



# Manual of Best Practice

Skin Cancer Prevention and Management  
for Persons with Albinism in Sub-Saharan Africa

Editor  
Created by

**Andrew Sharp**  
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**International Foundation for Dermatology**

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**Skin Cancer Prevention and Management  
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in Sub-Saharan Africa**



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**Editor**

**Andrew Sharp**

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## Foreword

**T**he *Manual of Best Practice: Skin Cancer Prevention and Management for Persons with Albinism in Sub-Saharan Africa* has been created by international human rights NGO Standing Voice and the International Foundation for Dermatology (IFD), and funded by the International League of Dermatological Societies, Novartis, and the Pierre Fabre Foundation.

The manual has had authorship and contributions from global health experts from Tanzania, Malawi, the United Kingdom, the USA and Spain who are members of the IFD-founded Albinism Working Group and the Standing Voice Skin Cancer Advisory Committee.

This project has benefited significantly from the in-kind support of expert clinicians and human rights defenders who have volunteered their time to write the core components of this manual. Many of these clinicians are volunteers who make regular field visits to the Standing Voice Skin Cancer Prevention Programme to promote clinical development through training.

The manual has been field-tested during programmatic interventions delivered by Standing Voice and the Regional Dermatology Training Centre in Tanzania and Malawi.

The manual is targeted toward consultant dermatologists, surgeons, dermatology officers, clinical officers and nurses working with people with albinism in sub-Saharan Africa. The manual aims to consolidate current learning and drive improvements in clinical practice for

professionals working to promote the dermatological health of people with albinism.

This manual is the first volume in a series of clinical best practice guides on skin cancer prevention and management for people with albinism in low-resource settings. While this particular manual focuses on sub-Saharan Africa, much of the content is relevant for clinicians working in a low-resource context anywhere in the world. Any clinician with an interest in this area is greatly encouraged to utilise this manual for the benefit of people with albinism, wherever they may reside.

This manual is an internationally recognised resource enabling clinicians to deliver effective quality care to patients across the African continent and beyond.

## Introduction



People with albinism are a violently abused minority throughout Africa. Albinism is a recessive genetic condition that impairs the body's production of melanin, reducing or eliminating pigmentation in the skin, eyes and hair. This melanin deficiency causes people with albinism to be visually impaired and uniquely vulnerable to UV radiation and sun damage. Markedly paler than their dark-skinned peers and families, people with albinism are also highly visible in many African communities, where the condition remains poorly understood and shrouded in suspicion and myth. Many people with albinism are shut out of civil participation and unable to access the most basic opportunities and services, including healthcare, education, housing, and employment. The belief that intercourse with a woman with albinism can cure AIDS has led to many reported cases of rape in several countries, while opportunistic witch doctors incite violence by peddling the myth that the body parts of a person with albinism can generate wealth and fortune when used in witchcraft. As of January 2019 this particular misconception has caused 207 people to be murdered, and 573 to be attacked, across 27 African countries since 2006. Tanzania presents a uniquely severe case—with 76 murders and counting—though the centre of gravity has recently switched to Malawi, where 38 reports have emerged in the last four years alone.

Rightly, much of the global attention paid to the plight of people with albinism in Africa has gravitated toward this violence: the origins of the atrocities, their movement across borders, and the unanswered questions of who orders these attacks and why they peak during political

elections. All of these have remained a topic of furious investigation for journalists, policymakers and development professionals alike.

Sadly, within the escalating profile of albinism in Africa, less has been said about the equally urgent problem of skin cancer. This is the greatest killer of people with albinism in Africa and statistically a much graver threat than witchcraft-related atrocities. With little melanin to protect their skin and obstacles to sun protection including poor access to sunscreen, people with albinism in Africa are dying every day because of the blistering tropical sun. Marginalisation impedes their access to treatment, restricts the delivery of preventative education, and isolates patients from their families, communities, and caregivers. Obstacles to care have caused lethal delays in diagnosis and epidemic rates of skin cancer.

This crisis has intersected on a devastating scale with other frontiers of discrimination facing people with albinism. The stigmatisation of albinism means many families do not understand how to protect their children against sun damage, a climate of neglect frequently reflected in schools, too, where teachers are ill-prepared to meet students' needs. The ongoing absence of albinism in mainstream dermatological training curricula leaves many practitioners unable to diagnose skin conditions or provide patients with albinism with the quality of care they deserve. Growing up, many people with albinism suffer irreparable skin damage and educational under-performance as a result of this neglect. Higher education, training and skilled employment become harder to access in adulthood, so many are forced into outdoor labour as subsistence farmers, where the risk of skin cancer becomes exponentially high. If visible lesions do occur, this can reinforce perceptions of people with albinism as contagious or monstrous, legitimising further discrimination and violence.

For people with albinism in Africa, the skin cancer crisis therefore has its origins in stigma. It is situated within a wider social story where albinism is a highly visible but appallingly misunderstood condition. Our solutions must be correspondingly agile, approaching skin cancer within and beyond its clinical parameters, viewing the health of people with albinism as a fundamental question of accountability for families, communities and service providers.

This manual is designed to be an entry point into that conversation. It is intended to be a weapon for change: a tool to be taken forward and applied by practitioners across Africa in the endeavour to give people with albinism the highest possible standard of dermatological care. By working to understand skin cancer in its social and clinical coordinates, we can mobilise all stakeholders to claim accountability for the welfare of this population, securing a healthier, happier and more inclusive future for persons with albinism across the African continent.

### How to use this Manual

The manual has six sections.

**Programme implementation** describes a model for running albinism clinics, including instruction on prevention, health education and skin examination.

**Skin cancer** is a resource for recognising and managing skin cancers found in albinism clinics.

**Cryotherapy** informs on this essential therapeutic intervention.

**Preoperative** covers preparation for diagnostic or excisional biopsy.

**Surgical procedures** is a guide to carrying out diagnostic and excisional biopsy.

**Postoperative covers** prevention of complications, the recording of procedures, sending of tissue for histological analysis, and wound care.

A glossary at the end of the manual describes the dermatological terms that may be unfamiliar to some users of the manual.





## PROGRAMME IMPLEMENTATION

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3. Prevention and Health Education	11
4. History and Examination in Albinism Clinics	22
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# 2

## A Model Of Care

The processes and procedures outlined in this manual will have the most impact when harnessed and delivered through a structured intervention which includes necessary training for clinicians, regular outreach dermatology services near to parents' homes and comprehensive referral management. The threat of skin cancer for people with albinism in sub-Saharan Africa is so severe that in order to bring an end to preventable skin cancer deaths, patients must be proactively targeted. Without a robust and structured process for outreach clinical care, users of this manual will be treating patients with albinism on a spontaneous or ad hoc basis, reacting to instances

of skin cancer only within the scope of daily clinical duty. Though admirable, this type of response alone is insufficient. A comprehensive outreach programme is a suggested model of care, needed not only to address the dermatological health of people with albinism *en masse*, but also to break the history of shared marginalisation that has hitherto caused this population to be ignored.

In order for a structured intervention to have the twofold impact of ending preventable



skin cancer deaths and challenging social discrimination it is critical that a strong network of partners is mobilised. Through such a network, patients become better connected to those with the ability to positively influence their welfare. Reciprocally, a wider range of stakeholders become sensitised to the needs of people with albinism, demystifying and humanising the condition and generating essential solidarity in the fight against stigma. All partners involved in the programme must have clearly defined roles and government health systems must be engaged.



To be successful an outreach programme must be well coordinated and managed. This is a complex and demanding task most likely to be delivered successfully when assigned to a specific entity, be it an individual, department or organisation.

Other critical roles include:

- clinical capacity development to continually improve clinicians' abilities to care for patients;
- patient mobilisation to ensure high attendance at albinism clinics;
- frontline service delivery by those tasked with conducting dermatological examinations, surgery and further treatment;
- referral facilitation to ensure referrals are swiftly processed and appropriately managed; and

- advocacy and networking to guarantee strong institutional support for the programme within and beyond government health systems

Additional roles could include fundraising and resourcing if required, as well as ensuring publicity for the programme when needed.

### Programmatic interventions in sub-Saharan Africa\*

There are currently many interventions seeking to improve skin health and prevent skin cancer among people with albinism in Africa. There are too many to list in full, but notable leaders in the field include Standing Voice; the Regional Dermatology Training Centre (RDTC) at the Kilimanjaro Christian Medical Centre (KCMC) in Moshi, Tanzania; the Pierre Fabre Foundation; the International Foundation for Dermatology; Under the Same Sun; UNICEF; Beyond SunCare; the Afrikaanse Albino Foundation; Drs Kelvin Mponda and Tenganawo Esther Mzumara in Malawi, and Drs Colette van Hees (Netherlands), Georg Klein and Rosemarie Moser (Austria) who have worked alongside them; Drs Beatrice Etemesi and Kiprono Sampson in Kenya; the Albino Foundation; and albinism associations across the continent.

To provide clarity and indicate how interventions might best be structured to deliver impact, below we provide an in-depth account of the Skin Cancer Prevention Programme being delivered by Tanzania-based NGO Standing Voice. Established in 2013 in partnership with the RDTC, this programme has grown to become the largest skin cancer prevention initiative for people with albinism in Africa. The programme currently reaches thousands of patients internationally and can be isolated here as a model of best practice.

### A Skin Cancer Prevention Programme in Tanzania

First established in Tanzania, the Skin Cancer Prevention Programme has sought to provide a scalable model of care that can be adapted and exported into neighbouring African states. As of January 2019, the programme has grown to operate biannual clinic cycles at 51 locations across 16 regions of Tanzania, regularly supporting over 5,500 patients: 3,500 through a comprehensive clinical service and a further 2,000 through sunscreen distribution. Together with their families, peers, and wider community members, patients are trained to



understand, manage, and advocate for their own needs. At each clinic, patients receive dermatological screening; preventative education and literature; liquid nitrogen cryotherapy; wide-brimmed sun hats; and suitable sunscreen. A referral for further treatment such as surgery is provided if needed. Depending on the nature of the referred lesion, it is either excised locally at a health facility closest to the patient's home, or if more complex treatment is required a referral is made to a larger hospital in one of Tanzania's major cities.

The programme also distributes Kilisun (SPF 30/50), a sunscreen specifically made for people with albinism and produced in Tanzania, eschewing past dependency on foreign imports, which were costly, unreliably sourced, and vulnerable to chemical impurities. Pioneered by Spanish pharmacist Mafalda Soto Valdés and manufactured in Moshi by the Kilimanjaro Sunscreen Production Unit (KSPU) within the RDTC at the Kilimanjaro Christian Medical Centre, Kilisun uses a water-in-oil



emulsion with a very low irritation risk and high performance in hot weather. Production of this life-saving sunscreen by the KSPU has been supported by Standing Voice alongside África Directo, BASF, Frida Dorsch, UNICEF, Under The Same Sun, and Beyond Suncare. The availability of Kilisun has expanded nationwide to reach 5,500 patients annually.

In Tanzania, skin cancer prevention services for people with albinism have historically either been sporadic, geographically restricted, or delivered by mobile teams of international specialists remote from Tanzanian communities, providers, and institutions.

The Skin Cancer Prevention Programme mobilises the strengths of existing actors and seeks to coordinate their efforts more sustainably. The Regional Dermatology Training Centre—the largest dermatology training facility in sub-Saharan Africa—has been training clinicians from across the continent for decades and delivering outreach services for people with albinism since 1992. As a training facility, the RDTC has, however, lacked the resources to scale these services nationwide, so its outreach has historically been localised. Budgetary constraints have meanwhile afforded few platforms for Tanzanian RDTC graduates to practise after qualifying and has made access to patients with albinism even harder to achieve. Standing Voice partners with the RDTC to identify, recruit and further train a dormant network of clinicians who have completed the RDTC's Advanced Diploma in Dermato-Venereology. These trainees



are then enrolled in the Skin Cancer Prevention Programme to treat the specific dermatological needs of persons with albinism. They are assigned to nearby clinical locations, creating a decentralised network of frontline providers who reside and work in patients' own communities and whose salaries are funded by the Tanzanian government. The programme has invested considerably in capacity development for clinicians by engaging local and international experts to deliver continual training workshops. Many of these experts have now been formalised into a Skin Cancer Advisory Committee. The International Foundation for Dermatology has also played an integral part in capacity development.

As the central civil society organisation run by and for people with albinism at the grassroots level in Tanzania, the Tanzania Albinism Society has remained largely overlooked in previous skin cancer interventions. With 12,000 members and 124 local branches across 25 regions, TAS is a critical partner in the Skin Cancer Prevention Programme.



TAS advertises upcoming clinics to their members to maximise publicity and facilitate patient retention. The Skin Cancer Prevention Programme increasingly provides platforms for TAS to fulfil its own organisational objectives by advocating for the welfare of its members and holding government authorities to account. Other partners include NGOs and CSOs such as Under the Same Sun and NELICO who support the programme to access patients. Additionally, media partners also prove vital in publicising and promoting the service.

Clinics are delivered in hospitals, district health centres and schools that house high numbers of students with albinism to maximise the institutional entrenchment of the programme and train more health professionals as well as teachers to understand the importance of preventative care. This strengthens the institutional support networks



available to people with albinism and leaves a trail of ambassadors to advocate for their rights in a spectrum of settings nationwide. The Tanzanian government has been an important partner in the expansion of the Skin Cancer Prevention Programme, which has witnessed promising strides toward state adoption. The government has shown increasing investment in the programme, funding dermatologists' salaries, providing free venue space, facilitating patient transport, and offering other health professionals as support staff.

The Skin Cancer Prevention Programme has found success by engaging Tanzanian individuals, families, communities, and institutions to pursue structurally sustainable improvements to dermatological healthcare for people with albinism. Its programmatic philosophy—working with all stakeholders to build collective capacity and mutual accountability—has given the first glimpses of a solution to this historical problem. In locations where Standing Voice's clinics have been running longest, reductions in the presentation of skin cancer have been as high as 85.7%. The Ministry of Health has formally endorsed the programme and the United Nations Independent Expert on the Enjoyment of Human Rights by Persons with Albinism has recognised the programme model as a form of best practice. Albinism associations from numerous African countries have issued requests for the replication of the Skin Cancer Prevention Programme in their respective national contexts. In 2016 Standing Voice began working with Dr Kelvin Mponda, the Association of Persons with Albinism in Malawi (APAM) and other partners to commence replication of the programme in Malawi. Further expansion across Africa is planned in the coming years.

\*Parts of this section have been adapted from an earlier publication, Clarke. S and J. Beale, "Albinism and Social Marginalization", in *Albinism in Africa: Historical, Geographic, Medical, Genetic, and Psychosocial Aspects*, eds. Kromberg, J. and P. Manga. New York: Elsevier, 2018. pp. 257-270 (pp. 266-268)

## Prevention and Health Education

# 3

**W**ith a depth of understanding of the dangers of sun exposure and methods of sun protection, no person with albinism need develop skin cancer. The disease is completely preventable and prevention is where emphasis should be. First and foremost, patients must be empowered to take responsibility for their own health. This can only be achieved by imparting knowledge to patients, and advocating for self-care as the first line of defence against skin cancer



If running an outreach programme of skin cancer prevention or conducting an examination in your hospital or clinic, it is best practice to deliver comprehensive health education to attending patients, ideally prior to clinical skin examinations.

There are three recommended components of preventative health education:

1. understanding albinism;
2. understanding skin cancer and its development; and
3. prevention measures: the “sun protection package”

### Understanding Albinism

Skin cancer in people with albinism is not merely a health issue; it is rooted in social disconnection, stigma and discrimination as a result of ignorance about the condition. It is therefore essential that albinism is normalised and its genetic origins are clearly explained and communicated in a manner discernible to patients, their families and caregivers.

Core messages to communicate are:

- Albinism is natural, occurs worldwide and affects people of all ethnicities and genders, as well as plants and animals
- Albinism is a non-contagious genetically inherited condition causing a complete lack or a reduction of melanin
- Melanin is a natural pigment that gives the hair, skin and eyes its colour and the lack of it is the most obvious characteristic of persons with albinism
- The reduction or lack of melanin has health implications for people with albinism: reduced visual acuity and higher vulnerability to sunburn and skin cancer
- As the albinism gene is recessive, someone can carry the gene without having albinism
- Albinism is passed on to the child by both parents i.e. both parents must carry the albinism gene in order to have a child with albinism
- Parents themselves do not need to have albinism to be carriers; they have one functional copy of the gene, so they produce pigment, and one altered, non-functional copy. If a baby inherits a non-functional



copy of the gene from both parents, they will not produce melanin pigment and will therefore have albinism

- If both parents carry the albinism gene the probability of having a child with albinism is 25% (1 in 4) in each pregnancy
- Albinism is a genetic condition that occurs at birth and lasts throughout life; it is not a sickness or disease and cannot be passed on through contact or touching
- People with albinism are of equal intelligence to anyone else, and no scientific study has ever linked the condition to impaired brain function or mental processing in any way
- With appropriate support, people with albinism can achieve the same as anyone else

### Understanding Skin Cancer and its Development

In resource-poor settings, the majority of patients with albinism will be poor, with limited formal education and only a rudimentary understanding (if any) of the dermatological implications of their condition. Many will have been marginalised from education and employment, and may work outdoors as subsistence farmers, where UV radiation and the risk of skin cancer are high. Ensuring patients and their families and caregivers understand skin cancer and can identify its development over time is a critical aspect of prevention.

Core messages to communicate are:

I. Why the sun's rays are especially harmful to people with albinism

- Ultraviolet radiation is part of the energy that comes from the sun; these invisible rays can burn and damage the skin. Melanin is an effective absorber of light, able to dissipate over 99.9% of absorbed ultraviolet radiation
- Melanin is the natural photo-protectant agent that human beings have to protect their skin against the harmful effects of ultraviolet radiation
- Due to the absence or reduction of melanin, the skin of people with albinism is less able to protect cells from the damaging ultraviolet rays of the sun, being particularly vulnerable to sun damage and the prompt onset of skin cancer

II. The effects of sunlight exposure on the skin

- The immediate visible effect of repeated sunlight exposure on the skin of patients with albinism is redness and even occasional blistering
- With further exposure to sunlight, some individuals develop pigmented freckles and solar lentigines (small, flat, brown spots) on their skin
- The skin also becomes wrinkled, thicker and harder
- Rough or scaly spots of damaged skin called actinic/solar keratoses commonly occur on the skin of people with albinism
- Actinic/solar keratoses tend to develop on areas of the skin exposed to sunlight, especially the face, hands, arms, and legs
- There is a risk that actinic/solar keratoses can develop into skin cancer if left untreated

III. How to prevent skin cancer

- Skin cancer is one of the biggest challenges facing people with albinism
- If patients suspect changes in any lesions on their skin, they must therefore consult a doctor immediately

- Actinic/solar keratoses can be treated with cryotherapy, which uses liquid nitrogen gas to freeze them. Cryotherapy can be a painful procedure, particularly for children
- Actinic/solar keratoses treated with cryotherapy tend to form a blister that must be kept clean and free from infection
- If skin cancer does develop it is vital that it is diagnosed as early as possible to ensure the greatest chance of effective treatment
- Small skin cancer lesions can be more easily removed by a surgeon
- If small skin cancer lesions are left they will grow and become more complicated to treat
- Bigger and deeper skin cancer lesions can become inoperable, increasing the risk of death for patients with these lesions

When discussing the clinical conditions associated with the development of skin cancer, it is best practice to show pictures to the patients i.e. sunburn, lentigo, actinic keratosis, operable SCC/BCC, inoperable SCC/BCC.

### Prevention Measures: the 'Sun Protection Package'

The final component of health education is prevention measures. The most important and efficient way to prevent skin cancer is to protect the skin from the harmful effects of the sun's rays.

It is of extreme importance to protect children from the sun. The delicate skin of a child is more sensitive to sun damage than the skin of an adult. Babies younger than 12 months should not be directly exposed to the sun. Sun damage can lead to skin cancer later in life.

Effective sun protection is achieved with the use of a set of measures to mitigate exposure to sun radiation. Sun protection measures are summarised under the acronym 'SCHEGS':

- Shade
- Clothing
- Hats
- Eyeglasses
- Sunscreen

## Evolution of sun damage on the skin of persons with albinism



Sunburn



Precancerous lesions



Operable cancer



Inoperable cancer

## Sun damage is preventable if you take care of yourself



Sunprotection



Cryotherapy



Surgery

## Remember

- Protect yourself by wearing a hat, sunglasses and long sleeved clothing
- Apply sunscreen twice a day in sun exposed areas every day of the year
- Check your skin regularly for unusual lesions
- See a dermatologist if you have any concerns
- Attend special skin cancer prevention clinics every six months



**YOU CAN DEFEAT SKIN CANCER**



These measures constitute the ‘sun protection package’, which is explained in detail below, and should be followed from birth throughout a lifetime:

#### IV. Avoid the sun

- It is of extreme importance that people with albinism avoid sun exposure as much as possible (even on cloudy days), especially during midday hours from 10 am to 4 pm when the sun is hottest
- During the hottest part of the day, outdoor activities should be limited to shaded areas
- Preferably keep hair longer rather than shaven to minimise sun exposure on the scalp
- Encourage people with albinism to find indoor employment

#### V. Wear sun-protective items

- Cover up as much as possible by wearing closed shoes, long-sleeved shirts and long trousers or skirts
- Ensure clothing is of a thickness that prevents the sun penetrating. Thin shirts, for example, do not offer sufficient protection from the sun. Wear clothes that you cannot see through when you hold them up to the light
- Dark colours protect better against ultraviolet radiation
- Wear closed shoes and when you wear opened shoes wear socks
- Wear a wide-brimmed hat, with a brim of at least 8 centimetres, made of thick fabric (e.g. denim) to cover the ears, nose, whole face and neck
- Wear UV-protective sunglasses to further protect the skin around the eyes
- Sunglasses also protect the eyes from sun-induced damage and discomfort. People with albinism are photosensitive.

#### VI. Wear sunscreen

- Sunscreens are topical products that combine several ingredients that help to prevent the sun’s ultraviolet radiation from reaching the skin by absorbing or reflecting it

- The Sun Protection Factor (SPF) is a measure of a sunscreen's ability to prevent ultraviolet radiation from damaging the skin

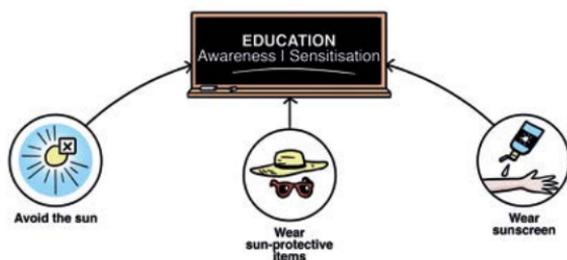
*Here's how it works: If it takes 20 minutes for your unprotected skin to start turning red, using an SPF-15 sunscreen theoretically prevents reddening for 15 times longer — about five hours.*

*But this is only if you apply 2mg of sunscreen per square centimetre of skin, which in reality nobody does. The real protection given by a sunscreen mostly depends on the amount applied and not just on the SPF. Encourage patients to apply a generous amount of sunscreen.*

- Encourage the use of high sun protection factor (SPF >30) sunscreen with a broad spectrum, protecting from both UVA and UVB rays
- Beware of lotions and spray which are easy to spread but make a very thin layer on the skin, providing less coverage and inadequate protection. Make sure you apply a large enough quantity of sunscreen
- Lotions and sprays usually wash out easily with sweat and water. Make sure that the sunscreen you use is waterproof
- Apply a generous amount of sunscreen to protect parts of the body that are still exposed even when wearing protective clothing, such as the hands, ears, nose, forehead, cheeks, chin and neck

The sun protection package will only work if accompanied by regular provision of education and continual monitoring of sun-protective behaviour among patients.

Teachers should monitor the skin of pupils with albinism. If they observe wounds that do not heal, they should ensure the child goes to a clinic or a hospital.



When outlining prevention measures it is best practice to invite any well-covered people with albinism—ideally one male adult, one female adult and one child—to the front of the audience as examples of how to protect oneself from sun exposure. It is also best practice to provide patients with protective items outlined above i.e. wide-brimmed hats, sunglasses and sunscreen. These items can be given to patients by clinicians at the end of their consultation or after by any supporting staff following clinical consultation.

If providing sunscreen, a clear demonstration of how to apply it must be included for all patients when delivering health education. This is important, as it is often the case that patients may not have used sunscreen before.

The steps for effective sunscreen use are:

1. Wash your hands and the area of application with water and soap (if available) to ensure the parts of the body to which sunscreen will be applied are clean
2. With clean hands, apply sunscreen twice per day, or 15 minutes before exposure to the sun if leaving a shaded environment. Reapply if your skin gets wet.
3. Apply sunscreen thickly and thoroughly to exposed skin (not covered with clothes) including the face, lips, ears and the whole neck including the back of the neck; avoid the eyes
4. Use two fingertips when applying sunscreen to ensure sunscreen is effectively applied i.e. do not rub it onto the palm of the hand because it will be absorbed into the hand, which is wasteful
5. Apply the sunscreen every day of the year (even on cloudy and rainy days) for a lifetime
6. The lips are extremely sensitive. Patients should apply sun-protective lip balm to the lips. When this isn't available, sunscreen should be used instead



7. Do not apply in the evening when there is no sunlight
8. If you wish to apply moisturiser/glycerine, do so at night after washing any remaining sunscreen off your body

It is essential that as well as understanding application patients also understand how to look after their sunscreen.

Important messages to communicate are:

- Keep sunscreen in a clean, dry and cool place
- Do not leave sunscreen in direct sunlight for a long time
- Protect sunscreen from all other heat sources
- Ensure hands are clean when interacting with sunscreen
- Remember to close the sunscreen jar each time it's opened so that unwanted material such as dust does not contaminate it
- Keep sunscreen away from small children as it is not edible
- Be aware of the expiry date of the sunscreen

Sunscreen is costly and may be unaffordable to many persons with albinism in low resource settings. It is therefore imperative that a sustainable supply of sunscreen and its continued access by patients are considered. In some countries such as Kenya and Malawi,





sunscreen for persons with albinism has been recognised by the Ministry of Health as an essential drug and is available in its central medical stores for clinicians to order. The innovative Tanzanian example of Kilisun, produced at the Kilimanjaro Sunscreen Production Unit within the RDTC at the Kilimanjaro Christian Medical Centre and previously presented in this manual, provides an alternative model of in-country production.

In order to empower patients with the knowledge and resources they need to make behavioural changes and protect themselves, clinicians must continually reinforce health education. A commitment to deliver health education at every albinism clinic is fundamental. In addition, clinicians must also emphasise the messages delivered during health education while examining patients. This enables rapport to develop and reiterates simple life-saving actions patients can follow.

## History and Examination in Albinism Clinics

# 4

For a definition of many of the medical terms used in this manual see the Glossary.

### Essentials for the clinic room

- Good lighting and adequate privacy
- Enough space to examine the patient easily
- Antiseptic hand cleanser or clean water and soap
- Marker pen for marking lesions for cryotherapy
- Cryospray gun (canister) and liquid nitrogen flask

*The chief purpose of albinism surveillance clinics is to offer attendees or their carers the education and assistance they need to reduce sun exposure in order to prevent skin cancer*

### Standardised examination form

A standardised form for albinism skin surveillance clinics is helpful to ensure that the assessment is comprehensive.

### *Suggested main headings for an examination form*

History	Age and occupation
	Family structure and family history
	Past medical history
	Exposure to sunlight
Examination	Verbal consent for examination
	Clinically likely type of albinism
	Clothing
	Region by region examination
	Mark skin lesions
Treatment given	Treat actinic keratosis and other skin conditions
Plan	Record and plan management
Advise	Give counselling and advice

### Notes on the Examination Form

#### **Past medical history**

- Previous skin cancer and treatments for other complications of albinism
- Other medical conditions and HIV status

#### **Exposure to sunlight. 'Time in the sun.'**

Knowledge and sensitivity concerning the patient's individual social situation is essential to providing effective advice. For example, many people with albinism have no choice but to work outdoors.

Sun exposure questions for children:

- How long does it take them to walk to school?
- Do they have their lessons inside or out?
- Do they work on a farm when they get home or when not at school?
- If in a rural area, do they collect the water and how long does it take?
- Are they protected from the sun whilst playing?

Sun exposure questions for adults:

- How many hours do they spend in the sun?
- What job do they have?
- Do they intentionally seek the shade?
- How many times in the last month have they felt discomfort in their skin from sun exposure?
- Do they collect water and how long does it take?

**Ask about sunscreen use:**

- Whether they have ever used sunscreen
- Did they apply sunscreen yesterday?
- Where they obtain their supplies
- How reliable that supply is
- Do they ever run out?
- How they apply their sunscreen

Poor sunscreen application technique can result in inadequate protection and wastes an expensive and limited resource.

To ensure informative answers, ask questions that require more than a yes/no answer. For example, instead of 'do you apply sunscreen in the morning?' ask 'can you tell me at what time of day do you apply sunscreen?'. Instead of 'do you apply sunscreen to your ears?', ask 'can you show or tell me where you apply your sunscreen?'.

*Do not rely on patients to alert you to a significant lesion. Do not miss lesions hidden under clothing that has only been partially removed.*

A full body examination is essential in skin cancer surveillance.

**Consent**

Explain the reason for the examination to the patient. Obtain their verbal consent.



### Note the clinically likely type of albinism

Without genetic analysis it is not possible to be sure of the patient's genotype but it may be helpful for statistical purposes to record the likely genotype.

### Examination of clothing

- Start with observation of whether the patient is wearing appropriate clothing to protect their skin from the sun. Ask if what they are wearing is what they normally wear in the sun or is it their 'clinic day' clothing
- Be aware and sympathetic to the reality that poverty may result in a lack of suitable clothing
- Be systematic in assessing the level of protection and categorise into fully, partially or unprotected

#### *Suggested classification of level of protection*

Region	Fully Protected	Some Protection	No Protection
Head/Face	Broad-brimmed hat	Cap with/without neck protection	No head covering
Neck	Neck flap on cap	Shirt with collar	T shirt
Upper Limbs	Shirt/blouse/sleeves that extend to the wrist	Short sleeved shirt	String top or vest or very short sleeves
Lower Limbs	Trousers or long dress/skirt down to the ankle	Long shorts or $\frac{3}{4}$ length trousers or dress/skirt	Shorts or dress/skirt not below the mid thigh
Feet	Shoes and socks	Shoes but no socks/sandals	Flip flops/tongs

## Principles of skin examination

- Use a standardised examination form to avoid missing elements of the examination
- Be unhurried and thorough
- The patient should be undressed as much as is possible while preserving their dignity and being respectful of cultural issues. This may require a chaperone
- Examining the patient on a couch may be most acceptable and expected. Alternatively, if a couch is not available, stand the patient up to examine them
- The entire skin surface should be examined including the scalp, ears, the back of the legs and dorsum of the feet. The groin and genitalia are not sun exposed and so are not routinely examined
- Palpate lesions for roughness, firmness and tenderness
- If a lesion is scaly, does the scale come off easily?
- If crusted, what is underneath? A crust can obscure an infected wound but also a squamous cell carcinoma. Scales and crusts can be lifted off with a scalpel blade



### Examine region by region

Look for signs of excessive UV exposure. Examine the patient systematically by anatomical region starting with the scalp.

See the Glossary for a description of the dermatological terms.

- Ectropion



*Ectropion of the lower eyelid*

- Actinic cheilitis



*Actinic cheilitis and erosion*

### Weathering nodules

These non-tender white fibrous nodules are a sign of chronic UV exposure.



*Weathering nodules on the helix and antihelix of the ear*

For each region note the presence of:

1. Lentigo



*Extensive lentiginos*

2. Erythema



*Solar erythema due to ultraviolet light exposure*

3. Solar Elastosis



*Solar elastosis on the neck and erythema on the face*

4. Actinic keratosis (AK)



*Actinic keratosis*

Record the number of AK in each region being examined.

5. Suspected tumours (see Chapter 6 Recognising Skin Cancer)

- If suspected tumours are found, record the type and number of tumours
- Common tumours in people with albinism are basal cell carcinoma and squamous cell carcinoma. Malignant melanoma and other skin malignancies are less common
- Examine for lymphadenopathy in the regional lymph nodes

6. Scars

A scar may indicate previous surgery for skin cancer. Beware of confusing a BCC for a scar.



*Keloid scars on the chest and new lesion marked next to scar*

## 7. Other skin conditions

Note other skin conditions such as eczema, tinea and impetigo.

### **Mark actinic keratosis and suspected cancers**

- Use a skin marker or pen to mark lesions during the course of the examination
- Record the number of lesions

### **Treat actinic keratosis with cryotherapy**

- See Chapter 8 Cryotherapy

### **At the end of the examination**

- Clean your hands with antiseptic hand cleanser
- Dispose of any used sharps in a sharps bin

## Summary and Management Plan

- Ensure your findings are clearly recorded
- Record any treatment administered such as cryotherapy
- Decide on whether the person with albinism is 'High Risk' (see the Glossary) and so will need frequent follow-up
- Decide on whether a referral for surgery is required
- Decide on what changes to lifestyle are needed to reduce risk of future tumours



### Advice / Counselling

Review the consultation with the person with albinism:

- Give praise for good sun protection i.e. wearing the correct hat or for the proper application of sunscreen or because their skin is in good condition. Positive reinforcement is effective
- Gently encourage and educate them in areas in which they could make improvements i.e. time in the sun. Always be sensitive to the challenges they face in their daily life
- Issue sunscreen if available and advise where they can obtain further supplies
- Explain how sunscreen should be applied. See Chapter 3 Prevention and Health Education
- If they are being referred for further treatment ensure that they have received counselling on what to expect and that they are clear on the referral process and how they will be contacted
- If not being referred, arrange a periodic check-up. For most patients 6 months will be appropriate but a shorter interval may be necessary for high-risk patients
- Suggest they contact their region's Albinism Association if available

# 5

## The Referral Process

**P**rompt and effective management of skin cancers is one of the most critical areas of an albinism surveillance programme. The process around referral and surgical treatment should be clear and robust. A 'designated person' should manage the process.

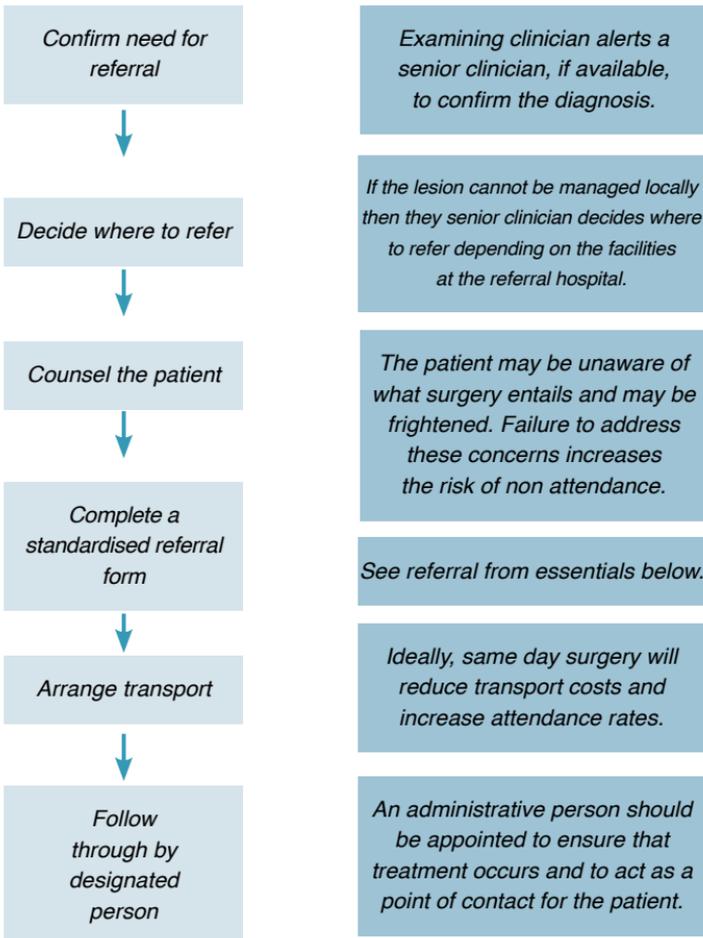
The majority of surgery should be carried out in a local hospital or health facility. Complex surgical cases may need referral to a specialist hospital.



Complex surgical cases include:

- High-risk SCCs and BCCs if adequate excision is beyond the capability of the local dermatologist surgeon
- Skin cancers on anatomical sites that need specialised skills for their excision, such as the eyelids
- All excision-biopsy-proven melanomas
- Recurrent cancer (at site of previous excision)
- Large tumours where direct closure is not possible and other closure options are beyond the capability of the community dermatologist surgeon
- Rare skin cancers

The following schema can be used to plan an effective referral process.



## Notes on Referral

### Counselling the patient

The patient may be unaware of what surgery entails and may be frightened. Failure to address their concerns increases the risk of non-attendance.

Explain:

- the need for surgery or other management
- the procedure
- wound care and postoperative recovery
- the importance of follow up

### Complete a standardised referral form

Forms should:

- be filled in accurately, legibly and completely
- include patients contact details, including telephone number
- include a description of the lesion, its size and anatomical location and a differential diagnosis.
- indicate the urgency of the referral
- indicate where and by whom the surgery should be performed

### Arrange transport

Ideally a patient needing surgical intervention should have surgery performed on the same day. This is usually convenient for the patient, saves transport costs and means that the cancer has been 'cured' on that day. It also reduces the risk of the patient being lost to follow up or of surgery being delayed due to issues of availability of a surgeon, theatre, or equipment.

### Responsibilities of the designated person

Check that the patient:

- is fully counselled about the procedure
- is informed of the date and time of the procedure
- is able to travel and has the funds to travel to the hospital/clinic
- is safe to travel to the clinic alone or whether they need to be accompanied
- arrives for surgery at the right place at the correct time

- is informed of the clinical diagnosis (benign or malignant)
- is given advice and appropriate follow up
- has postoperative wound advice and an appointment has been made for removal of sutures
- surgical site is inspected postoperatively for healing and signs of recurrence

Check that the operating room:

- is available at the arranged time
- surgical kits, anaesthetic, sutures, dressings and formalin pots are available

Check that the surgeon:

- and facility can competently undertake the planned surgery
- has the referral form and knows what procedure she/he should undertake
- meets the patient and confirms the site of surgery, checks that the patient is happy to proceed and a consent form is signed
- sends the histological specimen to the histopathologist
- records the procedure
- acts on the histological report



## SKIN CANCER

6. Recognising Skin Cancer 39

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# 6

## Recognising Skin Cancer

### Introduction

**H**istory taking is as important as examination in recognising benign and malignant skin lesions. Whilst most skin cancers present with typical features, some are more difficult to diagnose on clinical grounds. A diagnostic biopsy may be necessary to establish a diagnosis.

*In albinism skin surveillance clinics, an effective management plan for suspicious skin lesions is as important as diagnostic accuracy.*

Equipment to aid skin cancer recognition

- Bright lighting
- Handheld magnifying glass with or without an LED light
- Dermatoscope – a 10X magnifying device with polarised light. Expensive and not essential in albinism clinics but useful if trained in dermatoscopy
- Small ruler to measure and record lesion size
- Marker pen to mark lesions for review or cryotherapy
- Smartphone/camera for taking images with patient's permission for later comparison

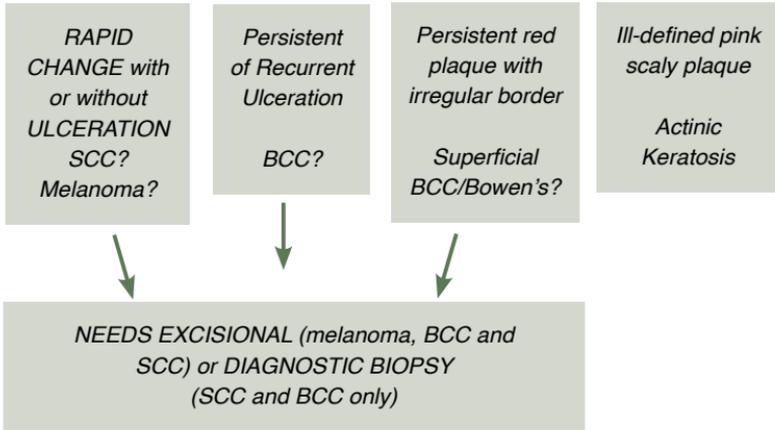
If in diagnostic doubt consider the following options:

- Examine closely in a brighter light. Use a magnifying glass or dermatoscope

- Feel the lesion for thickness and firmness
- Seek a second opinion from a colleague
- Take a diagnostic biopsy
- Ask the patient to return after a time interval to assess any change

Learn to describe the features that you are feeling and seeing.

### Recognising Skin Cancer – The Essentials



### Actinic Keratosis

Epithelial dysplasia (abnormal cells in the epidermis) in which there are areas of abnormal skin cell development. The skin is not maturing correctly. This may be restricted to the basal layer of the epidermis (see Chapter 9 Anatomy for Skin Surgery) or may extend to the full-thickness of the skin, at which point the lesion is known as SCC in-situ (Bowen's disease).

Examination findings:

- Starts as a small patch of scaly skin which has an ill-defined edge and may be gritty to the touch
- May progress to a scaly plaque
- May form a thickened crusty plaque
- May be a little tender to the touch
- The surrounding skin may show signs of chronic actinic damage such as solar elastosis

## Bowen's Disease

An intradermal (in-situ, confined to the skin) squamous cell carcinoma that may develop into invasive cancer.

Examination findings:

- Gradually enlarging well-demarcated erythematous plaque with an irregular border and surface crusting or scaling
- More common on the legs

Note that an irregularly-shaped, thin, scaly red plaque may be Bowen's disease or a superficial BCC. Dermatoscopy, if available, helps to distinguish between the two but in either case, diagnostic biopsy may be required.

Learn to recognise the three main skin cancers:  
SCC, BCC and Melanoma

Patient may report:

- Lesion started in a long-standing keratotic skin lesion (actinic keratosis) or a scaly red patch (Bowen's)
- Bleeding and scabbing
- Rapid (over the course of a few weeks or months) growth and ulceration

Examination findings. Any of the following:

- Scaly, thickened red patch
- Warty elevated papule or nodule
- Thick keratinous nodule or cutaneous horn
- Ulcerated lesion. May have a raised edge.

Examine the lesion with a strong light. Clothing fibres stuck to the lesion may indicate subtle ulceration. If in doubt, excise or biopsy the lesion.

Patients with severely sun-damaged skin need frequent surveillance and cryotherapy for actinic keratoses as are most at risk from developing invasive skin cancer

The treatment of choice for most SCCs is complete excision.



*Early SCC on the neck*



*Advanced SCC on back*

#### Basal Cell Carcinoma (BCC)

Patient may report:

- Slowly growing lesion that may have been present for over a year
- Recurrent scabbing
- Recurrent minor bleeding

Examination findings. Any of the following:

- The common nodular subtype presents as a firm-to-the-touch skin lesion which is 'pearly' and translucent, either as a domed skin nodule or with an irregular raised edge and central ulceration
- There may be small areas of eccentric ulceration and scabbing
- Superficial BCCs may present as an irregularly shaped, thin, scaly, red plaque
- A strong light and magnification (or dermoscopy) may show thin sharply-defined branching ('arborising') blood vessels
- Morphoeic BCCs may present with a scar-like patch with absence of skin pores in the patch



*BCC. Raised firm translucent edge and central scabbing. Well-defined vessels are visible to the naked eye.*



*BCC. Irregularly shaped lesion with firm edge and central pale pink area that on close inspection lacked pores*



*BCC. Domed, shiny, translucent nodule marked for excision*



*Asymmetrically ulcerated BCC*

## Melanoma

Melanomas arise from melanin producing cells (melanocytes) in the base layer of the epidermis. Melanomas in patients with OCA may be amelanotic (has no pigment) or pigmented. Amelanotic melanomas will not show classic pigment abnormalities. Suspect melanoma if a skin papule or nodule is increasing rapidly (over a few weeks) in size or is changing in shape.

Examine the palms of the hands and soles of the feet for acral melanomas. Melanomas may also present in the nail bed.

Patient may report:

- Rapidly changing (over a few weeks or months) lesion which may bleed easily if traumatised

Examination findings. Any of the following:

- Non-keratinised skin papule or nodule
- Lesion may be skin coloured, pink or red
- Lesion may bleed easily
- In OCA2 may show pigmentary features of asymmetry, multiple colours and an irregular border



*Atypical pigmented lesion in a patient with OCA2*



*Amelanotic melanoma*

### Other Skin Cancers

- Benign and malignant lesions arising from apocrine and sebaceous glands, connective tissue, blood vessel and nerve structures are much less common than BCCs and SCCs and may not be sun induced
- Their appearance is variable. A growing nodule or plaque which does not have the typical features of the common tumours should be managed with an excision biopsy to establish the diagnosis
- Excise with a 4 mm excision margin for diagnosis

### Suspected Skin Cancer on the Lips

- Actinic cheilitis (sun-induced inflammation on the lip) is common in albinism
- An erosion on the lips may be due to florid actinic cheilitis, in-situ SCC or invasive SCC but it may be difficult to distinguish between the three on clinical examination
- Carry out an incisional biopsy on any persistently eroded lip skin particularly if there is a raised edge



*SCC on lips*

### Suspected Skin Cancer on the Eyelids

- BCCs and SCCs may present as a nodule or an ulcer
- Sebaceous and sweat glands (glands of Zeiss and Moll) on the lid margin may form small white or translucent cysts and may be confused with BCC. If in diagnostic doubt, refer to an ophthalmologist
- Skin cancers of the eyelids should be managed in a major centre

# Principles of Skin Cancer Management in Albinism

# 7

## Introduction

**P**revention of skin cancer is the prime objective in dermatological management of people with albinism but early intervention for those who have pre-malignant and malignant skin lesions reduces mortality and morbidity from multiple or extensive surgery. Metastatic squamous cell carcinoma is a cause of death in albinism.



## Key Principles

- A surveillance programme and a register of high and low risk patients (see the Glossary) aids effective preventative skin cancer interventions
- Treat precursors of invasive skin cancer such as actinic keratoses and Bowen's disease to prevent progression to invasive disease. Whilst an individual actinic keratosis (AK) has a low risk of progression to squamous cell cancer (SCC), patients with albinism may have multiple AK, significantly increasing SCC risk
- Cryotherapy with liquid nitrogen is in most circumstances the most cost-effective intervention for pre-cancerous lesions

*Patients with severely sun-damaged skin need frequent surveillance and cryotherapy for actinic keratoses as they are most at risk from developing invasive skin cancer*

## Squamous Cell Carcinoma (SCC)

### Management options

- Excision – the treatment of choice in most circumstances
- Cryotherapy or curettage and cautery – only for in-situ (confined to the epidermis) tumours less than two cms in diameter on the body or less than one cm in diameter on the scalp, forehead, cheek and neck. Never for lesions of any size on the central face, temple or ear
- Topical agents such as 5-FU and imiquimod – can be used for biopsy-proven in-situ SCC. See Tips on Topical Treatments below
- Radiotherapy may be helpful in palliation for inoperable tumours or occasionally as an adjunct to excision where excision margins are not clear of tumour
- Chemotherapy – occasionally used for metastatic SCC

*The treatment of choice for most SCCs is complete excision*

### Assess the lesion

Ask yourself, is this SCC high or low risk?

High risk means higher risk of wider subclinical spread, higher risk of recurrence (15% vs 7.5%) and three times more likely to metastasise

(30% vs 9%). High risk tumours should be excised with a wider margin than low risk tumours.

Examine lesion with a good light. Tumour is high risk if any of the following:

- >2 cms diameter
- Rapidly growing
- Prior injury to skin (e.g. arising from a burn scar)
- Recurrent SCC
- On central face (including nose, lip, periorbital skin) and ear
- On skin not exposed to the sun
- Patient is immunosuppressed

If a biopsy result is available:

- >2 mm thickness (excludes keratin layer)
- Clark level IV or V (into subcutaneous tissue)
- Poorly differentiated
- Perineural, lymphatic or vascular involvement

Examine for enlarged regional lymph nodes if you have identified a malignant skin lesion.

### **Excision margins**

For high risk SCCs a 6mm excision margin will clear 95% of sub-clinical tumour spread. Consider referral to a major centre unless the tumour can be excised with a 6mm margin.

For low risk SCCs a 4mm excision margin will clear 95% of sub-clinical tumour spread.

The deep margin of excision should always include the underlying fat because the draining lymphatics of the skin lie in the fat under the tumour.

### **Follow up**

All albinism patients who have had an SCC are at risk of further SCCs and should be followed up long term at least every 6 months for surveillance of their skin.

## Basal Cell Carcinoma (BCC)

### Management options

- Excision – the treatment of choice for most BCCs
- Cryotherapy – early superficial BCCs
- Curettage and cautery – early superficial BCCs
- Topical therapy (for example 5-FU, imiquimod) – early superficial BCCs
- Photodynamic therapy and Mohs Micrographic Surgery are options available in major centres

*The treatment of choice for most BCCs is complete excision*

Some BCCs have an increased risk of recurrence and so are 'high risk'.

- >2 cms in diameter
- Located in the 'H zone' of the face: nose and upper lip, ears and lateral cheek, temple and lateral forehead
- Morphoeic/infiltrative morphology on histology
- Perineural spread on histology
- Recurrent BCC

### Excision margins

A 4mm margin gives a 97% complete excision rate for low risk BCCs. A 6mm margin should be taken for high risk BCCs. For low risk BCCs on the face an excision margin of 3mm is acceptable to reduce scar size.

### Follow up

The patient should be instructed to self-examine the scar for local recurrence. Recurrence usually occurs within 2 years.

## Melanoma

### Management options

Do not carry out an incisional biopsy as this does not allow accurate staging of the tumour which is necessary to determine the final excision margin, and may seed metastases.

*Fully excise all suspected melanomas with a 2mm margin*

Perform a complete excision of the lesion with a 2mm peripheral excision margin and include a layer of underlying fat so that an

accurate histological diagnosis can be made and staging of the tumour determined.

The resulting scar is then excised with an excision margin, which depends on the staging as determined by the histology report.

**Excision margin depends on staging of the tumour, which largely depends on melanoma depth and spread to the lymph nodes.**

Excision margins

- Stage 0 (in-situ – confined to epidermis) 0.5 cm
- Stage 1 (< 1.1 mm Breslow depth) 1 cm
- Stage 2 (1.1 to 2.0 mm Breslow) 1 – 2 cms
- Stage 3 (2.1 to 4.0 mm Breslow) 2 – 3 cms
- Stage 4 (Breslow > 4.0) 3 cms

Melanomas should be managed and followed up in a major centre.

### Dysplastic Naevae

These are naevae that may be precursors of some melanomas.

- Lesions reported on histology as dysplastic naevae (potentiality to lead to melanoma) may be graded as showing mild, moderate or severe dysplasia
- Any such lesion that has not been completely excised should be re-excised

### Rarer Skin Cancers

- Adnexal cancers
- Merkel cell carcinoma
- Microcystic adnexal carcinoma
- Dermatofibrosarcoma protuberans
- Other sarcomas
- Secondary cancer from another organ

Management of these should be carried out in a major centre. Most are managed in a similar way to squamous cell carcinoma.

A secondary cancer from another organ may present as a rapidly growing skin lump.

### Risk Stratification for Skin Cancer Surveillance in Albinism

Adjust frequency of skin surveillance appointments to reflect risk of developing skin cancer between visits.

**Low risk.** Very well protected skin with minimal sun damage. Examine once a year

**Medium risk.** Erythema and evidence of moderate chronic sun damage, with or without one or two AKs but no lesions suspicious of cancer. Examine every six months

**High risk.** Severe chronic sun damage with or without multiple AKs. Previous skin cancer. Examine once every three months

### Actinic Keratosis (AK)

The risk of progression of an individual AK to SCC is low but AK is a marker of sun-damaged skin so an indicator of overall skin cancer risk.

All AK should be treated with cryotherapy or curettage and cautery to pre-empt the few lesions that will progress to, or are already, in-situ SCC. In circumstances where a patient has multiple early or thin lesions and is not tolerating cryotherapy well, then it is acceptable to treat the thick lesions first and then re-examine the patient at the next clinic attendance.

Lesions that are rapidly growing, or have a fleshy base, or are painful, or are not responding to cryotherapy should be excised to exclude SCC.

### Bowen's Disease

Excision or the application of 5-Flourouracil cream are commonly used treatments in albinism clinics in low-resource settings. An alternative is three cryotherapy treatments at intervals of several weeks but this is associated with an increased risk of ulceration at the site of the cryotherapy.

### Tips on Topical Treatments

Excision is almost always the treatment of choice for skin cancer in low resource settings but the following topical agents, if available, can be used for the following histological types if surgical excision is not practicable or where it may cause unacceptable disfigurement.

Patients should be instructed carefully on how to apply the cream and warned to expect an inflammatory response. All such patients should be followed up for recurrence.

#### **Biopsy-proven superficial BCC up to 2cms across (but not on the face)**

Imiquimod 5% cream applied once a day for 5 days of the week for 6 weeks.

5-Flourouracil 5% cream applied twice daily for 3 weeks. There is a reported risk of recurrence to morphoeic BCC

#### **Biopsy-proven SCC in-situ (Bowen's disease)**

5-Flourouracil 5% cream applied twice daily for 3 weeks and repeated depending on the response.

Summary of Principle Management Options

	Dysplastic Nevi	Basal Cell Carcinoma		Squamous Cell Carcinoma		Melanoma
Treatment	Excision (5mm margin)	Low Risk Excision (3 to 4mm margins) Cryotherapy (early, superficial) Topical 5-FU or imiquimod (early, superficial)	High Risk Excision (6mm margins) Mohs micrographic surgery	Low Risk Excision (3 to 4 mm margin) Cryotherapy (< 2 cm diameter, in-situ) Topical 5-FU or imiquimod (in-situ)	High Risk Excision (6 mm margin) Radiotherapy (inoperable, close excision margins) Chemotherapy (metastatic)	Complete excision (Initial 2mm margin then dependent on melanoma depth)
Follow-Up	Annually	Every 6 months for two years and then yearly	Every 6 months for two years and then yearly	Every 6 months for two years and then yearly	Every 6 months for two years and then yearly	Major medical centre

### Suspected Skin Cancer on the Lips

- Actinic changes to the lips are common in albinism
- An erosion on the lips may be due to florid actinic cheilitis, in-situ SCC or SCC but it may be difficult to distinguish between the three on clinical examination
- Carry out an incisional biopsy on any persistently eroded lip skin
- Biopsy-proven actinic keratosis and in-situ SCC can be managed with 5-fluorouracil 5% cream
- Adequate sun protection may reverse erosions

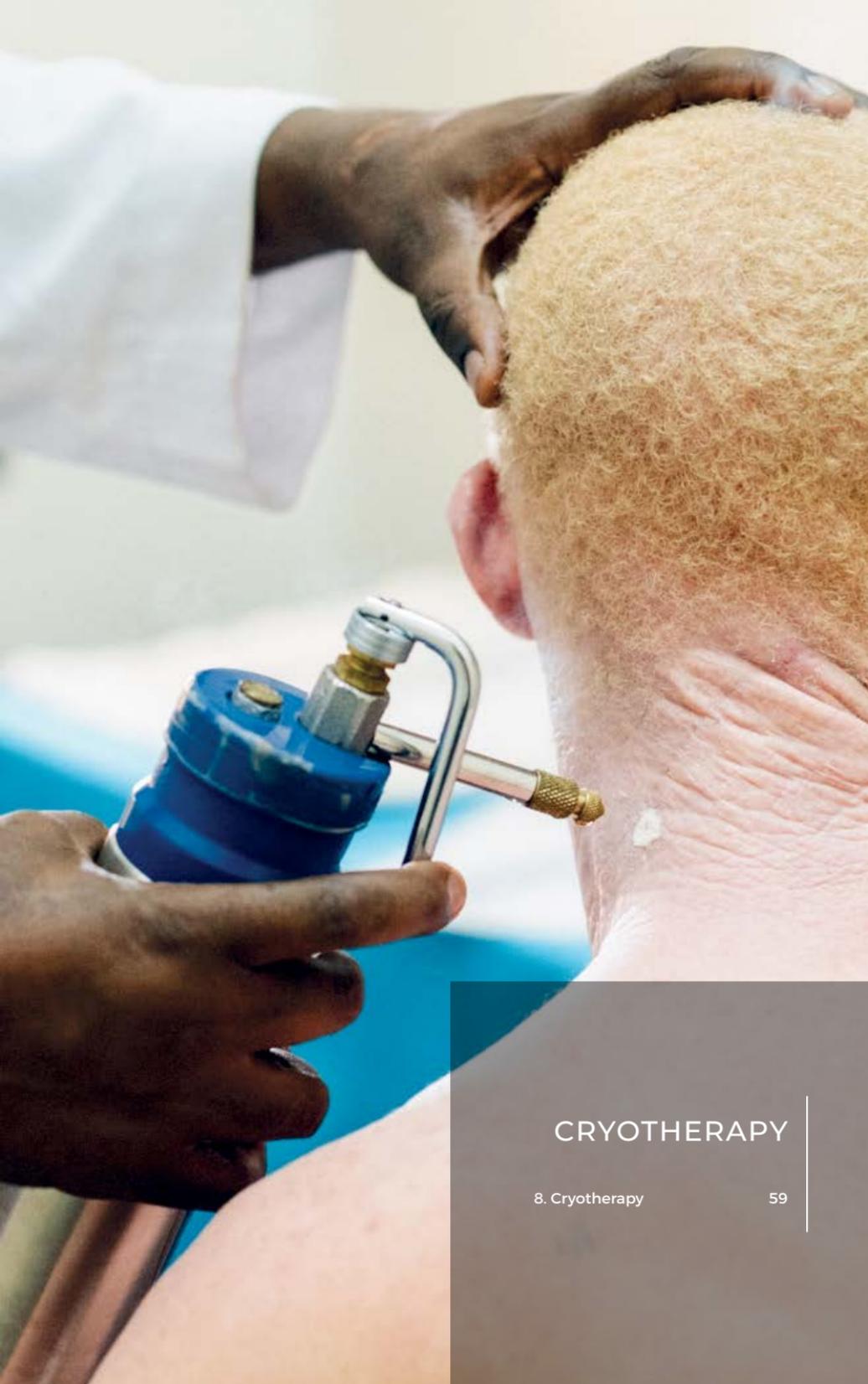
### Suspected Skin Cancer on the Eyelids

- Skin cancers of the eyelids should be managed in a major centre
- Chronic thickening of the eyelids due to elastosis and actinic damage to the lower lid margin is common
- Patients should be advised to apply suncream up to the lid margin and to wear sunglasses and hats

### Palliative Care

- Patients who have incurable skin cancers require continuing care to control pain and manage large ulcers
- They and their families require social and psychological support
- Health professionals running albinism clinics should identify services and key health professionals in their region for palliative and nursing care. Co-operate and communicate effectively with these services and individuals





## CRYOTHERAPY

8. Cryotherapy

59



## Cryotherapy

# 8

**C**ryotherapy is the destruction of abnormal tissue with an extremely cold liquid such as liquid nitrogen ( $-196^{\circ}\text{C}$ ) and is normally delivered as a spray from a canister. For young children, cotton tipped applicators dipped into the liquid nitrogen may be better tolerated than use of the spray canister.

### Cryotherapy in albinism

Cryotherapy with liquid nitrogen is an essential therapy in albinism skin surveillance clinics. It is the most cost-effective and efficient intervention for potential precursors of invasive skin cancer such as actinic keratoses.

Ideally, in-situ squamous cell carcinoma (Bowen's disease) and superficial basal cell carcinoma should be confirmed with a diagnostic biopsy before treatment but patients with albinism may have extensive actinic damage with multiple precursors of invasive skin cancer making biopsy of all lesions impractical. In such circumstances these lesions may be treated with cryotherapy on clinical suspicion.

*Biopsy any lesion in or next to a site of previous cryotherapy. Recurrent skin cancers may extend deeper and further than initially apparent. Excisional surgery may be required.*

### Sourcing liquid nitrogen

In many countries suppliers to the veterinary industry are a source of liquid nitrogen.

### Precaution

Only transport liquid nitrogen in a specialised container with a valve. If pressure is allowed to build in a container without a valve, the container may explode and cause a fatality.

### Indications

- Actinic keratosis
- Biopsy-proven superficial basal cell carcinoma and in-situ squamous cell carcinoma

### Equipment

Spray canister with liquid nitrogen or a cup of liquid nitrogen with cotton tipped applicators. If using cotton tipped applicators do not re-dip the applicator in liquid nitrogen as viruses can survive in liquid nitrogen. Use new cotton tip applicator for each application.



*Spray canister for liquid nitrogen*

### Inform the patient

Obtain consent following a discussion about the reasons for performing the procedure, what the procedure entails and potential side effects. Inform patient of the following:

- The procedure will hurt temporarily but is necessary to prevent cancer
- A blister may form within a few hours (clear, red or purple). Instruct the patient not to pop the blister
- The area may bleed (though this is not common)
- The blister shrinks to be replaced by a scab within a few days
- Swelling should settle in a few days
- A scar and dyspigmentation may result
- Healing depends on the site. The scab peels off within a week after cryotherapy to facial actinic keratoses, after about three weeks to a similar lesion on the hand, but may cause ulceration on the lower leg and take three months or longer to heal

### Procedure

- Not sterile but wash hands
- If multiple lesions, identify them with a marker.



*Lesions marked*

- Steady the spray canister nozzle 7 to 10 mm from the lesion. Spray the liquid nitrogen accurately. The frozen field should extend to just beyond the visible edge of the lesion. Short bursts of spray can be used to form the frozen field
- Keep the field frozen with short bursts of spray for around five seconds for actinic keratoses (ten to twenty seconds for superficial basal cell carcinoma and squamous cell carcinoma-in-situ)
- Two cycles of cryotherapy are more effective than one. **Allow for thawing of the lesion before repeating.** A finger pressed on the lesion will speed thawing

### Freeze times

Actinic keratoses = 5 seconds

Superficial BCCs = 10-20 seconds

SCC in situ = 10-20 seconds



*Cryotherapy from spray canister*

### Cautions

- If treating areas on the back of the hand ensure the ice ball does not freeze underlying tendons. They may rupture post-procedure. Periodically move the ice ball to check it is not becoming stuck to the underlying tissues indicating too deep a freeze
- Over-prolonged freezing may result in permanent white marks (scarring)

### Post-procedure

- Document the lesion site and treatment in the patient record including duration of liquid nitrogen application
- Give follow-up advice
- Periodically clean and sterilize the cryospray nozzles



*Normal blistering after cryotherapy*

### Complications and side effects

- Immediate: oedema/swelling, pain, headache after treatment of facial lesions
- Delayed: bleeding, infection, pigmentation changes and skin discomfort
- Permanent: lightening of skin (hypopigmentation), scarring, hair loss, altered sensation





## PREOPERATIVE

- |                                       |    |
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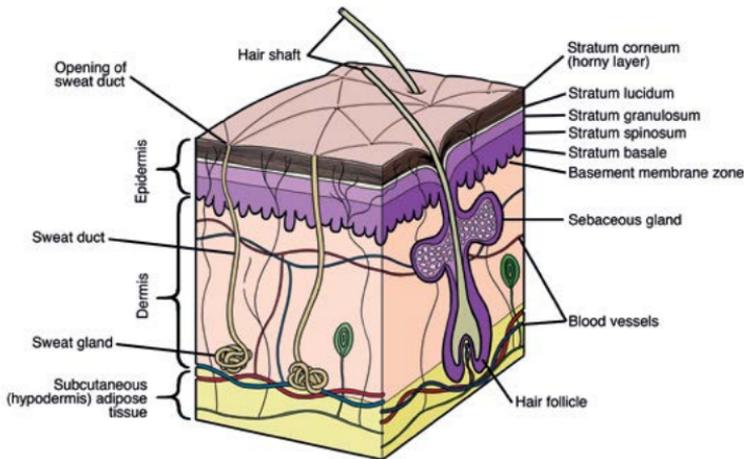
# 9

## Anatomy for Skin Surgery

**K**nowledge of skin anatomy is essential for avoiding injury to the patient, correct-depth biopsies and creating cosmetically acceptable wound scars.

### Skin Structure

The thickness of the skin varies from 0.5 mm on the eyelids to over 5 mm on the back. Skin reduces in thickness and elasticity with age. Curettage and cautery therapies and shave biopsies must involve the correct depth of skin or risk inadequate treatment.



*Basic skin anatomy*

**Epidermis** – the outer layer of the skin has a basal layer where keratinocytes form and migrate to the surface. It also contains melanocytes. Patients with albinism have the same number of melanocytes as those without albinism but melanin production and transport are impaired. In-situ lesions lie in the epidermis.

**Dermis** – beneath the epidermis. Much thicker and contains hair follicles, eccrine (sweat) and sebaceous glands. The papillary dermis lies next to the epidermis. The reticular dermis makes up the rest of the dermis.

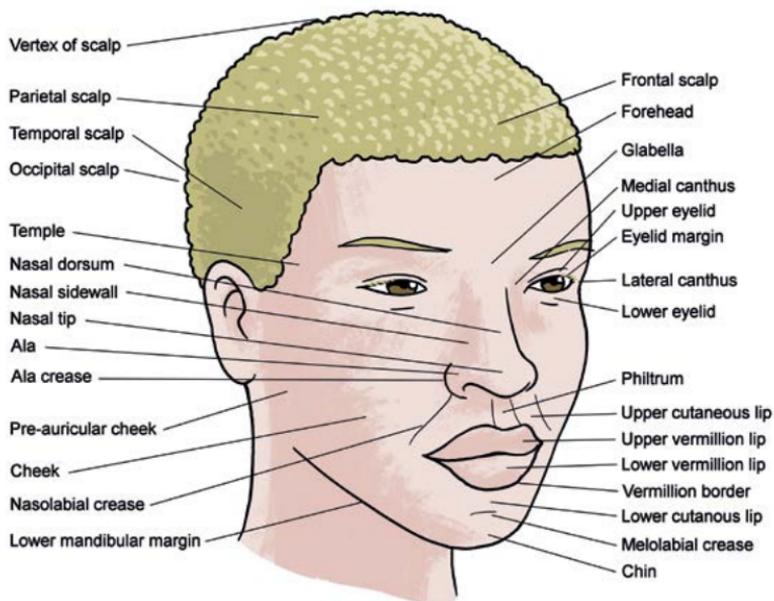
**Subcutaneous tissue** – deep to the dermis. Vessels, lymphatics and nerves lie in the adipose tissue immediately under the dermis and connect with the dermis. The skin's blood supply comes from a fine network of vessels in the adipose tissue.

### Anatomical Descriptions

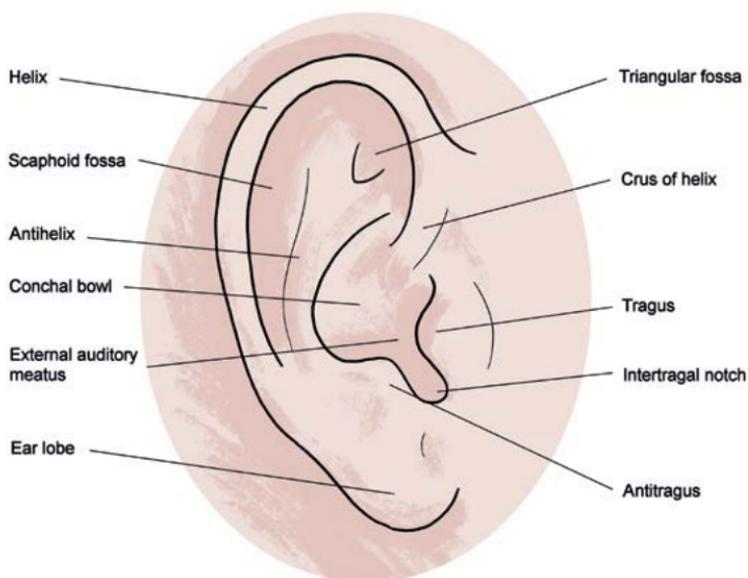
Know correct anatomical descriptions for good communication with colleagues.

Terms to describe positional relationships:

- Right or left
- Medial or lateral: towards the midline or away from the midline of the body
- Anterior or posterior: in front or behind
- Proximal or distal: close to the root of a limb/nose or towards the end
- Superior or inferior: above or below
- Cranial or caudal: towards the head end of the body or towards the feet end
- Site related: e.g. radial or ulna (side of the wrist)
- Supra or infra: over or under



*Essential face anatomy*



*Essential ear anatomy*

## The Scalp

The scalp has five layers:

1. **Skin**
2. **Connective tissue** (mainly fat) – richly vascular
3. **Aponeurosis** (galea) – strong fibrous layer
4. **Loose areola tissue** – bloodless layer that allows easy dissection
5. **Periosteum** of skull bones

The first three layers are bound tightly together and are very vascular. The loose areola tissue layer is relatively bloodless and has few attachments. High risk tumours on the scalp should be excised down to periosteum. Low risk tumours can be excised down to the aponeurosis.

## Relaxed Skin Tension Lines (RSTLs)

Memorise RSTLs.

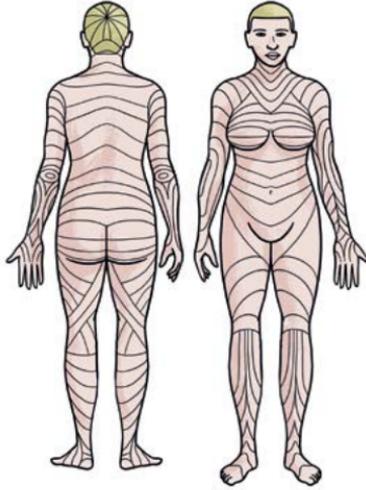
RSTLs are the directions in the skin along which there is a natural tension at rest due to the direction of the collagen fibres in the skin and the underlying structures. This constant tension is only temporarily altered by muscle action.

- Where possible direct the long axis of excisions along RSTLs to reduce the risk of noticeable or thick contracted scars.
- Placing incisions along the RSTLs reduces scarring compared to placing incisions at right angles to the RSTLs.
- Lines of maximal extensibility (LME) are perpendicular to the RSTLs. Placing incisions along RSTLs makes closure easier as there is less tension across the wound.



*RSTLs on face*

Ask the patient to grimace or screw up their eyes to help identify RSTLs on the face. Note that many RSTLs on the lower face run vertically.

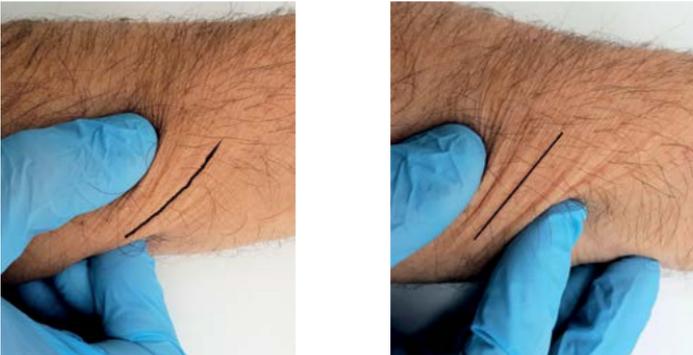


*RSTLs on body*

Note that on the limbs some RSTLs run obliquely. Bend the limb to make the RSTLs more obvious.

### Pinch test for RSTLs

RSTLs don't necessarily follow the natural wrinkle lines in the skin but the pinch test is nevertheless a useful guide.



*Pinching the skin from different angles to show direction of RSTLs*

Curved wrinkle on pinching the skin: pinch is not at right angles to the RSTLs.

Straight wrinkle on pinching the skin: pinch is at right angles to the RSTLs.

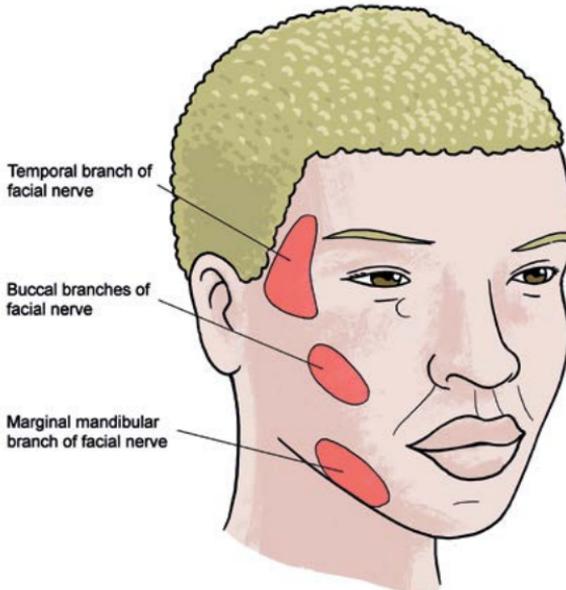
### Avoiding Injury to Nerves and Blood Vessels

Most skin surgery can be carried out with little risk to underlying structures but a knowledge of at-risk areas on the face and neck is essential.

*Do not make incisions that cut deeply. When starting an excisional biopsy cut only enough to allow the skin edge to spring apart. Then cut deeper tissue under direct vision.*

### At Risk Areas on the Face

Most excisions in skin surgery carry a low risk of damage to important underlying structures but extra caution is needed on the face where the nerve supplying the muscles of the face (facial nerve) is vulnerable.



*Nerves at risk in face*

### Branches of the facial nerve

- **Temporal:** particularly superficial over the zygoma (cheek bone) and lying just under the thin superficial temporal fascia. Dissect carefully under vision in this area. Division causes permanent drooping of the eyebrow. Note that local anaesthesia in the area causes temporary paralysis of the eyebrow
- **Buccal:** runs in the cheek deep to the cheek fat pad but over the masseter muscle and is close to the parotid duct which carries saliva to the mouth. Division of the nerve causes upper lip paralysis
- **Marginal mandibular:** runs near the angle of the jaw. Division causes paralysis of the lower lip and other muscles of facial expression

But: tumours will eventually erode underlying nerves, so nerves may have to be sacrificed if the tumour extends to the nerve.

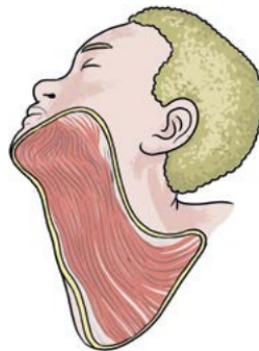
### Arteries at risk in the face

- Temporal branches of the facial artery are very superficial in the temple region. They require tying off if they bleed.
- Facial artery where it crosses the lower margin of the mandible. This can be identified by palpation.

Larger arteries often lie in the depths of skin creases or at the junction of one anatomical structure and another – for example in the pre-auricular area and between the nose and the cheek. Nerves often accompany arteries.

### Neck

The main risk in the anterior neck is incising a large vein. These lie under the thin platysma muscle which lies just deep to the skin of the neck. The at-risk structures in the neck all lie below platysma. Where possible, dissect above, or just below, platysma. Lift the specimen when dissecting it free to see and avoid branches of the external jugular vein. Use blunt scissors to dissect the specimen free.



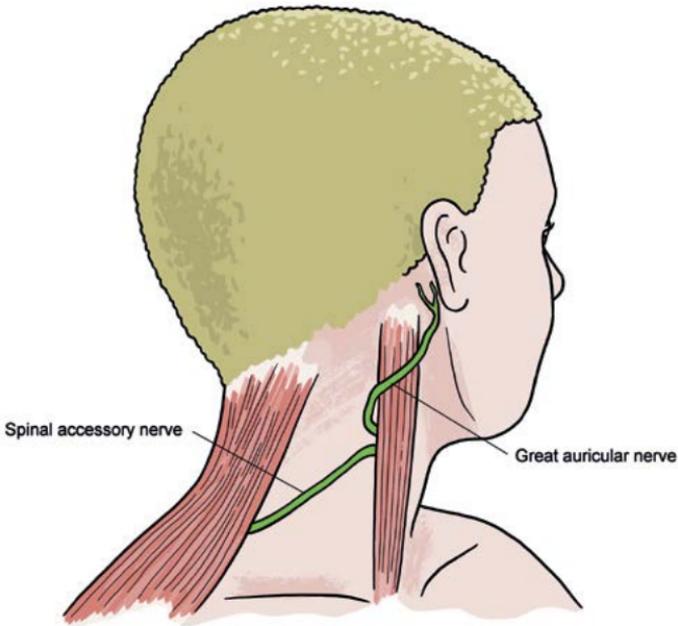
*Platysma muscle*

Do not attempt to excise skin lumps in the neck that are fixed to underlying tissues. Refer to a major centre.

**Two nerves are at risk in the posterior triangle (posterior to the sternomastoid muscle) of the neck:**

- **Greater auricular nerve.** Division causes sensation changes around the ear and sometimes a painful neuroma. The nerve is easily identified running over the sternomastoid muscle
- **Spinal accessory nerve.** Crosses the posterior triangle of the neck. Division causes paralysis of trapezius and sternomastoid muscles resulting in weakness of neck and shoulder movements

There is minimal risk to these nerves if lesions are excised with care, avoiding deep blind incisions.



*Nerves at risk in posterior triangle of neck*

## Other structures

### Eyelids, nostrils and lips

Anatomical margins are at risk of distortion from closure of the wound or from later contracture of the scar. See Chapter 15 Closure Options for techniques to avoid distortion.



*Late contracture of a scar below the eye causing ectropion of the lower eyelid.*

## Equipment for Surgical Procedures

# 10

### Operative Environment for Skin Surgery

**D**iagnostic biopsy and excisional skin surgery can be carried out at low risk and at low cost in a procedure room in a clinic environment rather than in an operating theatre.

#### Procedure room requirements

- 'Clean sink' for hand washing and a 'dirty sink' for disposing of liquid waste
- 'Sharps bin' for discarding needles and blades
- Clinical waste container for disposal of swabs and gloves
- Good lighting
- Low cost diathermy such as a hyfrecator
- Couch. A couch that can be raised at the head is ideal for facial and scalp lesion excisions
- Stainless steel trolley for the instruments

### Clothing

Skin surgery does not require full sterile clothing. The minimal requirement is a protective clean apron, sterile or clean single-use gloves, a mask and eye protection.

## Skin Preparation

Chlorhexidine gluconate, povidone-iodine or alcohol-based solutions are suitable for skin preparation. Chlorhexidine temporarily binds to the skin so is less easily washed away by blood or other fluids than iodine. Avoid spilling chlorhexidine into the eyes or the ear canal to avoid local toxicity.

## Surgical Instruments

Skin surgery does not require a large variety of expensive instruments but the correct instruments will help make procedures easy and safe to execute.

### Essential

- Needle holder. 15cms or less in length
- Number 3 scalpel blade holder for number 15 scalpel blades
- Small, toothed forceps such as Adson's
- Blunt-ended dissecting scissors. 15cms or less in length
- Sharp-pointed stitch cutting scissors



*Number 3 scalpel blade holder*



*Needle holder*



*Toothed forceps*



*Blunt ended dissecting scissors*

**Desirable**

- Skin hook. For delicate handling of skin edges
- Small curved artery forceps. For holding blood vessels that need tying off or for aiding excision of a skin cyst

*Skin hook***Re-sterilising disposable instruments**

Disposable instruments are designed to be used once but it is acceptable practice in low-resource settings to re-sterilise disposable instruments.

**Disposable Equipment****Marker**

Surgical marker pen for marking excision margins. Alternatively use gentian violet and a tooth pick. To avoid contamination do not re-dip the tooth pick in the gentian violet if the gentian violet is to be used again.

*Gentian violet for skin marking***Scalpel blades***Size 15 blade to fit size 3 blade handle.*

A size 10 blade is larger than a size 15 blade but has a similar shape and can be used for larger excisions on thicker skin such as on the back.

*Size 11 blade to fit size 3 blade handle.*

A size 11 blade is useful for nail bed biopsies, shave excisions and shave biopsies.

Larger blades, such as size 22, are less suitable for skin surgery and fit a size 4 blade handle.

## Sutures

### Non-absorbable sutures

Cause little tissue reaction and are cheaper than absorbable sutures but are less easy to handle and knots can unravel unless a surgical knot has been tied correctly.

Examples: polyamide (Nylon), polypropylene (Prolene®), silk.

### Absorbable sutures are fast or slow absorbing

- Fast absorbing sutures are used for surface skin closure. They keep sufficient tensile strength for about a week
- Slow absorbing sutures keep sufficient tensile strength for at least a month and are used to provide additional support to the surface skin closure as a deeper 'dermal suture' – see Chapter 14 Excisional Biopsy
- Examples: polyglactin (Vicryl®), polyglycolic Acid (Dexon®), polyester (Dacron®), catgut
- Understanding the suture packet information



Example of suture packet

4-0 relates to the diameter (thickness) of the thread. The higher the number the thinner the thread. 5-0 or 6-0 is used for delicate skin on the face. 4-0 or 3-0 is suitable for the body or the scalp.

The image of the needle on the left of the packet shows its shape and:

- Needle length – in this case 19mm
- The proportion of a circle the needle covers. In this case 3/8ths of a circle
- 'Reverse cutting' relates to the shape of the point of the needle. A cutting needle should be used for skin and a reverse cutting needle is ideal. A 'round bodied' or 'taper point' needle has a relatively blunt tip and is used for internal organ suturing. It is not suitable for skin surgery as does not pass easily through the skin

45 cms is the length of the thread.

### Making Cheap Sutures

Sutures can be made at a fraction of the cost of packaged commercial sutures by using nylon fishing line threaded into injection needles. Absorbable sutures such as PGA Plus® and Surgicryl® are also available.

#### Equipment for making cheap sutures

- Nylon fishing line with a breaking strength of 6 lbs (diameter of 0.22 to 0.26 mm) is equivalent in tensile strength to a 3-0 suture
- Nylon fishing line with a breaking strength of 2 to 4 lbs (diameter of 0.15 to 0.2 mm) is equivalent in tensile strength to a 4-0 suture
- 23 Gauge, 25 mm length, injection needle. A 21 Gauge needle can also be used but is thicker than ideal
- A metal pipe of approximately 12 to 15 mm in diameter and a short length of rubber or leather
- A pair of pliers

#### How to make a suture

Thread the fishing line to the desired length through the hollow injection needle. It is easiest to thread it through the needle from the sharp end

Bend the plastic Luer lock at the blunt end of the needle gently back and forth until it breaks off the needle and then slide it off the thread

Bend the needle into a curve by pressing it down around the pipe using the rubber to protect your fingers and the delicate tip of the needle. The bevel should face the outer side of the curve to simulate a reverse-cutting tip

Gently crimp the metal of the needle onto the thread with the wire-cutting jaws of the pliers. In addition, crimping the needle a third of the way from the blunt end will create a slightly flattened area for the needle holder to grip

Soak the needle and thread in 10% povidone iodine solution for ten minutes to sterilise, then rinse with sterile water or saline. Ethylene oxide gas sterilisation is also suitable but autoclaving or boiling is not. Do not re-sterilise after use in the patient

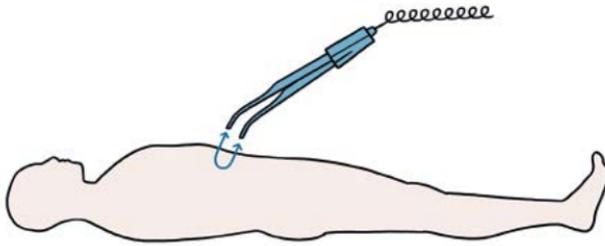


*Equipment to make sutures.*

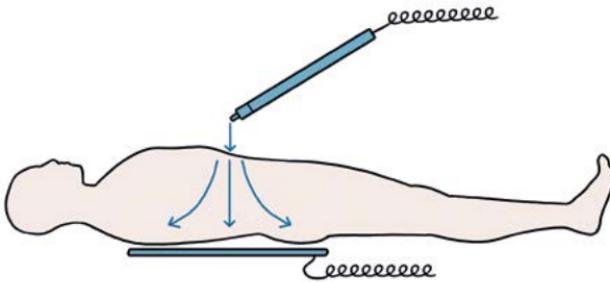
*Fishing line, 23G or 25G needle, pipe, leather/rubber, pliers*

## Electrocoagulation

- A diathermy machine is used to reduce intra-operative bleeding and the risk of postoperative haematoma formation
- The current passing from the electrode tip to the tissue creates heat which coagulates the tissues, sealing small blood vessels
- A unipolar diathermy forceps has a single electrode tip. It requires an earthing pad on the patient to safely earth the current
- A bipolar diathermy forceps has a double electrode tip so that current passes only between the electrode tips. No earthing pad is needed



*Unipolar diathermy*



*Bipolar diathermy*

A hyfrecator machine is cheaper to purchase than a diathermy machine. It does not need an earthing plate on the patient even when using a unipolar electrode as its low current dissipates safely. Its lower power makes it less effective than diathermy for larger vessels. Disposable electrode tips are required.



*Hyfrecator*

Note that if alcohol is used to prepare the skin, it should be allowed to dry/evaporate away before use of diathermy to avoid a fire/burn risk.

## Local Anaesthesia

**D**iagnostic biopsies and almost all excisional biopsies in dermatological surgery can be carried out under local anaesthesia at low risk to the patient and at low cost.

### Local anaesthetics

- Lidocaine is used commonly in skin surgery. It acts in seconds and lasts up to an hour. It lasts longer if mixed with adrenaline
- Bupivacaine is an example of a longer-acting local anaesthetic. It takes about four minutes to act but can last for two hours. It lasts longer if mixed with adrenaline
- Lidocaine with adrenaline may be mixed 50:50 with bupivacaine to create a fast-acting and long-lasting local anaesthetic

### Adding adrenaline/epinephrine

Lidocaine is a vasodilator. Mixing adrenaline (epinephrine) with lidocaine reduces intraoperative bleeding (but not postoperative bleeding) and so makes excisions easier by creating a dryer operative field.

### To make a 1 in 100,000 mixture of adrenaline/lidocaine

The volume of lidocaine should be 100 times the volume of 1:1000 adrenaline.

Use a 1ml syringe to draw up 1:1000 adrenaline. Add 0.1ml of 1:1000 adrenaline to every 10mls of lidocaine.

## Maximum safe dose of lidocaine

### BODY WEIGHT IN KGs X 0.7 IS THE MAXIMUM SAFE VOLUME IN MLS OF 1% LIDOCAINE WITH ADRENALINE

For example. 60 kg patient.  $60 \times 0.7 = 42\text{mls}$ .

If 2% lidocaine then divide maximum safe volume by 2. e.g. 60 kg patient = 21mls.

Maximum bupivacaine with adrenaline volume is a little under half that of 1% lidocaine with adrenaline.

Without adrenaline: halve the maximum volume.

#### Toxicity

This will occur if the maximum dose is exceeded or the anaesthetic is injected directly into a vein. It can cause fatality.

#### Signs of toxicity

- Tingling and numbness in the lips or tongue
- Metallic taste in the mouth
- Tremors, convulsions
- Respiratory arrest

#### Risk of exceeding maximum dose if:

- Lose track of how much has been injected
- Inject large volume in a light person
- Inject large volume quickly into a vascular area
- Inject directly into a vein. Greater risk in neck

#### Techniques for Local Anaesthesia

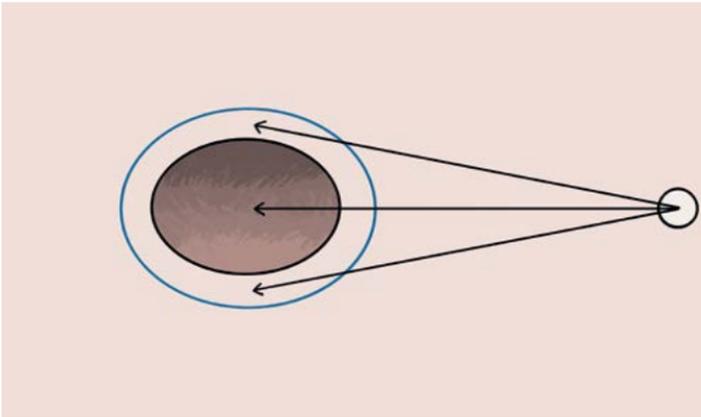
- Inject into the deep dermis or just below the dermis. Too superficial will be painful. Too deep will be ineffective or slow to act
- Test that the anaesthetic has caused complete numbness before incision by pinching the skin gently with a toothed forceps
- Preferably use a small gauge (27 or 23) needle to inject. To reduce the risk of injecting too much anaesthetic, avoid using a large syringe such as a 20 ml

**Reduce the pain of injection by:**

- Using a small gauge needle
- Injecting slowly
- Avoiding injecting very superficially in the skin
- Reinserting the needle through already anaesthetised skin
- Warming the anaesthetic to body temperature
- Mixing the anaesthetic with sodium bicarbonate to reduce its acidity.  
Add 1ml of 8.5% sodium bicarbonate for every 10 mls of lidocaine

**Infiltrative anaesthesia**

Local anaesthetic is infiltrated directly under the skin lesion. Use for diagnostic biopsies where only a small area needs anaesthetising.

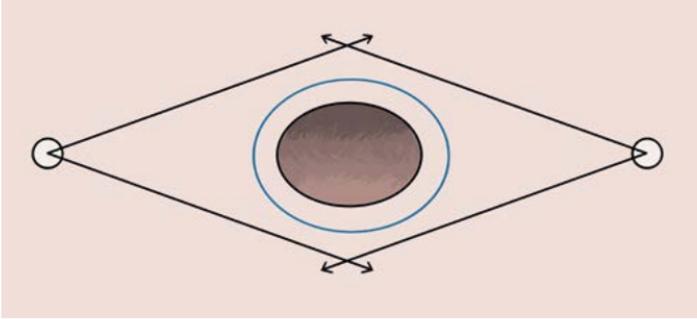


*Infiltrative anaesthesia*

Infiltrative anaesthesia can also be used to lift a lesion off underlying structures for easier excision.

**Field block anaesthesia**

The standard technique for skin excisions. Local anaesthetic is infiltrated around the entire lesion, not underneath it. The area inside the field block will become numb.



*Field block anaesthesia*

**Regional anaesthesia**

Infiltrating local anaesthetic around a sensory nerve will numb the area it supplies. The techniques for regional anaesthesia are outside the scope of this manual.

## Preoperative Preparation

# 12

### Consent

**N**ever operate without a signed consent form. Explain the reason for the procedure. Explain alternative treatment options. Tell the patient about the risks of the procedure. Ask if they have any questions.

#### *CONSENT FORM FOR EXCISION WITH DIRECT CLOSURE*

*Date ...*

*Patient's name ...*

*Name of procedure ...*

*Reason for procedure ...*

*Risks of procedure: Infection, bleeding or bruising, thick scar, numbness or altered sensation, possible need for further treatment.*

*Additional risks: ...*

*Statement of health professional*

*I have discussed the above procedure with the patient including alternative treatments, benefits and risks.*

*Name ...*

*Signature ...*

*Statement by patient*

*I agree to the above procedure. The intended benefits and possible risks have been explained to me by the above health professional.*

*Name ...*

*Signature ...*

## Time Out

Before starting the procedure take 'time out' with your assistants to use check lists.

### THEATRE EQUIPMENT CHECK LIST

1. *Operating table – preferably with head that can be raised to aid excision of facial and scalp lesion.*
2. *Good lighting.*
3. *Stainless steel trolley for the instruments.*
4. *Sharps bin for discarding needles and blades.*
5. *Clinical waste container for disposal of soiled swabs and gloves.*
6. *Diathermy or hyfrecator.*
7. *Sterile gloves.*
8. *Face mask, gown/apron, eye protection, theatre clogs if required.*
9. *Sterilised skin surgery instruments on a tray.*
10. *Sutures, surgical blade.*
11. *Local anaesthetic, adrenaline.*
12. *Syringe and needles.*
13. *Skin preparation such as iodine or chlorhexidine.*
14. *Sterile towels to isolate procedure site.*
15. *Local anaesthetic, adrenaline, needles and syringes.*
16. *Formalin pots.*
17. *Consent forms, procedure recording forms, post-op instruction leaflets and histology request forms.*
18. *Dressings and tape.*

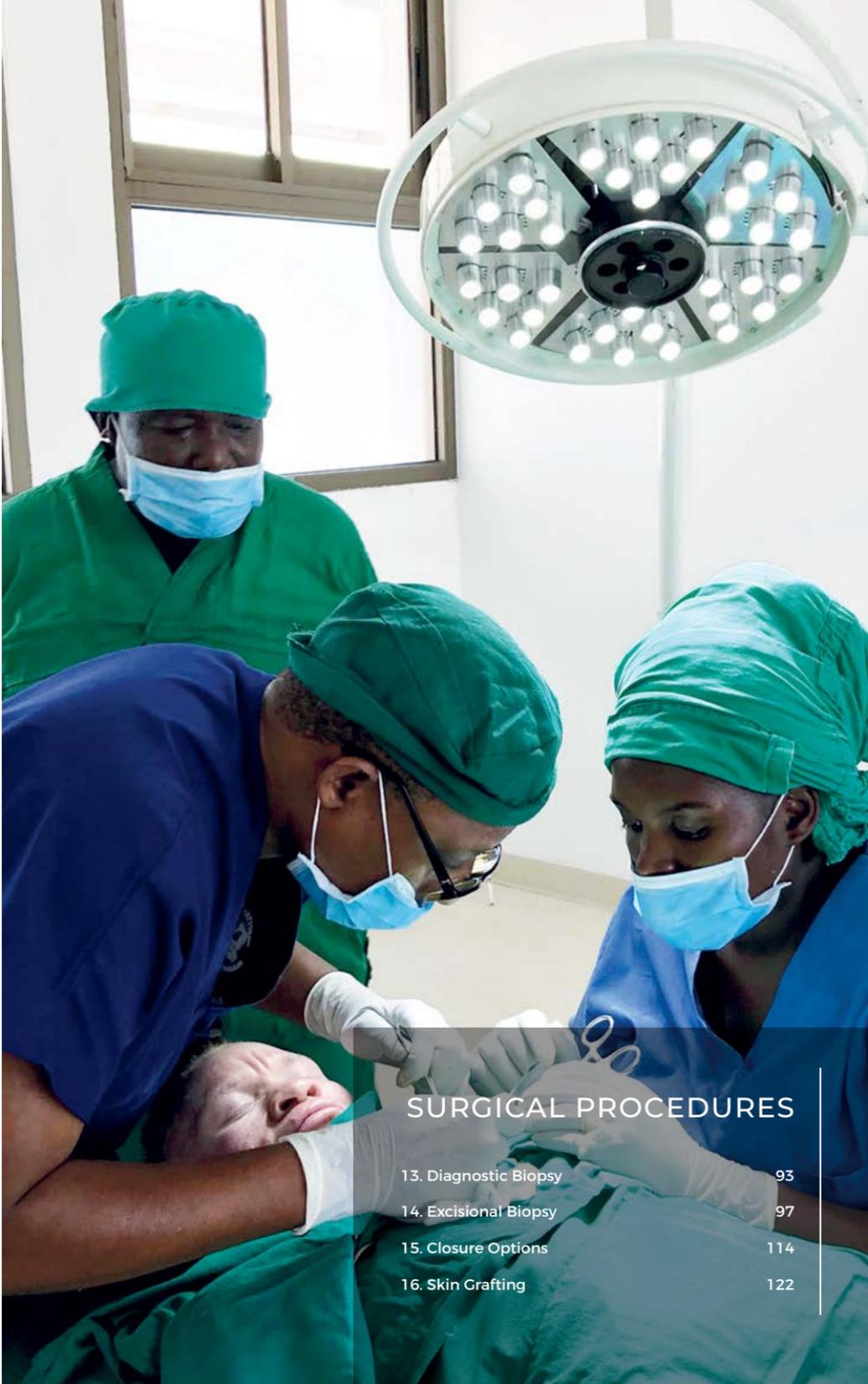
### SAFE SURGERY CHECKLIST WITH PATIENT

1. *Is this the correct patient?*
2. *Have I confirmed which lesion is to be removed?*
3. *Is the lesion marked?*
4. *Has the patient signed the consent form?*
5. *Allergy? Is adrenaline available in case of anaphylactic shock? Do you know where it is? Is it in date?*

6. *Pre-existing sepsis in the area for excision? This increases post-operative infection risk. Give an antibiotic one hour before the procedure.*
7. *Anticoagulant medication or herbal remedies? May increase the risk of post-operative haematomas. For patients on warfarin an INR of 3 or under is acceptable for skin surgery. Anticoagulation should not be stopped. Aspirin should not be stopped unless taken prophylactically.*
8. *Does the patient have a coagulopathy? Ask about easy bruising.*
9. *Smoker? Graft failure is more common in smokers. Should stop one week prior to surgery and for two weeks after.*
10. *Implanted electrical devices? Unipolar diathermy carries the risk of damage to electrical devices such as pacemakers.*

#### *PROCEDURE CHECK LIST FOR DERMATOSURGEON*

1. *Have I a working diagnosis and have I marked appropriate excision margins?*
2. *Will this wound close with direct closure? If not, what are the other options for closure? Should I keep closure options open by excising the lesion with a circular excision?*
3. *What local anaesthesia technique will I be using?*
4. *Is there a risk to nerves or blood vessels?*
5. *For a skin graft, have I chosen the donor site?*
6. *Have I positioned the patient so that access to the operative site is easy?*



## SURGICAL PROCEDURES

13. Diagnostic Biopsy	93
14. Excisional Biopsy	97
15. Closure Options	114
16. Skin Crafting	122



## Diagnostic Biopsy

**A** diagnostic biopsy is the removal of part of a skin lesion for histological examination in order to determine the diagnosis and so to plan management.

In albinism clinics, diagnostic biopsy is performed:

- When the diagnosis is uncertain and surgical excision of the lesion may be unnecessary or disfiguring
- To confirm the diagnosis/tumour type before referral to a major centre
- To confirm a diagnosis before carrying out non-excisional topical treatment

If biopsy results may be significantly delayed or the patient lost to follow up due to transport difficulties, then a full excision may be preferable where the diagnosis is uncertain.

### Types of Diagnostic Biopsy

#### **Incisional**

A small ellipse of full-thickness skin is excised from the lesion.

Advantages:

- Provides the pathologist with full thickness specimen
- Can be taken with a standard size 15 or 11 scalpel blade

Disadvantages:

- Takes a little longer to carry out than a shave or punch biopsy

**Shave**

A small sample of the epidermis and upper dermis is shaved from the lesion with a blade or a ring curette.

Advantages:

- Leaves a very small wound
- Quick and easy to do

Disadvantages:

- Needs skill to ensure correct depth of tissue is shaved to include dermis as well as epidermis
- Ideally needs a shave biopsy razor or a ring curette
- It is best used to confirm a clinical diagnosis as it gives no tumour depth information

**Punch**

A biopsy of full thickness skin taken with a disposable surgical punch. Available in sizes from 4mm to 8mm in diameter.

Advantages:

- Quick and easy
- Provides pathologist with full thickness specimen

Disadvantages:

- Needs disposable punch

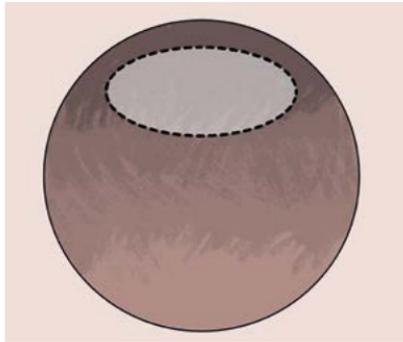


*Disposable punch biopsy*

### Incisional Biopsy Procedure

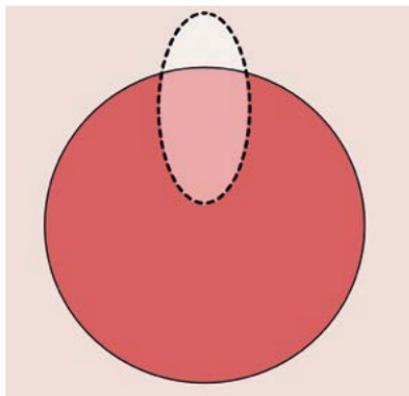
The incisional biopsy technique is described here as is most used in low resource settings.

- After infiltrative local anaesthesia remove any crust over the lesion
- Identify the area of the lesion that will give the histopathologist the best chance of making a diagnosis
- Biopsy from the thickest part of the lesion



*Biopsy taken from thickest part of lesion*

In ulcerated lesions biopsy from the edge of the ulcer after removing any overlying crust. Sending necrotic material from the middle of the lesion will not allow histopathological diagnosis.



*Biopsy from ulcerated lesion*

- Mark an ellipse for excision. The centre of the ellipse should measure at least 3mm in width to ensure an adequate specimen
- Local anaesthesia can be administered by the infiltration technique. See Chapter 11 Local Anaesthesia
- Excise the specimen, keeping the blade vertical and ensuring the full depth of dermis is taken
- Place the specimen in a formalin pot, label the pot and write a histology request form. See Chapter 19 Histology



*Keratinised skin lesion on lower leg*



*Keratin lifted off and lesion marked for incisional biopsy*

## Excisional Biopsy

# 14

**L**esions should be excised with an 'excision margin' of normal skin. This is the distance in millimetres from the visible edge of the lesion to the cut made for the excision. See Chapter 7 Skin Cancer Management in Albinism for suggested excision margins. Mark the ellipse with a marker pen (or gentian violet and a toothpick) before local anaesthetic is injected.



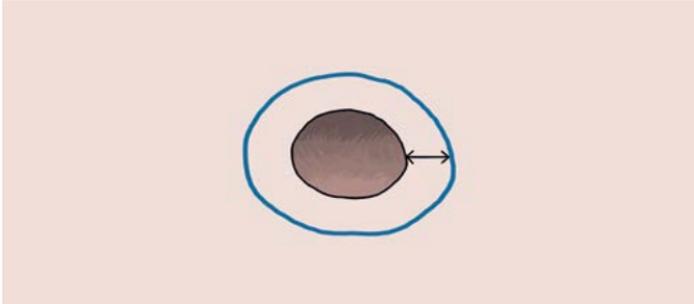
*Marking with gentian violet and a toothpick*

## Marking Out The Ellipse for Accurate Excision

### Step 1. Examine the lesion with good lighting

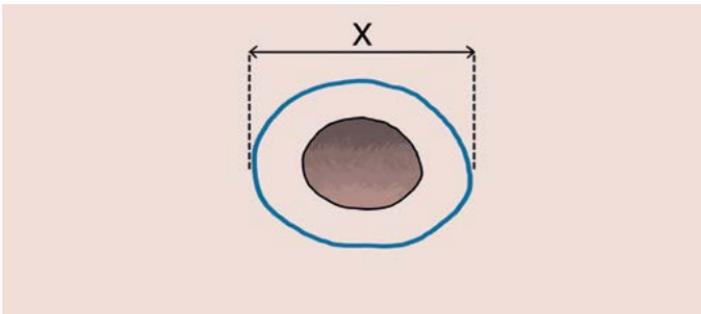
Mark the visible edge of the lesion with dots with a marker pen or with gentian violet and a clean toothpick.

### Step 2. Measure and mark the excision margin



*Circle drawn around the lesion with appropriate excision margin*

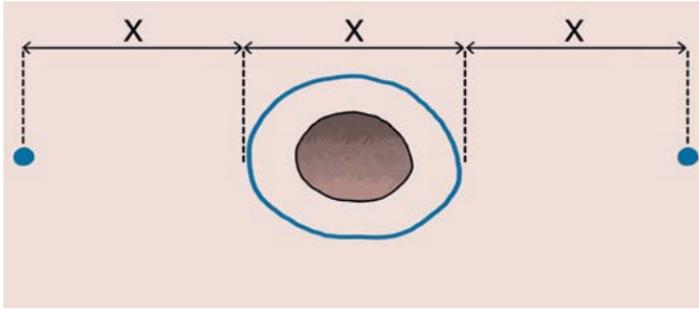
### Step 3. Measure across the marked circle



*Excision margin diameter measured. This is distance X*

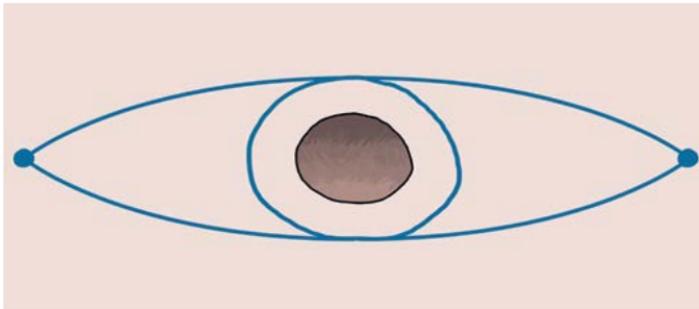
**Step 4. Measure out from each side of the excision margin circle the same distance as X**

Mark the end points on the skin. Ensure the marked end points lie along a Relaxed Skin Tension Line (See Chapter 9 Anatomy for Skin Surgery).



*Ends of ellipse marked with a dot*

**Step 5. Draw the ellipse**

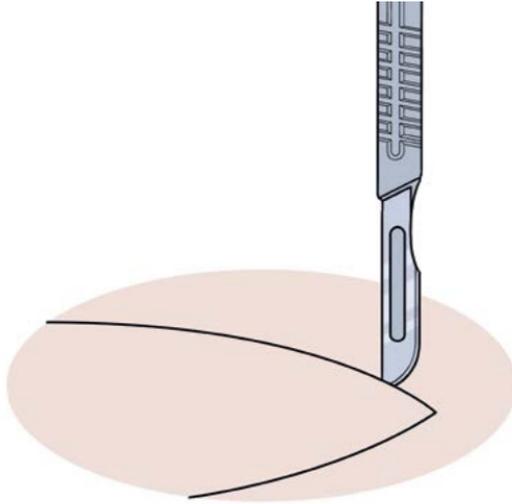


*Draw the long axis of the ellipse from the marked end points.*

Apply skin preparation and drape the patient with sterile towels. Inject local anaesthetic with a field block. Test with toothed forceps that the area is numb.

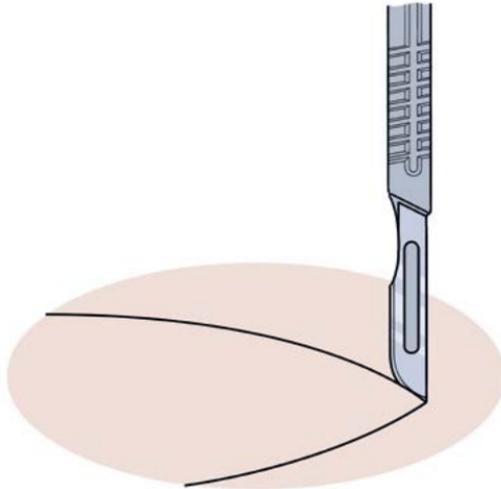
### Cutting Out The Ellipse

Score the skin along the marked line first. Keep the blade vertical to score with the tip.



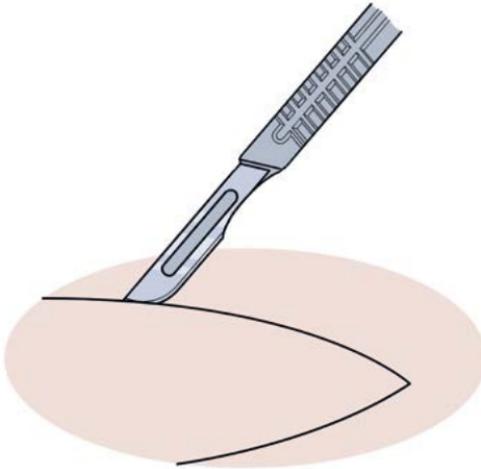
*Scoring the skin*

To avoid a fishtail (over-extending the incision) stop before the end of the ellipse, reverse the direction of the blade and score back from the end of the ellipse to meet the already-scored cut.



*Reversing the direction of the blade to avoid a fish tail*

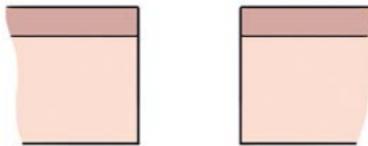
Now cut completely through the skin with one or two sweeps of the blade. The blade can now be angled along the cut to use the curved edge of the blade.



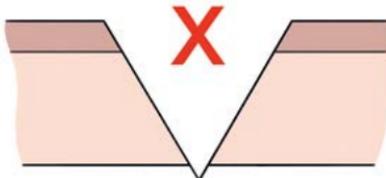
*Angle the blade along the cut*

Gently stretch the skin across the wound to help identify when you are through the skin. The skin will spring open revealing underlying fat.

Keep the blade at right angles to the surface of the skin so that the skin edge is not sloped in.



*Cut through the skin vertically.*



*Do not slope the blade*

Lift one end of the lesion with a skin hook or a toothed forceps and excise it with a pair of dissecting scissors. Ensure an even thickness of subdermal fat is taken with the specimen.

Place the specimen immediately into the formalin pot.

Cauterise any significantly bleeding blood vessels with diathermy or a hyfrecator.

### Suturing the Wound

Hold the needle one third of the way from the thread end to achieve good control of the needle.



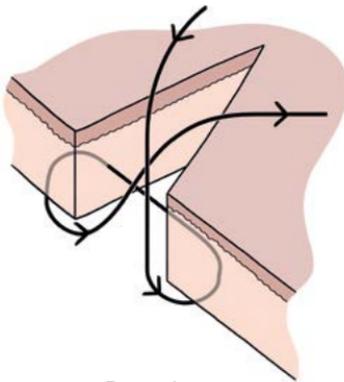
*Needle holder grasping needle*

If long-acting absorbable sutures are available then start the wound closure with a dermal suture.

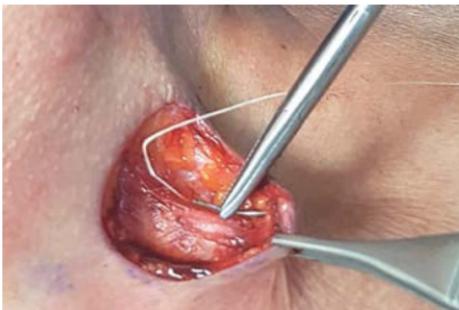
Dermal sutures reduce tension on the epidermal skin edge, support the wound whilst healing and help to prevent dehiscence and wide scars.

### How to Insert a Dermal Suture

- Enter the dermis from inside the wound. Turn the edge of the skin out with toothed forceps to more easily see the dermis
- Come out of the dermis below the epidermis and then enter the dermis on the other side of the wound and come out again below the dermis
- Make sure the threads are on the same side of the crossing thread before tying the knot
- Use three throws to start the knot. This provides more friction to prevent slipping of the knot before the second twist is thrown
- Pull along the wound to tighten and then throw the second twist of the knot to lock it
- After tying the knot, cut the threads short – one millimetre or less – to minimise the amount of suture material buried in the wound.



*Dermal suture*



*First stage of dermal suture insertion*

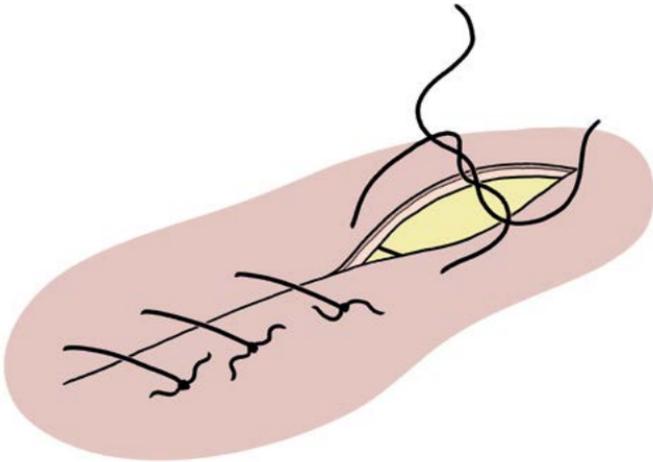
## Suturing Methods

The choice of suturing technique depends on the anatomical site, thickness of the skin, and ease of everting the wound. Everted wound edges heal more quickly and with less scarring than inverted wounds.

To avoid causing skin ischaemia, do not overtighten sutures.

### Simple interrupted

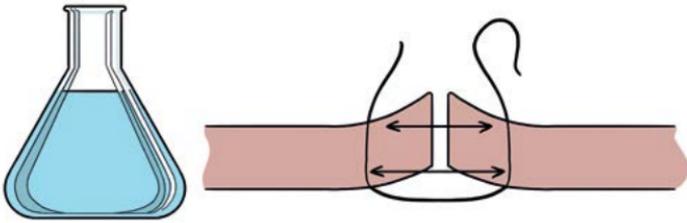
Used on the face as less puncture scars compared to vertical mattress and the thin skin allows easier eversion of the wound.



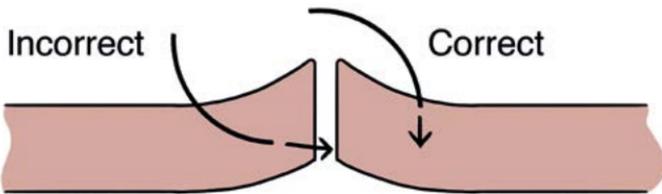
*Simple interrupted suture*

Enter the skin 3 to 4 mm from the skin edge and exit the skin the same distance from the skin edge on the other side of the wound.

A simple suture may invert the wound edges if not tracked correctly. A flask-shaped needle track helps to evert the wound edges.

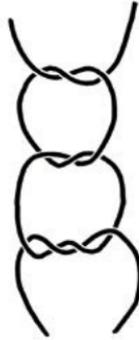


*Everting the skin edge with a simple interrupted suture*



*Needle tip should point away from the wound edge as it enters the skin*

## Tying a surgical knot

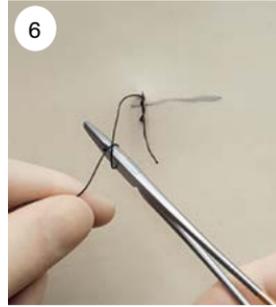
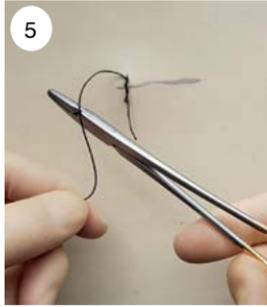
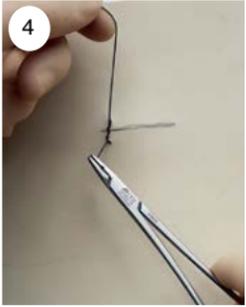
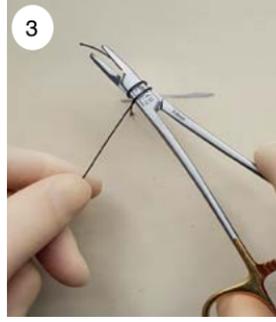
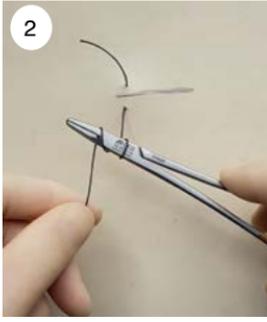
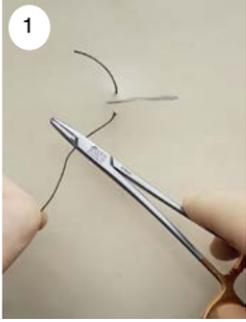


*Surgical knot*

A surgical knot is firstly two twists of the thread, then one twist in the opposite direction, and then a final twist back in the original direction to make two square knots. Knots may be hand tied or tied with the needle holder.

When tying with a needle holder:

1. Bring the needle holder down on the long end of the thread
2. Twist the long end thread twice around the closed needle holder jaws
3. Now move your needle holder towards you and the thread in your other hand away
4. Gently tighten the twists
5. To make the second throw, come up on the long end of the thread with the needle holder and twist the thread once around the jaws
6. Now move the thread in your hand towards you to tighten the second twist
7. Repeat in the opposite direction (down and away) for the final twist



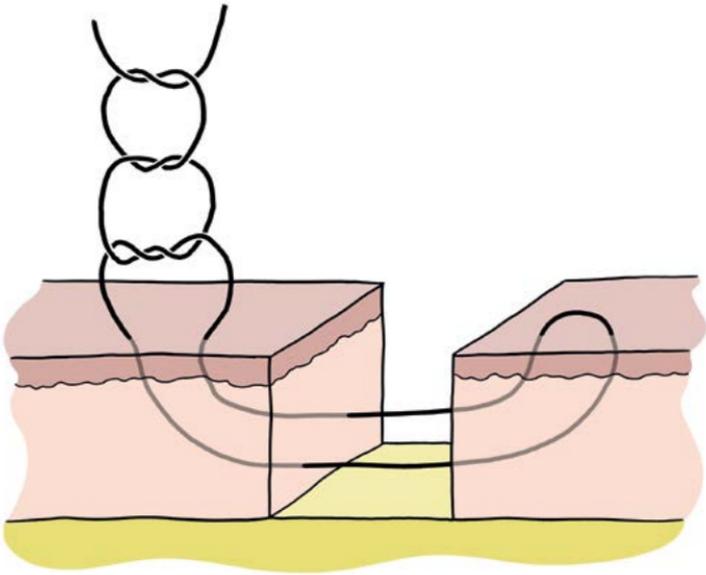
*Tying a surgical knot with a needle holder*

### Vertical mattress

A secure suture which everts the wound edge, particularly in closure of thick skin.

- Enter the skin 4mm or 5 mm away from the wound edge
- Come out the same distance from the wound edge
- Turn the needle and enter 1mm away from the wound edge
- Come out 1mm from the other wound edge

The suture insertions are far to far, then near to near.



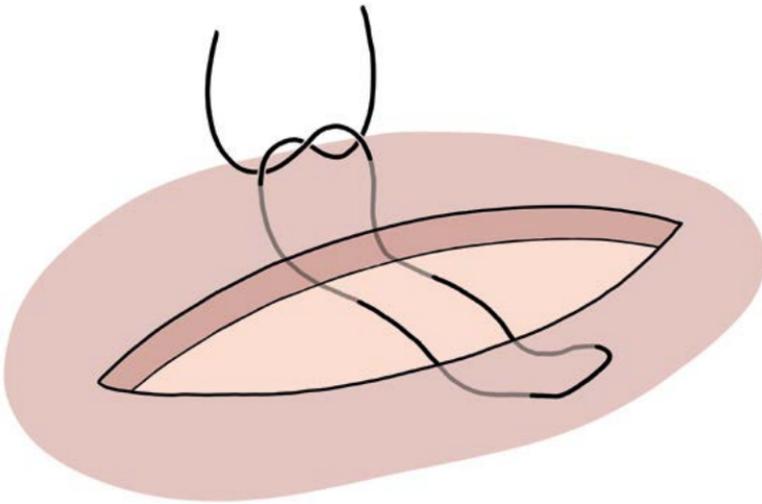
*Vertical mattress suture*

### Horizontal mattress

Everts the wound edge if placed correctly. Less knots to tie along the wound. Is haemostatic. Has the disadvantage that the stitch line along edge of the wound can leave noticeable scars.

- Enter the skin a maximum of 4 mm from wound edge, preferably 3 mm
- Come out of the skin on the other side of the wound exactly the same distance away from the wound edge as you entered it
- Enter the skin again 3 or 4 mm further down the wound and come out the same distance away on the other side of the wound
- To evert the wound, ensure each needle track is flask shaped

**The suture insertions are far to far, then far to far.**



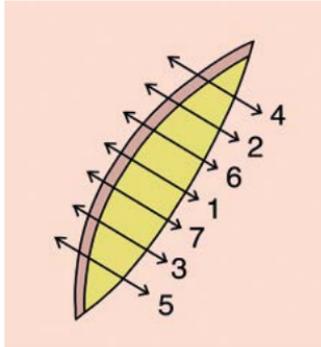
*Horizontal mattress*

## Tips For Ellipse Excisions

### Unequal wound edge lengths.

To avoid bunched up skin (a standing cutaneous deformity) at one end of the wound when there is a discrepancy in wound edge lengths use the halving method to close the wound.

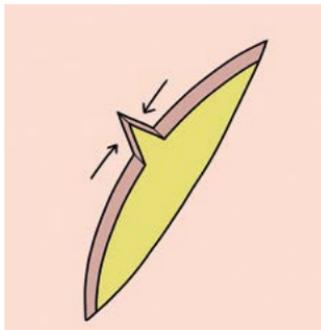
Insert the first suture half way along the wound. Then keep halving the wound with the suture insertions until closure is complete.



*Halving method. Example suture insertion order.*

Accurate skin opposition is assisted by drawing lines perpendicular to the direction of the ellipse prior to excision.

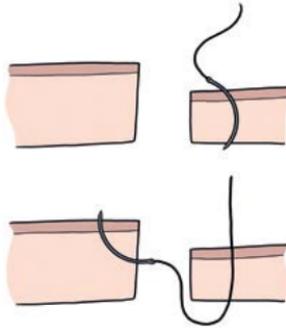
Alternatively cut a triangle of skin from the longer side to shorten it. The triangle can be cut from anywhere along the edge to best cosmetic effect.



*Cutting a triangle to equalise wound edge lengths*

### Unequal skin edge depths

Take full thickness skin on the thin edge and then a partial thickness on the thick edge.



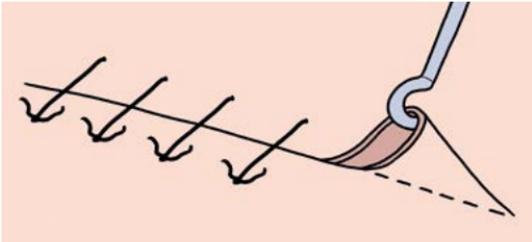
*Needle track to equalise skin edges*

### Standing Cutaneous Deformities (SCDs)

An SCD is bunched up skin that is a consequence of an inadequately long ellipse or other wound length discrepancy.

In some anatomical sites, such as the scalp, the SCD will tend to disappear with time, but in other areas, particularly the forehead, the SCD may persist.

To cut out an SCD, lift the excess skin with a skin hook or forceps and then pull the skin to one side and cut along one side of the SCD. Then pull the skin the other way and cut the other side. Now insert sutures to close the wound.



*Excising a standing cutaneous deformity*

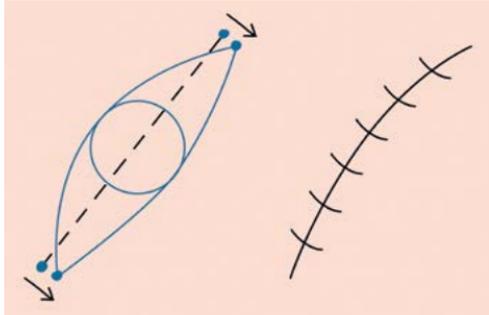
An M-plasty (see below) can also be used to excise a SCD.

### Curved RSTLs

If a straight symmetrical ellipse is performed where there are curved RSTLs, such as on a convex surface like the cheek, then the resulting straight scar will not follow the RSTLs and the scar may be very noticeable.



*Curved RSTL on cheek of face*



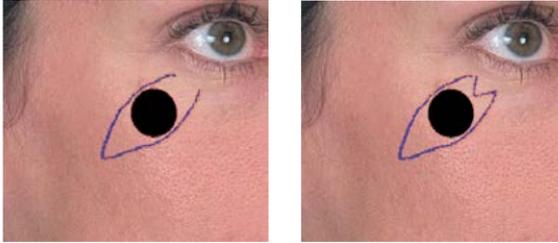
*Ellipse ends shifted in direction of inner curve to create a curved wound*

To curve a wound line, adjust the end points of the ellipse so that they are positioned towards the inside of the curve.

Undermine on the inner shorter-curve side so that when the wound is closed the shorter side can move up to meet the longer side. This will create a curved scar which more accurately follows the RSTL

### Excisions near to anatomical margins

An M-plasty shortens the ellipse if it will encroach on an anatomical margin. The angles of the M should be approximately 30 degrees.



*M-plasty to shorten the ellipse*

If a closure threatens to cause distortion, such as an ectropion of the eyelid, change the direction of closure to alter the direction of pull (tension) on nearby structures.



*Dermal sutures inserted in a vertical direction risk causing ectropion of the lower lid.*



*Dermal sutures inserted in a horizontal direction less likely to cause ectropion.*

# 15

## Closure Options

**M**ost skin cancer excision wounds can be closed with direct closure but not all wounds will close directly without excessive tension or distorting nearby structures. In elderly patients the skin may be fragile and tear if closed under tension. Alternative closure techniques may be necessary.

Use the closure ladder to think through closure options, starting with direct closure.

- Step five: Complex skin flap – axial pattern, interpolated
- Step four: Random pattern skin flap
- Step three: Skin graft
- Step two: Secondary intention healing
- Step one: Direct closure



*Consider an initial circular excision of the lesion to keep closure options open, for example if you are not sure in which direction the wound will close most easily.*

## Step 1 of Closure Ladder: Direct Closure

### Tips for reducing tension across a wound to aid closure:

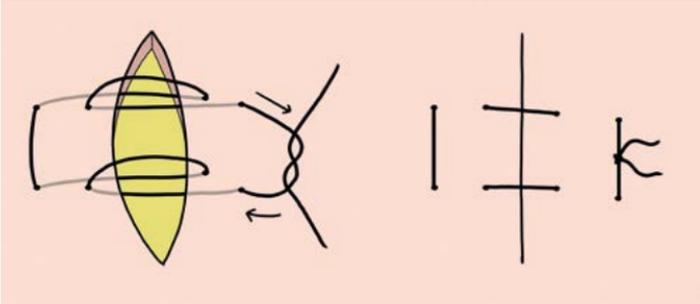
- Move the patient's limb/head to reduce tension across the wound
- Undermine the skin edges. Gentle undermining of the skin edge up to 2 cms reduces subcutaneous tissue restraint. Use blunt-ended scissors
- Start sutures at edges of the ellipse, not in the middle. Close alternately from each side of the ellipse
- Get help from your assistant's fingers and hands in pressing the skin together while you insert the sutures
- On the limb ask your assistant to place their hand underneath the limb and lift all the soft tissues forward



*Assistant's hands behind limb to bring tissue forward*

**Pulley suture**

This exerts tension without tearing through the skin.

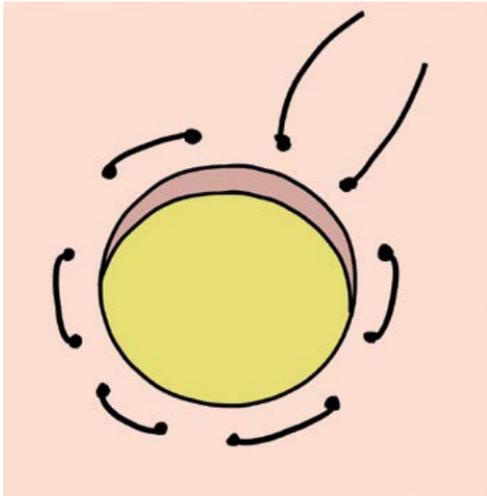


*A double pulley suture*

Enter far, come out near on the other side of the wound. Enter the skin on the opposite side near and come out far on the other side of the wound. Then, instead of tying the knot, enter again far a few mms further down the wound and repeat in opposite direction.

**Purse string closure**

The thread is run in and out around the defect and then tightened. This will reduce the size of the defect and so allow other closure options to be considered for the remainder, for example skin grafting or secondary intention healing



*Purse string suture*

### **Burow's graft**

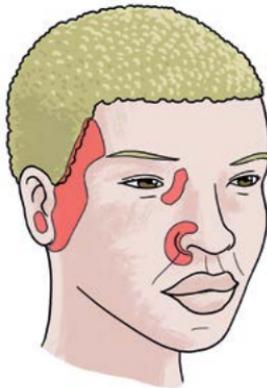
Standing cutaneous deformities can be used as full thickness skin grafts to close a defect in the middle of a tight wound. The lesion is excised with a circular excision and then one or both ends of the ellipse are preserved as a skin graft.



*Burow's graft using an end of the ellipse to fill the defect*

### **Step 2 of Closure Ladder: Secondary Intention Healing**

The wound is left to granulate and re-epithelialise. Granulation tissue forms within three or four days and the wound re-epithelialises from the edges over a few weeks depending on the size of the defect. Concave surfaces heal more quickly and with less scarring than convex surfaces. The wound must be redressed frequently, preferably daily, with a moist dressing until healing occurs.



*Areas of the face where secondary intention healing gives best cosmetic result*



*Good result from secondary intention healing in the medial canthus*

### Step 3 of Closure Ladder: Full Thickness Skin Grafting

See Chapter 16 Skin Grafting.

### Steps 4 to 5 of Closure Ladder: Skin Flaps

Skin flaps are carried out in major centres and are outside the scope of this manual. Most wounds in skin cancer surgery can be closed with steps 1 to 3 of the closure ladder.

### Closure of Defects at Special Sites

Although skin flaps are often used to close defects at anatomically sensitive sites on the face, direct closure, secondary intention healing and skin grafting are acceptable alternatives in low resource settings.

#### The Ear

When operating on the ear, protect the ear canal from accumulating blood by placing a small swab plug in the external auditory meatus.

The helix of the ear is a common site for dysplastic skin lesions. If the wound cannot be closed directly, use a full thickness skin graft from post-auricular skin to cover the defect. The graft will survive on exposed cartilage as long as the perichondrium has not been stripped off.



*Actinic keratosis and SCCs are common on the helical rim*

If the tumour on the helical rim may involve the cartilage or its perichondrium perform a wedge excision.

#### **Wedge excision**

- Mark the wedge on the anterior and posterior aspects of the ear ensuring a suitable excision margin
- Pierce the apex of the wedge with an injection needle to ensure both anterior and posterior marked wedges match up at their tips
- The wedge must be of adequate length to reduce the risk of the ear buckling forward when the wound is closed
- Cut out the wedge with a scalpel or sharp straight scissors
- Bring the wound edges temporarily together before committing to closure to assess that there is no buckling forward of the ear. If buckling occurs then two triangles of cartilage can be excised with sharp pointed scissors at right angles to the wound. Cut at the point of maximum buckling
- Stop bleeding with diathermy
- Before skin closure, approximate the cartilage with an absorbable suture, placing the knots on the posterior surface
- Ensure the skin sutures evert the helical rim skin to avoid a notch in the helical rim profile when the wound has healed
- Apply a pressure dressing to reduce the risk of postoperative haematoma formation



*Triangles indicate where cartilage is to be removed to prevent excessive buckling after wound closure*

Evert the skin edge with horizontal or vertical mattress sutures when closing the skin of the helical rim. This will prevent a dip (notch) in the profile of the helix when the wound heals.



*Everted wound edge on helical rim*

The anterior surface of the ear can be covered with a full thickness skin graft.

The conchal bowl heals well by secondary intention.

*If the cartilage of the ear has been incised, a prophylactic antibiotic such as flucloxacillin and amoxycillin may be given to help prevent post-operative chondritis.*

The head should be bandaged to provide compression for 48 hours to prevent a postoperative haematoma.

## The Nose

Defects of the distal nose may not close directly without distorting the nostril. Cover the defect with a full thickness skin graft or, if the defect is in the ala crease region, leave to heal by secondary intention. Glabella skin, if not sun damaged, is a suitable donor site for defects of the nose.

## The Lips

Mark the vermillion border with a marker pen or gentian violet before the excision if the excision will cross the vermillion border. This will help in alignment of the vermillion border when the wound is closed and so avoid an unsightly step in the border.



*Marking the vermillion border before an excision*

## Near the Eyelids

Bring the wound edges together with skin hooks or forceps whilst asking the patient to look up whilst opening their mouth. If the lower lid leaves the surface of the eye choose an alternative closure method. The elderly are particularly at risk of ectropion.

When applying a skin graft near the eye, oversize the skin graft by 25% to allow for scar contraction.

## Skin Grafting

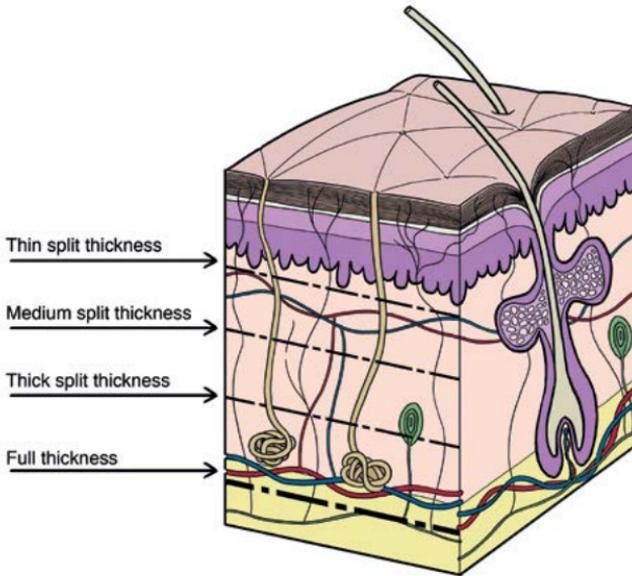
# 16

**S**kin grafting is the third rung of the closure options ladder.

*A skin graft may be preferable to a skin flap in patients with albinism as the skin graft donor site can be selected from skin which is not sun-damaged whereas a local skin flap may be significantly sun-damaged.*

Full thickness skin grafts (FTSG) are used more commonly than split thickness skin grafts (STSG) in skin cancer surgery and are described in this section.

- A FTSG includes the full thickness of the dermis preserving adnexal glands and hair follicles. The donor site must be closed with sutures.
- A STSG does not contain adnexal glands and leaves a layer of dermis at the donor site to re-epithelialise.



*Depths of split thickness skin grafts and full thickness skin grafts*

### Full thickness skin grafts (FTSG)

- FTSGs are used to cover defects that would otherwise be difficult to close because of size, tension or shape.
- The technique is simple and has been used for 3000 years but attention to detail and good aftercare is needed to reduce the risk of graft failure
- It is easier to detect a recurrent cancer under a skin graft than a skin flap
- A skin graft may also be used as a temporary covering until further surgery is carried out, for example if there is significant concern that the excision may be incomplete

### FTSG compared to STSG

- Better final appearance
- Includes adnexal structures. Allows survival of most hairs and glands
- Less contracture
- Donor site can be closed directly rather than left to epithelialize which requires prolonged dressings and pain relief
- Simpler technique and no special equipment (dermatome) needed

BUT

- More likely to fail than a split skin graft
- Size limited by need to be able to directly close the donor site

#### How grafts survive

- Fibrin attaches the graft within minutes to the recipient bed
- Plasma exudate supplies a small amount of oxygen and nutrients. The graft swells. This ischaemic phase lasts up to 48 hours
- Dermal vessels link with the graft bed and revascularisation starts from the recipient base and wound edge. Lasts up to 10 days. Lymph drainage restored
- Fibrous attachment. Occurs over several weeks
- Reinnervation is slow and may be incomplete

#### Recipient surface suitability

A skin graft is dependent on the recipient site base for its blood supply.

- Granulation tissue – good
- Fascia and muscle – good
- Perichondrium and periosteum – good
- Fat – fair
- Bare bone and cartilage – poor

#### Equipment for a FTSG

In addition to the equipment required for an ellipse excision:

- Marker pen to mark donor site
- Template to match the donor skin shape to the recipient site shape. Can be card from a suture packet or a sterile dressing
- Sterile saline and a sterile pot to place donor skin in until ready to be sewn into place unless graft is sewn into the defect immediately after excision
- Ointment such as petrolatum (Vaseline®)
- Padded dressing such as gauze

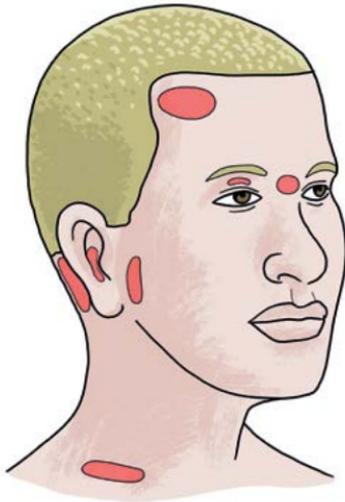
### FTSG donor sites

Choose a site that:

- Most closely matches the recipient site for skin thickness and colour
- Is not already sun-damaged
- Does not contain hair

The following skin sites can be used as donor sites on the face and neck:

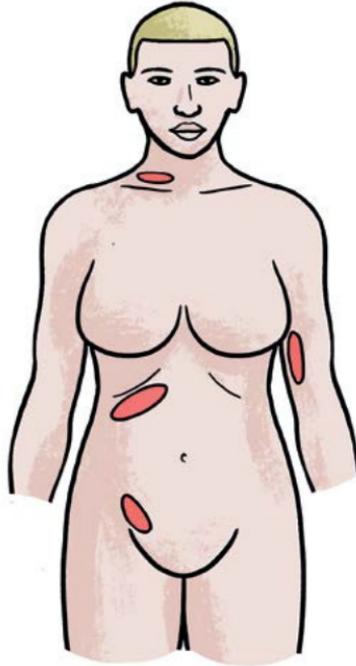
- Pre-auricular – but do not transfer hair-bearing skin
- Post-auricular – is not a good colour match for skin on the upper cheek
- Upper eyelid
- Conchal bowl of ear (leave to heal by secondary intention)
- Glabellar region – a good choice for nasal defects
- Lateral upper forehead
- Supraclavicular region



*Potential donor sites on the face and neck*

The following skin sites can be used as donor sites on the body

- Inner upper arm
- Subcostal
- Groin – away from the pubic hair area



*Donor sites on the body*

### How to perform a full thickness skin graft

#### Preparation for the procedure:

- Ensure above equipment is available
- Select the donor site and clean with skin preparation such as iodine or chlorhexidine. Mark the location of the donor site with a marker so that when the donor site is anaesthetised it can be located easily
- Anaesthetise both the lesion to be excised and the donor site

**Excise the lesion and create a template:**

- Excise the lesion. Ensure good haemostasis. A bleeding recipient base will cause graft failure by lifting the graft and so causing ischaemia of the graft
- Make a template of the recipient site with the back of the sterile suture packet or other sterile material. Oversize by 10%. If the lower eyelid, oversize by 25%. Allow for contours
- Use the template to outline the skin to be excised from the donor site. Use a marker pen or lightly score with a blade

**Excision and placement of donor skin:**

- Excise the outlined donor skin. Temporarily cover the donor site with a swab
- Cut all the fat off the under surface of the donor skin with a pair of scissors. Drape the graft over a swab on your finger to assist in defatting the graft
- Suture the graft into the recipient site ensuring the epidermis is uppermost
- The needle should enter from the graft side. Try for accurate opposition of graft and skin edges as some vascularisation occurs from the skin edges
- Stitch in the graft with simple interrupted sutures. Either place opposite tacking sutures if the donor skin is a good size match or place the stitches next to each other and then trim the graft as needed as the sutures are inserted
- Stitches should be placed all around the graft 2 to 3 mm apart



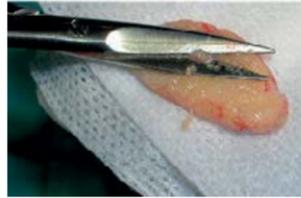
Recipient site ready for sizing with a template



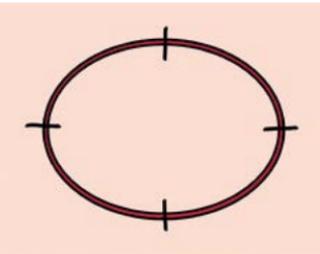
Template cut to size in recipient site



Cutting the fat off the donor skin with scissors



Fat removed to show white dermis



Starting to stitch in the graft



A FTSG stitched into place. Note immediate white appearance.

- Close the donor site, converting the wound into an ellipse if necessary, to prevent standing cutaneous deformities

**Apply dressings:**

- Apply a thick layer of ointment such as petrolatum (Vaseline®) on the graft before applying the dressing
- Fold or cut a swab to make a bolster dressing and apply it gently to the skin graft. This will protect the graft while it takes
- Secure the bolster dressing with sutures or a secure taped dressing
- Apply another swab dressing to the skin graft and, if possible, a bandage to protect the graft



*Petrolatum soaked gauze dressing secured with a bolster suture*

### Postoperative care

- Take off the outer dressing and the bolster dressing after one week. Wash the wound gently with clean water. There will be dried blood around the stitch line. Remove any loose scab
- The patient or their carer should then apply ointment daily for a week
- Inform the patient that the graft will take several months to lose its pink appearance



*Postoperative appearance of FTSG on tip of nose at two weeks and six weeks.*

### Reasons for graft failure

- Haematoma/seroma under the graft
- Shearing forces due to inadequate protection of the graft
- Unsuitable recipient base
- Infected recipient base
- Fat not completely removed from dermis of donor skin

### What to do if the graft does not take

At one week postoperatively the graft should be mainly pink. If it is black it has died. Leave the graft in place and treat as a wound that will heal by secondary intention. Dress daily with a moist dressing such as petrolatum.

### Other options for skin grafting

- A Burow's graft is a good tissue match for a defect as uses adjacent skin. See Chapter 15 Closure Options
- Grafting can be delayed if the primary defect has left a deep defect that will result in a significant concavity. Graft between two and three weeks postoperatively when granulation tissue has formed and filled the defect. Keep the granulating defect moist and change the dressing frequently, preferably daily





## POSTOPERATIVE

- |                              |     |
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# Preventing Complications

# 17

## Wrong Patient and Wrong Site Surgery

**U**se check lists preoperatively. See Chapter 12 Preoperative Preparation.

## Postoperative Infection

### Risk factors

- Pre-existing infection near or at the site of surgery
- The scalp and face are relatively resistant to infection due to their good arterial supply but the lower leg is susceptible
- Diabetes
- Immunosuppression and malnutrition

### Prevention

- Pre-wash the skin prior to surgery for patients whose hygiene is poor
- With sterile technique and good postoperative wound management most patients do not need a prophylactic antibiotic

### Consider oral antibiotic if:

- Pre-existing skin infection
- Immunocompromised patient e.g. HIV AIDS
- Patient is malnourished or has serious systemic disease
- Ear cartilage has been incised
- Good postoperative wound care will be difficult to achieve

## Bleeding

### Risk factors

- Anticoagulants, including herbal remedies
- Excision of large or space-occupying lesions

### Prevention and Management

- Avoid blind deep incisions into deep subcutaneous fat
- Avoid aggressive undermining of the skin edges
- Heavy bleeding should be dealt with by firm pressure (up to five minutes) and a suture prepared to underrun the bleeding site
- The wound can be packed with gauze and external compression applied with a bandage for 24 hours if bleeding cannot be fully controlled with a suture. After 24 hours gently remove the dressing and underrun the bleeding site with a suture if there is still leakage

### The neck

- When operating on the anterior neck beware of cutting large veins
- After incising lightly through the skin raise the specimen with forceps or a skin hook to lift it off underlying structures. Then excise the specimen under direct vision with blunt-ended scissors

### The scalp

- Bleeding on the scalp can be heavy but is always controllable with the correct technique
- Compress the skin against the skull to control bleeding
- If the vessel is visible then coagulate it with a diathermy or hyfrecator, or underrun it with a suture
- If the vessel is difficult to identify, close the skin with vertical mattress sutures placed close together and apply pressure until oozing from the wound has stopped
- A haemostatic suture can be inserted deeply through the skin either side of the point of bleeding on the same side of the wound and tied on the skin so that the tissue containing the bleeding vessel is compressed. The suture can be removed 48 hours postoperatively

## Nerve Damage

Know the sites of at-risk nerves in the face and neck. See Chapter 9 Anatomy for Skin Surgery.

## Wound Dehiscence and Skin Necrosis

### Risk factors

- The wound has been closed with excessive tension
- Dermal sutures have not been used to aid closure of the wound
- Infection or haematoma
- Poor nutrition or systemic disease

### Prevention

- Use dermal sutures to aid closure of skin wounds
- Ensure adequate haemostasis
- Avoid closing wounds with excessive tension

## Hypertrophic Scars

A scar that is abnormally thick. These have the same risk factors as wound dehiscence. Scars from wounds that are not parallel to relaxed skin tension lines are also at risk.

## Keloid Scars

A keloid scar extends beyond the limits of the original wound and may become very large.

### Risk factors

- Previous keloid scars. Warn patient that a new scar will also lead to keloid
- Upper central chest, shoulders and upper back

### Prevention and management may require specialised treatment

- Intra-scar postoperative corticosteroid injections
- Topical silicone
- 5-FU, cryo treatment, lasers

## Preventing Injury to Yourself and your Assistant

- Avoid uncontrolled or fast hand movements when operating
- Keep eye contact with instruments when picking them up or receiving them from an assistant

- Keep sharps on a designated area of the instrument trolley
- Double glove if there is an HIV risk
- Keep your hepatitis B immune status up to date
- If you sustain a needle stick injury, follow the hospital procedure.  
Check that HIV post-exposure prophylaxis is available and is in date

## Recording the Procedure

# 18

**A** record of the procedure is essential to good care and to effective follow up.

### Example Procedure Recording Form

*Location*

*Date*

*Patient name/ID*

*Allergy/Anticoagulant/At risk of infection?*

*Surgeon ...*

*Assistant ...*

*Local anaesthetic and volume ...*

*Skin cleansing agent ...*

*Excision/Biopsy*

*If biopsy: incisional/punch/shave*

*If excision: marked peripheral margin (mm)*

*Anatomical site ...*

*Procedure notes ...*

*Closure method: Direct/Secondary intention/Skin graft/Flap*

*Dermal suture Yes/No Closing suture make and size ...*

*Specimen placed in formalin and correct details on*

*pot and form Yes/No*

*Post-operative instructions ...*

*Follow up plan ...*

*Signature ...*

## Histology

**E**nsure a robust process for the sending of excised tissue for histological examination and for follow up of the histology report. Management of skin cancer is not complete until the histology report has been seen and acted on.

*The histologist is an essential member of the extended dermatology team. Reviewing and discussing reports with the histologist will be mutually beneficial.*

### Before the Procedure

- Ensure the patient's full name and date of birth is on the formalin pot.
- Ensure that the formalin pot is leak proof.

*Place the specimen in the formalin pot immediately on excision to ensure that it is not lost.*

### What to write on the Formalin Pot

- Patient's full name and date of birth
- Date of excision
- Anatomical site

If more than one specimen is to be sent from the same patient then place each specimen in separate pots and number and label each pot clearly with the site of excision.



*Formalin pot for biopsy specimen*

## What to Write on Pathology Request Forms

- Comprehensive information on the request form will help the pathologist to write a useful report
- Whether excisional or diagnostic biopsy
- Anatomical site
- Previous histological diagnosis if a recurrence
- Duration of lesion
- Description of lesion including size
- Previous radiation or burn
- Suspected diagnosis

## Before Sending Specimen Check That:

- The patient details match on the request form and the pot
- There is a specimen in the pot

It is good practice for two people to check that the pot and the request form details match up.

## On Receiving the Histology Report, Record:

- The diagnosis in the patient record
- Whether excision is complete or incomplete
- The peripheral and deep margins of excision
- Act on any required follow up or further procedure

## What if the Excision Margin is Reported as very Close?

- A deep or peripheral histological margin under 1.0 mm for an SCC excision is a close excision margin
- For low risk SCCs, it is acceptable to keep the scar under observation in follow up clinics rather than carry out a re-excision
- For high-risk SCCs, the scar is best excised with at least a 5mm margin. If this is not possible then consider a referral for adjuvant radiotherapy
- In some sites, such as the back of the hand, a close margin may be acceptable if it is not possible to take a deeper excision without damaging important underlying structures

- Close excision margins are acceptable for most BCCs due to their very low metastatic potential

Be aware that standard vertical section histology can miss involvement of a deep or peripheral margin because a limited number of sections are examined under the microscope. Mohs Micrographic Surgery avoids this risk by use of horizontal sections and immediate frozen section histological examination but the technique is expensive.

#### Tip for Good Practice

Keep a record of the peripheral and deep margins recorded on the histology reports from your excisions. If greater than 95% complete histological clearance of the tumour then you are marking and excising lesions correctly.

## Dressings and Aftercare

# 20

**C**hoice of dressings depends on availability and affordability. Here are principles to bear in mind.

### **A dressing should:**

- Provide a moist environment
- Wick exudate away from the wound
- Provide physical protection
- Provide pressure if there is a risk of postoperative bleeding

### **After direct closure:**

- A dry protective dressing is sufficient
- The dressing should be removed after two days and the wound washed with clean water daily.
- Petrolatum (Vaseline®) can be applied daily to the wound after washing

### **Wounds healing by secondary intention**

- The absence of a crust and moist conditions help epidermal migration from the skin edges. Wound healing occurs 40% faster in a moist environment
- Open wounds should therefore be kept moist. An ointment such as petrolatum or a paraffin dressing under an occlusive dressing, or under a non-occlusive dressing if an occlusive dressing is not available
- Change the dressing daily, wash the wound with clean water and reapply petrolatum ointment and a dressing
- There is no need for an antibiotic ointment

### **Full thickness skin grafts**

See Chapter 16 Skin Grafting

#### **Additional tips**

- A weeping wound needs frequent dressing changes to wick away exudate which otherwise acts as a bacterial culture medium
- A gauze pad and bandage can provide physical protection and pressure to discourage a postoperative haematoma. The ear is particularly prone to postoperative haematoma

#### **Postoperative Instructions to Patients**

- The patient can take paracetamol for pain relief
- Written instructions are preferable to verbal instructions, which may not be remembered. Translate into the patient's language
- Explain the follow up arrangements

## Example postoperative written instructions

*The local anaesthetic will wear off in about one hour. You may take a simple painkiller such as paracetamol but follow the instructions on the packet. Avoid anti-inflammatory pain killers such as ibuprofen for a few days.*

*Keep the dressing dry and in place for 48 hours. You may then remove the dressing and wash gently with clean (boiled and then cooled) water. Pat dry with a clean towel. You do not need to apply a new dressing unless the wound needs protection from knocks or rubbing.*

*If the dressing is stuck to the wound you can soak it off with clean water.*

*It is normal for the wound to leak a little blood in the first few hours after the procedure. If the leaking does not stop or is excessive then apply firm pressure to the wound for at least 5 minutes with a clean cloth such as a handkerchief.*

*The sutures need to be removed in ... days  
If the wound becomes hot, swells or discharges then seek medical advice.*

*Contact person if you need advice ...*

## Suture Removal

5 to 7 days on the face

7 days on the scalp and neck

10 to 12 days on the arms and hands

12 to 14 days on the trunk and legs

## Wound Healing

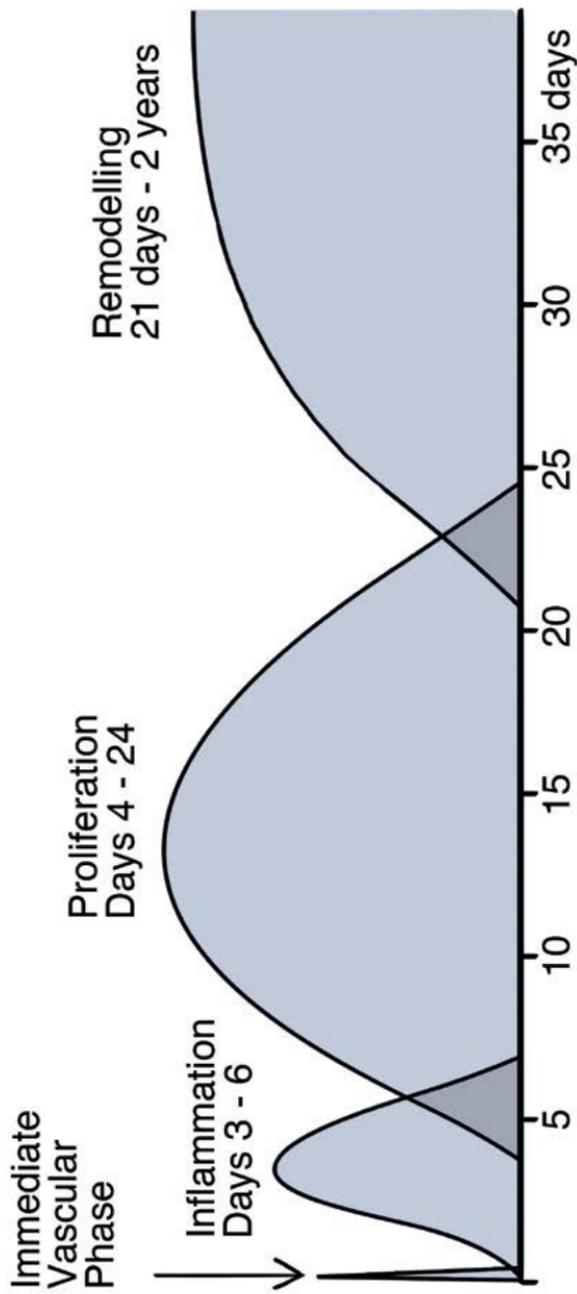
# 21

**A**n optimal environment for wound healing will reduce complications and promote neat scars. A scar takes at least six months to reach its final appearance and may contract, stretch or hypertrophy during this time.

*Good scars reassure patients that surgery will not be disfiguring and so will encourage compliance with treatment*

### Phases of wound healing

- Immediate vascular phase – vasoconstriction to prevent blood loss and then vasodilation to bring in healing mediators
- Inflammatory phase – cells remove foreign material and bacteria. Fibroblasts migrate into the wound to start making collagen
- Proliferative phase – new vessels form and re-epithelialisation starts. Re-epithelialisation is essential for restoration of the barrier function of the skin
- Remodelling phase – scar strengthens through realignment of collagen fibres



*Phases of wound healing*

### Tensile strength

- Tensile strength in the scar increases to about 80% of skin strength after about 6 months
- In the immediate post-operative period tensile strength can dip at 10 to 14 days – just when the skin stitches are removed
- Most long-acting absorbable dermal sutures retain significant tensile strength for 30 days. They will support the wound until there is sufficient tensile strength to prevent dehiscence

### Local factors in poor wound healing

- Infection
- Haematoma or seroma
- Mechanical factors including poor suturing technique
- Oedema
- Ischaemia
- Dryness
- Previous radiotherapy

### Systemic factors in poor wound healing

- Wound care is more than just about the wound. The following systemic factors slow down or prevent wound healing.
- Smoking slows down wound healing in the inflammatory and proliferative phases. The patient should refrain from smoking a week before surgery and for two weeks after
- Systemic disease – for example, diabetes
- Malnutrition, including vitamin deficiencies
- Alcohol disturbs the proliferative phase of wound healing
- Age. Wounds heal slower in older people
- Immunosuppression such as steroid treatment
- Time of day and psychological factors. Circadian rhythm affects fibroblast activation. Wounds created during the day heal faster than those created at night. Previous traumatic experiences can slow wound healing

## Glossary of Dermatological Terms

Term	Description
Actinic cheilitis (farmer's lip)	Lip inflammation caused by long term sun exposure. It is the lip variant of actinic keratosis. There is variable thickening of the vermillion of the lips and patchy dryness. There may be erosions, which may be a precursor to squamous cell carcinoma
Actinic keratosis (AK)	A pre-cancerous patch of scaly rough skin caused by sun exposure that may progress to squamous cell cancer
Adipose	Fat
Atypical	In the context of melanocytic lesions: having an appearance that sets it apart from other lesions. May indicate malignant change
Blister	A rounded elevation of the skin containing fluid

Bulla	<p>A large blister.</p> <p>A circumscribed lesion more than 1 cm in diameter that contains liquid (clear, serous or haemorrhagic)</p>
Crust	<p>The result of plasma exuding through an eroded epidermis, which dries to form a hard layer. It is rough on the surface and is yellow or brown in colour. A crust may be bloody and appear red, purple or black</p>
Dermatoscopy	<p>Examining the skin with a polarised magnifying light called a dermatoscope</p>
Diagnostic biopsy	<p>The removal of part of a lesion for histological examination. Excisional biopsy is the removal of the entire lesion for histological examination</p>
Dysplasia	<p>Abnormal cells which may be a precursor of cancer</p>
Ectropion	<p>Chronic UV exposure of the eyelids causes thickening and disorganisation of the elastic fibres in the dermis leading to out-turning of the eyelids away from the eyeball</p>
Erosion	<p>Superficial or partial thickness loss of the epidermis (outer layer) of the skin</p>
Erythema	<p>Redness in the skin due to dilation of blood vessels from inflammation</p>
Fungating	<p>A large, often malignant, tumour that is erupting like a mushroom or fungus</p>
Genotype in albinism	<p>The set of genes in a person's DNA responsible for the particular type of albinism</p>

High risk for developing skin cancer	All people with albinism are at risk of skin cancer but some are at increased risk. These are: <ul style="list-style-type: none"> <li>• Previously diagnosed skin cancer</li> <li>• Multiple AK</li> <li>• Severe solar elastosis</li> <li>• Young patients with multiple AK and solar elastosis.</li> <li>• Those who work outdoors</li> </ul>
High risk BCC or SCC	See Chapter 7
Histology	Examination of tissue with a microscope
Hypertrophy	An excessive enlargement in a component of the skin or in a scar
Keratosis	A localised scaly or rough thickening of the skin
Lentigo	A well-demarcated benign pigmented macule
Lesion	Any damaged area of skin including ulcers and benign and malignant tumours
Macule	A flat, non-palpable, well-defined area of skin less than 1 cm in diameter that differs in colour from the surrounding skin
Melanocytic	A common benign lesion due to a local proliferation of melanocytes (pigment cells). They may be congenital or acquired. Their colour may vary from pink to dark brown
Metastases	Tumour spread to a site distant from the original site
Morphology	The form and structure of a tumour when viewed under a microscope

Nodule	An elevated, solid, palpable lesion > 1 cm, usually located primarily in the dermis and/or subcutis (deep to the dermis). The greatest portion of the nodule may be above or beneath the skin surface
Oculocutaneous albinism (OCA)	The medical term for albinism. There are different types of OCA depending on the gene defect. OCA2 and OCA2B are the common types in sub-Saharan Africa followed by OCA3. OCA1 and OCA1A are the common types in many Western countries
Papule	Elevated, solid, palpable lesion that is $\leq 1$ cm in diameter
Plaque	A circumscribed, palpable lesion more than 1 cm in diameter
Poorly differentiated	The terms 'well differentiated' and 'poorly differentiated' relate to the histological appearance of cells in a cancer. Poorly differentiated cells look more abnormal
Pustule	A circumscribed lesion that contains pus. It is filled with neutrophils, and may be white, or yellow. Not all pustules are infected
Scale	An increase in the dead cells on the surface of the skin. In sun-induced lesions they may be referred to as keratotic or hyperkeratotic
Solar elastosis	Thickening and/or yellowing of the skin due to long term sun exposure
Staging	A grading system for cancers to help determine prognosis and treatment

Ulcer	Full-thickness loss of the epidermis plus at least a portion of the dermis; it may extend into the subcutaneous tissue
Vesicle	A circumscribed blister $\leq 1$ cm in diameter that contains liquid (clear, serous or haemorrhagic)



## Organisational Bios and Further Information

### Standing Voice



Standing Voice is a leading human rights charity empowering people with albinism in Africa. Working widely across health, education, community development, advocacy and research, Standing Voice has transformed thousands of lives in Tanzania and Malawi. The organisation has established clinical networks to treat visual impairment and prevent skin cancer; relocated children with albinism from segregated camps to inclusive schools and universities; and supported hundreds of adults to rebuild their lives through apprenticeships and training.

For further information visit: [www.standingvoice.org](http://www.standingvoice.org)

International League of Dermatological Societies and  
International Foundation for Dermatology



The International League of Dermatological Societies (ILDS) works with our 175 member societies and partners around the world including the World Health Organization (WHO) to improve skin health for all people around the world. The International Foundation for Dermatology (IFD) was created in 1987 to carry out the humanitarian work of the ILDS. Today, the IFD supports projects in Africa, Asia Pacific and South America.

For further information visit: [www.ilds.org](http://www.ilds.org) / [www.ifd.org](http://www.ifd.org)

Fondation Pierre Fabre



On 6 April 1999, the Fondation Pierre Fabre was awarded privileged charitable status, recognised by the state as a public-interest organisation. For the past 20 years, with the help of its local partners, it has created and supported long-term programmes to improve access to quality medicines and healthcare for the people of the Global South. The Foundation has made access to dermatological treatment one of its main areas of intervention.

For further information visit: [www.fondationpierrefabre.org](http://www.fondationpierrefabre.org)





International Foundation  
for Dermatology

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