- Leg ulceration – Most commonly on the gaiter area of the lower legs where circulation is compromised. In such circumstances cryotherapy should be avoided.
- Occasional hair loss in the beard area.

Types of liquid nitrogen

- Cryogun (spray/probe) – Most effective
- Histofreeze or cotton bud technique - The temperatures achieved are significantly less than above so freeze times may need to be longer and such applications should be avoided on larger lesions, troublesome plantar warts, Bowen's disease and superficial BCC.

Technique

- If the lesion is large try and remove some of the superficial material before freezing by paring down.
- Small lesions should be treated by spraying at the centre of the lesion, larger lesions should be treated by using the 'paint-spray' method.
- The area treated must include a 2mm margin of normal surrounding skin.
- Freezing times given are from when the target area is white, not from when the cryotherapy begins. Once the area turns white the liquid nitrogen should be applied in a fashion that maintains the 'ice-ball'. Stop application when the freeze time is up.
- Give a patient information leaflet with regards after care of the treated area.

Freeze times

Warts

- Must be paired flat by the patient on a weekly bases using an emery board or sandpaper, any remaining dead skin can be removed by a health professional using a scalpel blade.
- A 15-30 second single freeze is adequate for most although troublesome plantar warts (e.g. persistent or mosaic) may require a double 30 second freeze.
- Cryotherapy must be repeated every 2-3 weeks; otherwise the treatment is less likely to be effective.
- The additional use of salicylic acid preparations each night may hasten resolution.
- Alternative treatments such as formaldehyde solution may be of benefit – See tutorial for more information.

Seborrhoeic keratoses

- A single freeze time of 10-20 seconds depending on the thickness.

Molluscum contagiosum

- A short time only is needed i.e. 5-10 seconds.

Actinic keratosis

- For most a single freeze time of 10-15 seconds is adequate.

Bowen's disease

- A single freeze time of 20-30 seconds.

When calculating freeze times, consideration must also be given to the site. For example more care needs to be given to the skin overlying the extensor tendons of the fingers, the nail margins and the dorsal aspect of the hands in elderly patient's, the latter is more prone to blistering.

11) Secondary intention wound healing

This takes two main forms as follows:

Uses

Most wounds resulting from an excisional process will be managed by direct closure. However under certain circumstances secondary intention may be the treatment of choice (e.g. elderly patients who otherwise may have needed a skin graft). The skin of the ear and temporal area of the face are particularly suited to this method as they produce good healing. The main drawbacks are:

- Wounds do take longer to heal.
- More scarring compared to sutured wounds.
- Tissue retraction occurs so care needed near free edges such as the lips and eyelids, where it is probably best avoided.

All wounds produced by curettage and cautery close by secondary intention . Care must be taken on areas with poorer circulation e.g. lower limbs, where in such cases the following is recommended:

- Check Doppler's – If readings unfavourable consider alternative techniques.
- Post-op oedema must be prevented as it will impair wound healing. Advise on leg elevation when resting and compression bandages if Doppler's OK.

Technique

- When using secondary intention after elliptical excisions, a purse-string suture around the wound will make it smaller and aid in healing. Beware though as excessive suturing on wound edges can compromise circulation.
- All secondary intention wounds should be kept clean, and any secondary infection must be treated vigorously. Infected wounds will not heal until infection is dealt with.

12) Dressings

- Dressings are not necessary. However if one is required use a non-adhesive dressing such as tegaderm or mepore.
- In situations where a haematoma is more likely (see under haemostasis), pressure dressings must be used. In these circumstances jelonet can be applied directly to the skin to absorb any exudates, N/A dressings placed on top and then a bandage. Care must be taken if used on the lower legs to make the bandage is not too tight.
- Wounds must be gently washed on a daily basis to remove any crust.
- Vaseline may be applied and helps to keep the wound moist.
- In keloid prone areas consider treatments that may reduce the degree of scarring. There is some evidence to suggest that Silicon gel may be of benefit. This should be started once the wound has healed (10-14 days), applied thinly and twice daily for a minimum period of 2 months.. This can be purchased over the counter or prescribed as 'Dermatix gel'.
- All patients need to be given a patient information leaflet on wound care.

13) Histology

- All samples should be sent for histology
- Adequate clinical history should be added onto the request form e.g. duration, site, size and provisional diagnosis.
- Histology is not the be all and end all of dermatology:
 - A punch biopsy may miss an early case of lentigo maligna
 - It can be difficult to differentiate histologically between a moderate/severely dysplastic melanocytic naevus and a melanoma. To this end all lesions reported as being incompletely excised 'dysplastic' naevi must be re-excised.
 - Histology of 'difficult' rashes may not be of additional diagnostic value. In many cases difficult rashes are best managed by referral rather than in house biopsy.

Reference book list

1. Minor Surgery by Christopher Price & Rodney Sinclair - Health Press
2. An Introduction to Dermatological Surgery by Clifford Lawrence - Churchill Livingstone
3. Fundamental techniques of Plastic Surgery and their Applications by Alan McGregor
4. Grants Atlas of Anatomy by Anne Agur & Ming Lee