



La-Net

SUG 601

PLASTIC SURGERY AND BURNS



Course video is available on our app

lanetonline.com



la-NET | ONLINE LEARNING VIDEO PLATFORM FOR POST-SECONDARY & HIGHER INSTITUTION STUDENTS

Course code: SUG 601

Course title: Plastic Surgery and Burns

Course credit load: 2 Units

Series 1: Symptoms and Signs of Common Lesions in Plastic and Reconstructive Surgery

- **Part 1.1: Approach to Common Skin and Soft Tissue Lesions**
 - Sub Part 1.1.1: Principles of lesion assessment: history and examination
 - Sub Part 1.1.2: Interpreting key symptoms in cutaneous lesions
 - Sub Part 1.1.3: Interpreting key signs in cutaneous lesions
- **Part 1.2: Benign Cutaneous and Subcutaneous Lesions**
 - Sub Part 1.2.1: Naevi and pigmented lesions
 - Sub Part 1.2.2: Cysts and lipomas
 - Sub Part 1.2.3: Keloids and hypertrophic scars
- **Part 1.3: Malignant and Premalignant Skin Lesions**
 - Sub Part 1.3.1: Basal cell carcinoma
 - Sub Part 1.3.2: Squamous cell carcinoma
 - Sub Part 1.3.3: Malignant melanoma
- **Part 1.4: Ulcers and Sinuses: Symptoms and Signs**
 - Sub Part 1.4.1: Chronic wounds and ulcers: clinical features
 - Sub Part 1.4.2: Sinuses and fistulae: clinical features
 - Sub Part 1.4.3: Interpreting lesion signs to guide differential diagnosis

Introduction

A small lump noticed in the shower, a mole that has started to change, a wound that simply will not heal, these are the everyday complaints that bring patients to a plastic and reconstructive surgery clinic, and behind each one lies a specific set of symptoms and signs waiting to be correctly read. This opening Series of **Plastic Surgery and Burns** builds the foundation for



everything that follows in the course, teaching you to recognise, describe, and interpret the symptoms and signs of the lesions most commonly encountered in this specialty. Getting this foundation right matters enormously, since the whole discipline of plastic and reconstructive surgery rests on accurate lesion recognition before any decision about investigation or treatment can be made.

The aim of this Series is to equip you with the ability to list the symptoms and signs of common lesions in plastic and reconstructive surgery and to interpret them accurately, covering the general approach to lesion assessment, benign cutaneous and subcutaneous lesions, malignant and premalignant skin lesions, and chronic wounds, ulcers, and sinuses. Each of these categories presents with a recognisable, learnable pattern of symptoms and signs, and by the end of this Series you should be able to approach an unfamiliar lesion systematically rather than relying on memorised diagnoses alone.

This Series opens with the **general approach to common skin and soft tissue lesions**, moves through **benign cutaneous and subcutaneous lesions** and **malignant and premalignant skin lesions**, and closes with **ulcers and sinuses**, building a comprehensive picture of lesion recognition across the specialty.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 1.1:** list the symptoms of common lesions encountered in plastic and reconstructive surgery
- **SLO 1.2:** list the signs of common lesions encountered in plastic and reconstructive surgery
- **SLO 1.3:** describe the clinical features that distinguish common benign cutaneous and subcutaneous lesions
- **SLO 1.4:** interpret symptoms and signs to differentiate between benign lesion types
- **SLO 1.5:** describe the clinical features of malignant and premalignant skin lesions
- **SLO 1.6:** interpret signs that raise suspicion of malignancy in a skin lesion
- **SLO 1.7:** describe the clinical features of chronic ulcers, sinuses, and fistulae
- **SLO 1.8:** interpret symptoms and signs to guide the differential diagnosis of common lesions



1.1 Approach to Common Skin and Soft Tissue Lesions

1.1.1 principles of lesion assessment: history and examination

Building a systematic foundation for every lesion

A sound **lesion assessment** begins with a focused history covering the duration of the lesion, its rate of growth, any associated pain, itching, bleeding, or discharge, and relevant risk factors such as sun exposure, occupational exposure, smoking, or a family history of skin cancer. The history alone often narrows the differential diagnosis considerably before the lesion is even examined, since a rapidly growing, painless lump raises different concerns from a slow-growing lesion present unchanged for many years. Asking about previous similar lesions and any prior treatment received also helps place the current presentation in proper clinical context.

Examination follows a structured sequence: inspection of site, size, shape, colour, and surface characteristics, followed by palpation to assess consistency, mobility, tenderness, and temperature, and, where relevant, assessment of the regional lymph nodes and surrounding tissue. Systematic examination in this order avoids missing important findings and allows the same lesion to be reliably re-examined and compared at a later visit, which is particularly important for lesions being monitored over time rather than treated immediately. Photographic documentation at each visit is increasingly used to support this comparison and should be considered standard practice wherever available.

Fill in the blank: A rapidly growing, painless lump raises different concerns from a lesion present unchanged for many _____.

1.1.2 interpreting key symptoms in cutaneous lesions

What the patient reports and why it matters

Symptoms reported by the patient, such as pain, itching, bleeding, discharge, or a change in size or colour, each carry distinct diagnostic weight and should never be dismissed as incidental. Pain in an otherwise unremarkable lesion can indicate inflammation, infection, or nerve involvement, while itching is more commonly associated with benign inflammatory or allergic processes, though persistent itching in a pigmented lesion can also be an early warning sign of malignant change that deserves careful attention. Bleeding from a lesion, particularly spontaneous bleeding without trauma, is a symptom that should always prompt closer evaluation given its association with both benign vascular lesions and malignant change.

A reported change in size, shape, or colour over time is one of the most clinically significant symptoms a patient can offer, since stability over years favours a benign process while recent, progressive change favours a process requiring urgent further evaluation. Eliciting this history



accurately requires specific, direct questioning, since patients do not always volunteer subtle changes unprompted, and a general question such as asking whether anything has changed about the lesion recently should be a routine part of every consultation regardless of how obviously benign the lesion first appears.

Fill in the blank: Persistent itching in a pigmented lesion can be an early warning sign of malignant _____.

1.1.3 interpreting key signs in cutaneous lesions

What examination reveals and how to read it

Signs identified on examination, including irregular borders, colour variation, ulceration, surface texture, and fixation to underlying structures, provide objective evidence that complements the patient's reported symptoms. An irregular, poorly defined border and marked colour variation within a single lesion are both classic warning signs associated with malignant melanoma, while a smooth, well-defined border and uniform colour are more reassuring features typical of benign pigmented lesions, though neither feature alone is ever fully diagnostic in isolation.

Fixation of a lesion to deeper structures, meaning it cannot be moved independently of the tissue beneath it, is a particularly important sign suggesting local invasion and warrants prompt further investigation rather than reassurance. Ulceration of a previously intact lesion, especially in the absence of trauma, similarly raises concern and should be interpreted alongside the full clinical picture rather than in isolation, since the significance of any single sign depends heavily on the context of the lesion as a whole.

Fill in the blank: Fixation of a lesion to deeper structures suggests local _____ and warrants further investigation.





Figure 1.1: A surgeon examining a skin lesion, assessing its borders and mobility.

Pilot questions 1.1

1. List the key elements of a focused lesion history. (Linked to SLO 1.1)
2. Explain why rate of growth is an important historical feature. (Linked to SLO 1.1)
3. Describe the structured sequence followed during lesion examination. (Linked to SLO 1.2)
4. Explain the diagnostic significance of spontaneous bleeding from a lesion. (Linked to SLO 1.1)
5. Explain why fixation to underlying structures is a concerning sign. (Linked to SLO 1.2)

1.2 Benign Cutaneous and Subcutaneous Lesions

1.2.1 naevi and pigmented lesions

Common pigmented lesions and their typical features

Naevi, commonly known as moles, are among the most frequently encountered pigmented lesions, typically presenting as well-defined, symmetrical, uniformly coloured lesions that remain stable in appearance over long periods of time. Congenital naevi are present from birth and can vary considerably in size, while acquired naevi typically appear during childhood and



adolescence and gradually stabilise in adulthood, a pattern of evolution that is itself reassuring when it follows the expected course.

Other pigmented lesions encountered in practice include seborrhoeic keratoses, which present as well-demarcated, waxy or warty lesions with a stuck-on appearance, and solar lentigines, flat pigmented patches associated with cumulative sun exposure. Distinguishing these benign pigmented lesions from early malignant melanoma relies heavily on the features already discussed, symmetry, border regularity, colour uniformity, and stability over time, reinforcing why a structured, comparative approach to pigmented lesions is so essential in everyday clinical practice.

Fill in the blank: Acquired naevi typically appear during childhood and adolescence before stabilising in _____.

1.2.2 cysts and lipomas

Common benign lumps beneath the skin

Epidermoid cysts, often loosely referred to as sebaceous cysts, present as smooth, mobile, subcutaneous swellings, frequently with a visible central punctum, and can become tender and inflamed if they rupture or become secondarily infected. They arise from the epidermis and are filled with keratinaceous material, and their characteristic central punctum, when present, is a helpful distinguishing sign on examination that separates them from other subcutaneous lumps.

Lipomas are soft, mobile, non-tender subcutaneous masses composed of mature fat cells, typically slow-growing and often multiple, with a characteristically soft, lobulated feel on palpation that differs noticeably from the firmer texture of a cyst. Both cysts and lipomas are generally benign and can often be managed conservatively or with straightforward surgical excision when they cause discomfort, cosmetic concern, or recurrent infection, though any lesion with atypical features, such as rapid growth, fixation, or overlying skin changes, should prompt reconsideration of the diagnosis.

Fill in the blank: A visible central punctum is a helpful distinguishing sign of an _____ cyst.

1.2.3 keloids and hypertrophic scars

Excessive scarring and how to tell the two apart

Hypertrophic scars are raised, red scars that remain confined to the original wound margins and typically improve gradually over months to years, while **keloids** are raised scars that extend beyond the original wound margins, can continue to grow indefinitely, and are more likely to



recur even after treatment. This distinction, staying within versus extending beyond the original wound boundary, is the single most useful clinical sign for telling the two apart on examination.

Both conditions arise from an exaggerated wound healing response and are more common in areas of high skin tension, such as the chest and shoulders, and in individuals with darker skin tones, who carry a higher overall risk of keloid formation. Recognising the distinction between hypertrophic scarring and true keloid formation matters clinically because it shapes both the expected natural history and the counselling given to a patient about the likely response to any planned treatment.

Fill in the blank: Keloids extend beyond the original wound margins, unlike _____ scars, which remain confined within them.

Table 1.1: Comparing epidermoid cysts and lipomas

Feature	Epidermoid cyst	Lipoma
Origin	Epidermis	Mature fat cells
Texture on palpation	Firm, may have central punctum	Soft, lobulated
Common complication	Infection or rupture	Rarely complicated

Pilot questions 1.2

1. Describe the typical features of a benign naevus. (Linked to SLO 1.3)
2. Distinguish a seborrhoeic keratosis from a solar lentigo. (Linked to SLO 1.3)
3. Describe the characteristic examination finding of an epidermoid cyst. (Linked to SLO 1.4)
4. Distinguish a lipoma from an epidermoid cyst on palpation. (Linked to SLO 1.4)
5. Distinguish a keloid from a hypertrophic scar. (Linked to SLO 1.4)

1.3 Malignant and Premalignant Skin Lesions

1.3.1 basal cell carcinoma

The most common skin malignancy

Basal cell carcinoma is the most common malignant skin lesion and typically presents as a slow-growing, pearly or translucent papule or nodule, often with visible surface telangiectasia and a rolled, raised border, most frequently occurring on sun-exposed skin of the head and neck.



Central ulceration can develop as the lesion enlarges, sometimes referred to as a rodent ulcer, though the lesion characteristically remains locally invasive rather than metastasising to distant sites, distinguishing its overall clinical behaviour from other skin malignancies.

Despite its generally indolent course, basal cell carcinoma can cause significant local tissue destruction if left untreated, particularly around the eyes, nose, and ears, where even limited local growth can threaten important structures and complicate later reconstruction. Early recognition of the pearly, telangiectatic appearance is therefore clinically important, since prompt treatment while the lesion remains small greatly simplifies both the surgical approach and the eventual cosmetic outcome.

Fill in the blank: Basal cell carcinoma characteristically remains locally invasive rather than _____ to distant sites.

1.3.2 squamous cell carcinoma

A malignancy with genuine metastatic potential

Squamous cell carcinoma typically presents as a firm, indurated nodule or plaque with a scaly, crusted, or ulcerated surface, and, unlike basal cell carcinoma, carries a genuine, if generally modest, risk of regional lymph node metastasis, making it a clinically more concerning diagnosis that warrants a correspondingly more thorough assessment. It arises most commonly on chronically sun-damaged skin and can also develop within long-standing scars or chronic ulcers, a well-recognised association that underlines the importance of monitoring any chronic wound that fails to heal as expected.

Precursor lesions, particularly **actinic keratosis**, present as rough, scaly patches on sun-exposed skin and represent an important opportunity for early intervention before progression to invasive squamous cell carcinoma occurs. Recognising actinic keratosis and treating it appropriately therefore forms a genuinely preventive step within the broader spectrum of skin cancer management, rather than something to be regarded as a purely cosmetic concern.

Fill in the blank: Squamous cell carcinoma can develop within long-standing scars or chronic _____.



1.3.3 malignant melanoma

The most dangerous common skin malignancy

Malignant melanoma arises from pigment-producing melanocytes and is recognised using the well-established ABCDE criteria: asymmetry, border irregularity, colour variation, diameter greater than six millimetres, and evolution or change over time, features that together distinguish a suspicious pigmented lesion from a benign naevus with reasonable clinical confidence. Any single one of these features occurring in isolation warrants closer attention, though the combination of several features together raises suspicion considerably further.

Melanoma carries genuine metastatic potential and, unlike basal cell and squamous cell carcinoma, prognosis correlates closely with the depth of invasion at the time of diagnosis, making early recognition and prompt excision biopsy of any suspicious pigmented lesion a genuine clinical priority rather than a matter that can safely be deferred for observation. Any established or changing pigmented lesion meeting several ABCDE criteria should be regarded as melanoma until proven otherwise by histopathological examination.

Fill in the blank: Melanoma prognosis correlates closely with the _____ of invasion at the time of diagnosis.

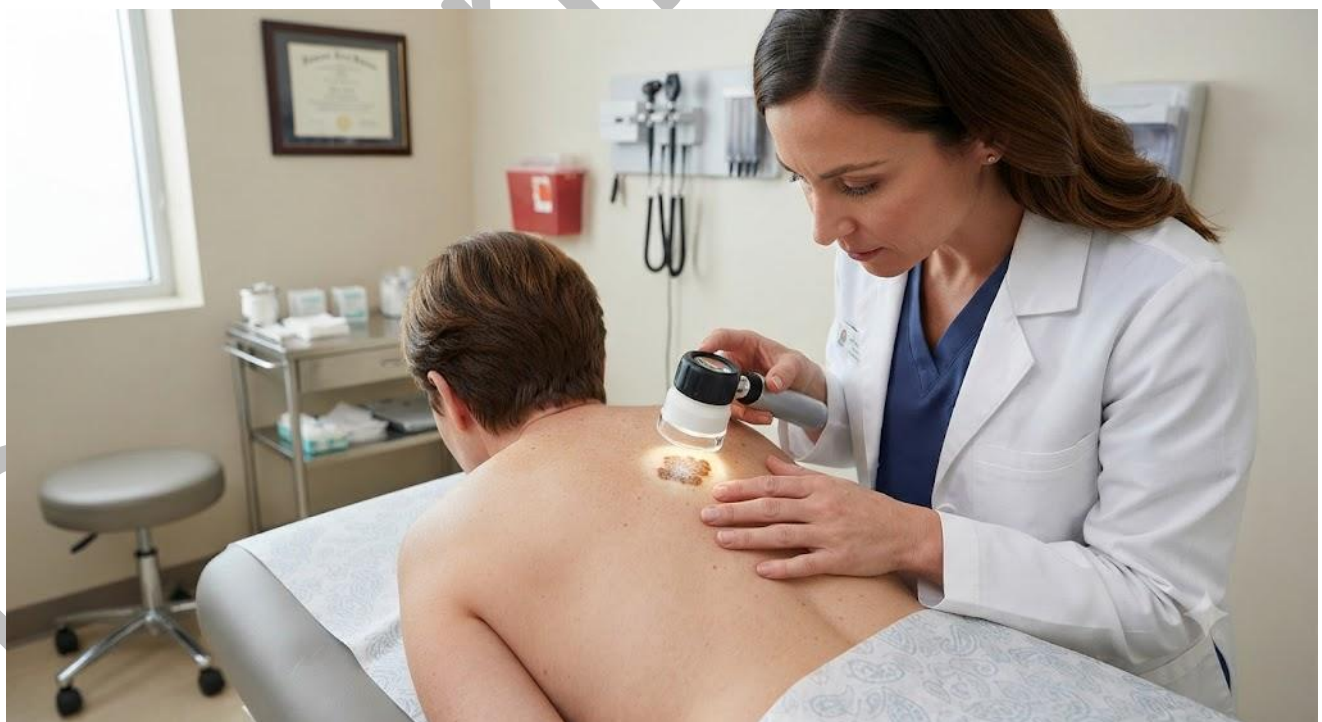


Figure 1.2: A clinician examining a pigmented lesion with a dermatoscope.



Pilot questions 1.3

1. Describe the typical appearance of basal cell carcinoma. (Linked to SLO 1.5)
2. Explain why basal cell carcinoma is described as locally invasive rather than metastatic. (Linked to SLO 1.6)
3. Describe the clinical presentation of squamous cell carcinoma. (Linked to SLO 1.5)
4. Explain the significance of actinic keratosis. (Linked to SLO 1.6)
5. List the ABCDE criteria used to assess a pigmented lesion for melanoma. (Linked to SLO 1.6)

1.4 Ulcers and Sinuses: Symptoms and Signs

1.4.1 chronic wounds and ulcers: clinical features

Reading a wound that will not heal

A **chronic ulcer** is a wound that fails to progress through the normal stages of healing within an expected timeframe, and careful assessment of its edge, base, surrounding skin, and discharge provides essential clues to the underlying cause. A sloping, shallow edge is typically seen in venous ulcers, a punched-out edge in arterial or neuropathic ulcers, and an everted, rolled edge should always raise suspicion of malignant transformation within a chronic wound, a recognised and clinically important complication of long-standing ulceration.

The surrounding skin also offers valuable diagnostic information, with venous ulcers typically accompanied by pigmentation, eczema, and swelling of the lower leg, while arterial ulcers are more often surrounded by pale, cool, hairless skin reflecting poor local blood supply. The character of any discharge, whether clear, purulent, or malodorous, together with the presence or absence of pain, further refines the clinical picture and helps direct the investigations most likely to identify the underlying cause efficiently.

Fill in the blank: An everted, rolled ulcer edge should always raise suspicion of malignant _____ within a chronic wound.



1.4.2 sinuses and fistulae: clinical features

Tracking down where a discharging opening leads

A **sinus** is an abnormal track leading from a deep focus of infection or a foreign body to an epithelial surface, typically presenting as a small opening with intermittent or persistent discharge, while a **fistula** is an abnormal communication between two epithelial-lined surfaces, such as between bowel and skin, and can present with discharge that varies characteristically depending on which structures are connected.

Careful examination of the discharge, its colour, consistency, and odour, together with palpation along the likely track and assessment of any surrounding induration or tenderness, helps localise the underlying pathology before further imaging is arranged. A persistently discharging sinus that fails to heal despite adequate treatment of the presumed underlying cause should always prompt consideration of a retained foreign body or an unusual underlying pathology, such as an occult malignancy, rather than simply escalating the same unsuccessful treatment further.

Fill in the blank: A fistula is an abnormal communication between two _____-lined surfaces.

1.4.3 interpreting lesion signs to guide differential diagnosis

Bringing the whole picture together

Interpreting the signs of a lesion successfully requires holding the full clinical picture in mind simultaneously rather than fixating on a single feature in isolation, since the same individual sign, such as ulceration or bleeding, carries a different significance depending on the lesion's overall context, duration, and the patient's risk factors. A systematic approach, working through site, size, shape, colour, border, surface, and relationship to underlying structures in a consistent order, reduces the risk of missing an important feature under time pressure.

Ultimately, the goal of this Series is to build the pattern recognition and structured reasoning that allows a lesion to be placed correctly within the differential diagnosis before any investigation is even ordered, since the choice of investigation itself, covered in the Series that follow, depends heavily on the working diagnosis reached through careful symptom and sign interpretation at this initial stage. This foundational skill underpins every subsequent Series in this course and is worth genuinely mastering before moving on to management.

Fill in the blank: The choice of investigation depends heavily on the working _____ reached through symptom and sign interpretation.

Table 1.2: Distinguishing features of venous and arterial ulcers



Feature	Venous ulcer	Arterial ulcer
Edge	Sloping, shallow	Punched-out
Surrounding skin	Pigmented, eczematous, swollen	Pale, cool, hairless
Typical site	Gaiter area of lower leg	Pressure points and toes

Pilot questions 1.4

1. Describe the significance of a rolled, everted ulcer edge. (Linked to SLO 1.7)
2. Distinguish the surrounding skin features of venous and arterial ulcers. (Linked to SLO 1.7)
3. Define the difference between a sinus and a fistula. (Linked to SLO 1.7)
4. Explain what should be suspected when a discharging sinus fails to heal despite treatment. (Linked to SLO 1.7)
5. Describe the systematic approach to interpreting lesion signs. (Linked to SLO 1.8)

Series Summary

This opening Series set out to build the foundation of accurate lesion recognition on which the rest of this course depends. Part 1.1 covered the general approach to assessing a skin or soft tissue lesion, including how to interpret both reported symptoms and examination signs, while Part 1.2 turned to common benign cutaneous and subcutaneous lesions, naevi, cysts, lipomas, and keloids. Part 1.3 covered the malignant and premalignant skin lesions most frequently encountered, basal cell carcinoma, squamous cell carcinoma, and malignant melanoma, and Part 1.4 closed with chronic ulcers, sinuses, and fistulae.

You should now be able to list and interpret the symptoms and signs of common lesions across all four Parts, and to use this interpretation to guide a sound differential diagnosis, meeting the outcomes set for this Series. Series 2 turns next to the principles of management of ulcers in plastic and reconstructive surgery.

Glossary of Terms

- **Actinic keratosis:** a rough, scaly precursor lesion to squamous cell carcinoma on sun-exposed skin.



- **Basal cell carcinoma:** the most common skin malignancy, typically pearly, slow-growing, and locally invasive.
- **Epidermoid cyst:** a smooth, mobile subcutaneous swelling, often with a central punctum.
- **Fistula:** an abnormal communication between two epithelial-lined surfaces.
- **Hypertrophic scar:** a raised scar that remains confined to the original wound margins.
- **Keloid:** a raised scar that extends beyond the original wound margins and can recur after treatment.
- **Lipoma:** a soft, mobile subcutaneous mass composed of mature fat cells.
- **Malignant melanoma:** a pigmented skin malignancy assessed using the ABCDE criteria.
- **Naevus:** a common, usually benign, pigmented skin lesion, also known as a mole.
- **Sinus:** an abnormal track leading from a deep focus of infection to an epithelial surface.
- **Squamous cell carcinoma:** a skin malignancy with genuine metastatic potential arising on sun-damaged skin.
- **Ulcer:** a wound that fails to progress through the normal stages of healing as expected.

Concept Check Questions [Series 1]

Objective questions

1. A rapidly growing, painless lump raises different concerns from a lesion present unchanged for many _____. (Linked to SLO 1.1)
2. A visible central punctum is a helpful distinguishing sign of an _____ cyst. (Linked to SLO 1.3)
3. Basal cell carcinoma characteristically remains locally invasive rather than _____ to distant sites. (Linked to SLO 1.5)
4. Melanoma prognosis correlates closely with the _____ of invasion at the time of diagnosis. (Linked to SLO 1.6)
5. A fistula is an abnormal communication between two _____-lined surfaces. (Linked to SLO 1.7)

Short-answer questions

6. Explain the diagnostic significance of spontaneous bleeding from a lesion. (Linked to SLO 1.1)
7. Distinguish a keloid from a hypertrophic scar. (Linked to SLO 1.4)
8. Describe the typical appearance of basal cell carcinoma. (Linked to SLO 1.5)
9. List the ABCDE criteria used to assess a pigmented lesion for melanoma. (Linked to SLO 1.6)



10. Distinguish the surrounding skin features of venous and arterial ulcers. (Linked to SLO 1.7)

Long-answer questions

11. Discuss the general approach to assessing a skin or soft tissue lesion, including the interpretation of symptoms and signs. (Linked to SLO 1.1, 1.2)
12. Compare the clinical features of naevi, epidermoid cysts, lipomas, and keloids. (Linked to SLO 1.3, 1.4)
13. Discuss the clinical presentation of basal cell carcinoma, squamous cell carcinoma, and malignant melanoma. (Linked to SLO 1.5, 1.6)
14. Describe the clinical features that distinguish venous from arterial ulcers. (Linked to SLO 1.7)
15. Discuss how symptoms and signs are interpreted together to guide the differential diagnosis of a common lesion. (Linked to SLO 1.8)

Answers to Concept Check Questions [Series 1]

Objective questions

1. Years.
2. Epidermoid.
3. Metastasising.
4. Depth.
5. Epithelial.

Short-answer questions

6. Spontaneous bleeding without trauma should prompt closer evaluation given its association with both benign vascular lesions and malignant change.
7. A keloid extends beyond the original wound margins and can recur, while a hypertrophic scar remains confined within the original margins.
8. Basal cell carcinoma typically presents as a pearly, slow-growing papule or nodule with surface telangiectasia and a rolled border.
9. The ABCDE criteria are asymmetry, border irregularity, colour variation, diameter greater than six millimetres, and evolution over time.
10. Venous ulcers are surrounded by pigmented, eczematous, swollen skin, while arterial ulcers are surrounded by pale, cool, hairless skin.



Long-answer questions

11. **Basic response:** Assessment begins with a focused history of duration, growth, and risk factors, followed by structured examination of site, size, shape, colour, and mobility; symptoms and signs together narrow the differential diagnosis.

Value-added response: A value-added response notes that photographic documentation supports reliable comparison of a lesion over successive visits, particularly for lesions being monitored rather than treated immediately.

12. **Basic response:** Naevi are well-defined, stable pigmented lesions; epidermoid cysts are firm swellings often with a central punctum; lipomas are soft, lobulated fatty masses; keloids extend beyond the original wound margin unlike hypertrophic scars.

Value-added response: A value-added response notes that darker skin tones carry a higher risk of keloid formation, which is relevant to patient counselling before treatment.

13. **Basic response:** Basal cell carcinoma is pearly and locally invasive; squamous cell carcinoma is scaly or crusted with metastatic potential; malignant melanoma is assessed using the ABCDE criteria and carries the greatest metastatic risk.

Value-added response: A value-added response notes that actinic keratosis represents a preventable precursor stage before progression to invasive squamous cell carcinoma.

14. **Basic response:** Venous ulcers have a sloping, shallow edge with pigmented, eczematous surrounding skin, typically in the gaiter area, while arterial ulcers have a punched-out edge with pale, cool, hairless surrounding skin at pressure points.

Value-added response: A value-added response notes that an everted, rolled edge in any chronic ulcer should raise suspicion of malignant transformation regardless of the underlying cause.

15. **Basic response:** Symptoms and signs must be considered together within the lesion's full clinical context rather than in isolation, using a systematic approach covering site, size, shape, colour, border, and relationship to underlying structures.

Value-added response: A value-added response notes that this structured reasoning directly determines the choice of investigation covered in the Series that follow, making it a genuinely foundational skill.



Part 1.1

1. Key elements include duration, rate of growth, associated pain, itching, bleeding, discharge, and relevant risk factors.
2. Rate of growth helps distinguish a benign, slow-growing lesion from one requiring urgent further evaluation.
3. Examination follows inspection of site, size, shape, colour, and surface, then palpation of consistency, mobility, and tenderness.
4. Spontaneous bleeding without trauma is associated with both benign vascular lesions and malignant change, warranting closer evaluation.
5. Fixation to underlying structures suggests local invasion and warrants prompt further investigation.

Part 1.2

1. A benign naevus is well-defined, symmetrical, uniformly coloured, and stable in appearance over time.
2. A seborrhoeic keratosis has a waxy, stuck-on appearance, while a solar lentigo is a flat pigmented patch from sun exposure.
3. An epidermoid cyst is a smooth, mobile swelling often with a visible central punctum.
4. A lipoma feels soft and lobulated, while a cyst feels firmer and may have a central punctum.
5. A keloid extends beyond the original wound margins, while a hypertrophic scar remains confined within them.

Part 1.3

1. Basal cell carcinoma presents as a pearly, translucent papule or nodule with surface telangiectasia and a rolled border.
2. Basal cell carcinoma causes local tissue destruction but characteristically does not metastasise to distant sites.
3. Squamous cell carcinoma presents as a firm, indurated nodule or plaque with a scaly, crusted, or ulcerated surface.
4. Actinic keratosis is a precursor lesion representing an opportunity for early intervention before progression to squamous cell carcinoma.
5. The ABCDE criteria are asymmetry, border irregularity, colour variation, diameter greater than six millimetres, and evolution.



Part 1.4

1. A rolled, everted ulcer edge should raise suspicion of malignant transformation within a chronic wound.
2. Venous ulcers have pigmented, eczematous, swollen surrounding skin, while arterial ulcers have pale, cool, hairless surrounding skin.
3. A sinus leads from a deep focus of infection to an epithelial surface, while a fistula connects two epithelial-lined surfaces.
4. A retained foreign body or occult malignancy should be suspected when a discharging sinus fails to heal despite treatment.
5. The systematic approach works through site, size, shape, colour, border, surface, and relationship to underlying structures in order.

References and Attributions [Series 1]

- Thorne, C. H., Chung, K. C., Gosain, A. K., Gurtner, G. C., Mehrara, B. J., Rubin, J. P., & Spear, S. L. (2013). *Grabb and Smith's Plastic Surgery* (7th ed.). Wolters Kluwer.
- Williams, N. S., Bulstrode, C. J. K., & O'Connell, P. R. (2018). *Bailey and Love's Short Practice of Surgery* (27th ed.). CRC Press.
- Bosanquet, D. C., & Harding, K. G. (2014). Wound Bed Preparation. In *Ferri's Clinical Advisor*. Elsevier.
- Weller, R., Hunter, J., & Mann, M. (2015). *Clinical Dermatology* (5th ed.). Wiley-Blackwell.

Figures, Plates, Tables, and Boxes

- Figure 1.1: A surgeon examining a skin lesion, assessing its borders and mobility. AI-generated using the prompt: "Create a realistic clinical illustration titled Examining a Skin Lesion, showing a surgeon carefully palpating a lesion on a patient's forearm with gloved hands, patient seated calmly, clinical examination room setting. Clean clinical illustration style, no text."
- Table 1.1: Comparing epidermoid cysts and lipomas. AI-generated using the prompt: "Create a clean reference table titled Comparing Epidermoid Cysts and Lipomas, listing



feature, epidermoid cyst, and lipoma across origin, texture, and common complication. Simple clinical reference table style with outside border."

- Figure 1.2: A clinician examining a pigmented lesion with a dermatoscope. AI-generated using the prompt: "Create a realistic clinical illustration titled Dermatoscopic Examination of a Pigmented Lesion, showing a clinician holding a dermatoscope close to a pigmented lesion on a patient's back, patient lying prone, clinical examination room setting. Clean clinical illustration style, no text."
- Table 1.2: Distinguishing features of venous and arterial ulcers. AI-generated using the prompt: "Create a clean reference table titled Distinguishing Features of Venous and Arterial Ulcers, listing feature, venous ulcer, and arterial ulcer across edge, surrounding skin, and typical site. Simple clinical reference table style with outside border."



Course code: SUG 601

Course title: Plastic Surgery and Burns

Course credit load: 2 Units

Series 2: Principles of Management of Ulcers in Plastic and Reconstructive Surgery

- **Part 2.1: General Principles of Ulcer Management**
 - Sub Part 2.1.1: Principles of wound bed preparation
 - Sub Part 2.1.2: Dressings and topical management of ulcers
 - Sub Part 2.1.3: The multidisciplinary approach to chronic ulcer care
- **Part 2.2: Investigation of Chronic Ulcers**
 - Sub Part 2.2.1: Clinical investigations for venous and arterial ulcers
 - Sub Part 2.2.2: Microbiological and wound swab investigations
 - Sub Part 2.2.3: Biopsy of a non-healing ulcer
- **Part 2.3: Treatment of Venous, Arterial, and Other Ulcers**
 - Sub Part 2.3.1: Compression therapy for venous ulcers
 - Sub Part 2.3.2: Revascularisation and management of arterial ulcers
 - Sub Part 2.3.3: Management of neuropathic and pressure ulcers
- **Part 2.4: Complications of Ulcer Treatment**
 - Sub Part 2.4.1: Infection as a complication of ulcer treatment
 - Sub Part 2.4.2: Malignant transformation in a chronic ulcer
 - Sub Part 2.4.3: Recurrence and long-term ulcer management

Introduction

Recognising an ulcer correctly, as covered in the previous Series, is only the first step, since a venous ulcer treated as though it were arterial, or an infected wound dressed without proper



preparation, can leave a patient worse off despite the best of intentions. This Series turns to the **principles of management of ulcers**, working through wound bed preparation, investigation, treatment by underlying cause, and the complications that can arise along the way. Getting management right depends directly on the accurate lesion interpretation built in Series 1, and this Series shows how that foundation translates into a coherent treatment plan.

The aim of this Series is to equip you with a sound understanding of the general principles of ulcer management, the investigations relevant to a chronic ulcer, the treatment of ulcers according to their underlying cause, and the complications that can arise during ulcer treatment. Each Part builds logically on the one before it, moving from preparation and investigation through to targeted treatment and, finally, the recognition and management of complications that can arise even with appropriate care.

This Series opens with the **general principles of ulcer management**, moves through **investigation of chronic ulcers** and **treatment of venous, arterial, and other ulcers**, and closes with **complications of ulcer treatment**, building a complete picture of ulcer care from first principles to long-term outcome.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 2.1:** discuss the principles of wound bed preparation and topical ulcer management
- **SLO 2.2:** describe the multidisciplinary approach to chronic ulcer care
- **SLO 2.3:** list the investigations relevant to a patient presenting with a chronic ulcer
- **SLO 2.4:** explain the indications for biopsy of a non-healing ulcer
- **SLO 2.5:** describe the treatment of venous, arterial, neuropathic, and pressure ulcers
- **SLO 2.6:** discuss the principles of compression therapy for venous ulcers
- **SLO 2.7:** list the complications that can arise during ulcer treatment
- **SLO 2.8:** describe the management of malignant transformation and recurrence in a chronic ulcer

2.1 General Principles of Ulcer Management

2.1.1 principles of wound bed preparation



Creating the conditions healing needs

Wound bed preparation is the systematic process of optimising a chronic wound so that it can progress towards healing, and is commonly organised around the TIME framework, addressing Tissue debridement, Infection or inflammation control, Moisture balance, and Epithelial edge advancement. Working through each element systematically ensures that no single barrier to healing is overlooked, since a wound can fail to heal for several reasons simultaneously and addressing only one of them often produces disappointing results.

Debridement, the removal of non-viable tissue from the wound bed, is frequently the essential first step, since necrotic or sloughy tissue provides a nutrient source for bacteria and physically obstructs the healing process, and can be achieved surgically, mechanically, enzymatically, or through autolytic methods depending on the wound and the resources available. Reassessing the wound bed regularly and adjusting the management plan as the wound changes over time is just as important as the initial preparation itself, since a static plan applied to a dynamically healing or deteriorating wound quickly becomes inappropriate.

Fill in the blank: The TIME framework addresses Tissue, Infection, Moisture, and Epithelial edge _____.

2.1.2 dressings and topical management of ulcers

Matching the dressing to the wound

Dressing selection should be guided by the specific characteristics of the wound rather than habit or convenience, since a highly exuding wound requires a dressing capable of absorbing significant fluid, such as a foam or alginate dressing, while a dry wound benefits from a hydrogel or hydrocolloid dressing that donates moisture rather than absorbing it. Matching the dressing to the wound in this way, rather than defaulting to a single familiar product regardless of presentation, meaningfully improves the rate of progress towards healing.

Topical antimicrobial agents, such as silver-impregnated or iodine-based dressings, are reserved for wounds showing signs of critical colonisation or local infection rather than applied routinely to every chronic ulcer, since unnecessary use can delay healing and contribute to antimicrobial resistance over time. Regular reassessment of the wound, typically at each dressing change, allows the dressing choice to be adjusted as the wound bed evolves, reflecting the genuinely dynamic nature of chronic wound management rather than a fixed, one-time decision.

Fill in the blank: A highly exuding wound requires a dressing capable of absorbing significant _____.



2.1.3 the multidisciplinary approach to chronic ulcer care

Why one clinician alone rarely suffices

Chronic ulcer care genuinely benefits from a **multidisciplinary approach**, drawing on the surgeon, specialist wound care nurses, vascular specialists where arterial or venous disease contributes, diabetes specialists for neuropathic ulcers, dietitians to optimise nutritional status, and physiotherapists to support mobility and offloading, since chronic ulcers rarely have a single, simple cause that one specialty alone can fully address.

Coordinating this multidisciplinary input effectively, rather than pursuing each specialty's contribution in isolation, produces meaningfully better outcomes, particularly for complex or slow-healing wounds where progress has stalled despite seemingly appropriate individual treatment. Regular multidisciplinary review, whether through formal clinic structures or informal case discussion, allows the overall management plan to be reassessed as a whole rather than incrementally adjusted by whichever specialist happens to be reviewing the patient on a given day.

Fill in the blank: Chronic ulcers rarely have a single, simple cause that one _____ alone can fully address.



Figure 2.1: A wound care nurse debriding and dressing a chronic leg ulcer.



Pilot questions 2.1

- List the four elements of the TIME framework. (Linked to SLO 2.1)
- Explain the purpose of debridement in wound bed preparation. (Linked to SLO 2.1)
- Describe how dressing choice should be guided by wound characteristics. (Linked to SLO 2.1)
- Explain when topical antimicrobial dressings are appropriately used. (Linked to SLO 2.1)
- List the specialists commonly involved in multidisciplinary chronic ulcer care. (Linked to SLO 2.2)

2.2 Investigation of Chronic Ulcers

2.2.1 clinical investigations for venous and arterial ulcers

Confirming the underlying cause before treating

The **ankle-brachial pressure index**, comparing systolic blood pressure at the ankle and arm, is the key bedside investigation used to distinguish venous from arterial disease as the underlying cause of a leg ulcer, and its result directly determines whether compression therapy, the mainstay treatment for venous ulcers, can be safely applied, since compression is contraindicated in significant arterial disease.

Duplex ultrasound further characterises venous or arterial disease where the ankle-brachial pressure index result is abnormal or borderline, assessing venous reflux and valve competence, or arterial flow and the site of any significant stenosis, providing the detailed anatomical information needed to plan definitive treatment such as venous ablation or arterial revascularisation. Investigating before treating in this structured way prevents the genuinely harmful scenario of applying compression therapy to a limb with significant undiagnosed arterial disease.

Fill in the blank: The ankle-brachial pressure index result directly determines whether _____ therapy can be safely applied.



2.2.2 microbiological and wound swab investigations

Distinguishing colonisation from true infection

Wound swabs are useful for identifying the causative organism when clinical signs of infection, such as increased pain, spreading erythema, or purulent discharge, are present, but should not be sent routinely from every chronic wound, since all chronic wounds are colonised with bacteria to some degree and a positive swab result in the absence of clinical infection does not indicate a need for antibiotic treatment.

Deep tissue biopsy for microbiological culture provides more reliable information than a superficial swab in cases of suspected deep infection or osteomyelitis, since surface swabs predominantly sample colonising organisms rather than the true pathogens present within deeper, infected tissue. Interpreting any microbiological result together with the clinical picture, rather than treating the laboratory result in isolation, remains essential to avoid unnecessary antibiotic use and the resistance this can drive over time.

Fill in the blank: A positive wound swab result in the absence of clinical infection does not indicate a need for _____ treatment.

2.2.3 biopsy of a non-healing ulcer

Ruling out malignant transformation

Any chronic ulcer that fails to show expected signs of healing despite appropriate treatment over a reasonable period, typically several months, warrants **biopsy** to exclude malignant transformation, since a Marjolin's ulcer, squamous cell carcinoma arising within a chronic wound or scar, can otherwise be mistaken for a simply slow-healing benign ulcer and treated inappropriately for a prolonged period.

Biopsy is also indicated when an ulcer shows atypical features on examination, such as an everted or rolled edge, unusually rapid growth, or friable, easily bleeding tissue within the wound bed, features that should never simply be attributed to ordinary chronic ulceration without histopathological confirmation. Taking the biopsy from the edge of the ulcer, where viable, representative tissue is most likely to be found, gives the best diagnostic yield compared with sampling only the central, often necrotic, base of the wound.

Fill in the blank: A Marjolin's ulcer is squamous cell carcinoma arising within a chronic wound or _____.



Table 2.1: Indications for investigation in a chronic ulcer

Investigation	Purpose	Key indication
Ankle-brachial pressure index	Distinguish venous from arterial disease	Before starting compression therapy
Wound swab	Identify causative organism	Clinical signs of infection present
Biopsy	Exclude malignant transformation	Failure to heal despite appropriate treatment

Pilot questions 2.2

1. Explain the purpose of the ankle-brachial pressure index. (Linked to SLO 2.3)
2. Describe when duplex ultrasound is indicated in ulcer investigation. (Linked to SLO 2.3)
3. Explain why routine wound swabbing is not recommended for every chronic wound. (Linked to SLO 2.3)
4. Describe the indications for biopsy of a non-healing ulcer. (Linked to SLO 2.4)
5. Explain why biopsy should be taken from the edge of an ulcer rather than its centre. (Linked to SLO 2.4)

2.3 Treatment of Venous, Arterial, and Other Ulcers

2.3.1 compression therapy for venous ulcers

The cornerstone of venous ulcer treatment

Compression therapy, applied through multilayer bandaging or compression stockings, is the mainstay treatment for venous ulcers, working by reducing venous hypertension and oedema to create favourable conditions for healing, and should only be applied once significant arterial disease has been excluded through the ankle-brachial pressure index, since compression can cause serious harm in the presence of significant arterial insufficiency.

Graduated compression, applying greater pressure at the ankle and progressively less towards the knee, mimics the natural direction of venous return and improves healing rates compared with uniform compression, and patient adherence to the compression regimen is a genuinely significant determinant of ultimate healing success, making patient education and comfort important practical considerations alongside the physiological rationale for treatment.



Fill in the blank: Compression therapy should only be applied once significant _____ disease has been excluded.

2.3.2 revascularisation and management of arterial ulcers

Restoring blood supply before expecting healing

Arterial ulcers result from inadequate blood supply, and healing cannot generally be expected until that blood supply is improved through **revascularisation**, whether by angioplasty, stenting, or surgical bypass, making vascular assessment and, where appropriate, referral for revascularisation a genuine priority ahead of local wound care measures alone.

Local wound care in arterial ulcers focuses on protecting the wound and managing pain rather than aggressive debridement, since aggressive intervention in poorly perfused tissue can worsen the wound rather than improve it, and analgesia is a particularly important consideration given that arterial ulcers are characteristically far more painful than venous ulcers, a clinical feature that itself supports the underlying diagnosis.

Fill in the blank: Arterial ulcers are characteristically far more _____ than venous ulcers.

2.3.3 management of neuropathic and pressure ulcers

Offloading and protecting insensate or pressured skin

Neuropathic ulcers, most commonly seen in diabetic patients with peripheral neuropathy, arise from repeated unrecognised trauma to an insensate area, typically the plantar surface of the foot, and management centres on **offloading**, redistributing pressure away from the ulcer using specialised footwear, casting, or orthotic devices, alongside strict glycaemic control and regular podiatric review.

Pressure ulcers arise from sustained pressure over a bony prominence in an immobile or insensate patient, and prevention through regular repositioning, appropriate pressure-relieving mattresses and cushions, and skin inspection is considerably more effective than treatment once an established pressure ulcer has developed, making prevention a genuine clinical priority in any at-risk, immobile patient rather than an afterthought once damage has already occurred.

Fill in the blank: Neuropathic ulcer management centres on _____, redistributing pressure away from the ulcer.





Figure 2.2: A clinician applying multilayer compression bandaging for venous ulcer treatment.

Pilot questions 2.3

1. Explain how compression therapy promotes healing of venous ulcers. (Linked to SLO 2.6)
2. Describe graduated compression and its benefit. (Linked to SLO 2.6)
3. Explain why revascularisation is prioritised in arterial ulcer management. (Linked to SLO 2.5)
4. Describe the principle of offloading in neuropathic ulcer management. (Linked to SLO 2.5)
5. Explain why prevention is emphasised in pressure ulcer management. (Linked to SLO 2.5)

2.4 Complications of Ulcer Treatment

2.4.1 infection as a complication of ulcer treatment

Recognising infection despite treatment already underway

Infection can complicate ulcer treatment even when initial management has been appropriate, presenting with increasing pain, spreading erythema, purulent discharge, malodour, or systemic



signs such as fever, and should prompt reassessment including wound swab or deep tissue culture, review of the current dressing regimen, and consideration of systemic antibiotic therapy when clinical infection is confirmed rather than merely suspected colonisation.

Deep infection extending to bone, osteomyelitis, is a particularly serious complication that requires prolonged antibiotic therapy and, frequently, surgical debridement of infected bone, and should be actively suspected in any chronic ulcer overlying a bony prominence that fails to improve despite what otherwise appears to be adequate treatment, since delayed recognition considerably worsens the eventual outcome for the patient.

Fill in the blank: Deep infection extending to bone is known as _____ and requires prolonged antibiotic therapy.

2.4.2 malignant transformation in a chronic ulcer

A serious, underrecognised complication of long-standing ulceration

Malignant transformation within a chronic ulcer, most commonly presenting as a Marjolin's ulcer, is a genuinely serious complication that can be missed if a chronically non-healing wound is simply treated as refractory rather than actively reassessed for an alternative explanation, and the clinical signs already discussed in Series 1, an everted or rolled edge, unusually rapid growth, or friable tissue, should always prompt biopsy rather than continued conservative management alone.

Once malignant transformation is confirmed histologically, management shifts from conventional wound care to oncological surgical excision with clear margins, and, depending on staging, adjuvant treatment, meaningfully changing the entire trajectory of the patient's care and underlining why maintaining vigilance for this possibility throughout the treatment course, not just at the initial assessment, genuinely matters.

Fill in the blank: Once malignant transformation is confirmed, management shifts to oncological surgical _____.

2.4.3 recurrence and long-term ulcer management

Preventing the return of a healed wound

Recurrence after apparently successful ulcer healing is common, particularly for venous ulcers, where the underlying venous hypertension persists unless definitively treated, making long-term compression stocking use and, where appropriate, definitive venous intervention such as ablation



genuinely important even after the wound itself has closed, rather than something to be discontinued once healing is achieved.

Long-term management also involves patient education about early warning signs of recurrence, regular follow-up review, and ongoing attention to modifiable risk factors such as smoking, obesity, and poor glycaemic control in diabetic patients, since sustained healing depends as much on addressing these underlying contributors as it does on the original wound care that achieved closure in the first place.

Fill in the blank: Long-term venous ulcer management includes ongoing compression stocking use even after wound _____.

Table 2.2: Complications of ulcer treatment and their management focus

Complication	Key warning feature	Management focus
Infection	Increasing pain, erythema, discharge	Culture and targeted antibiotic therapy
Malignant transformation	Everted edge, rapid growth, friable tissue	Biopsy and oncological excision
Recurrence	Return of ulceration after healing	Address underlying cause and risk factors

Pilot questions 2.4

1. List the clinical features suggesting infection in a treated ulcer. (Linked to SLO 2.7)
2. Describe osteomyelitis as a complication of ulcer treatment. (Linked to SLO 2.7)
3. Explain when malignant transformation should be suspected in a chronic ulcer. (Linked to SLO 2.8)
4. Describe how management changes once malignant transformation is confirmed. (Linked to SLO 2.8)
5. Explain why long-term compression stocking use continues even after a venous ulcer has healed. (Linked to SLO 2.8)



Series Summary

This Series translated the lesion recognition skills built in Series 1 into a coherent approach to ulcer management. Part 2.1 covered the general principles of wound bed preparation, dressing selection, and multidisciplinary care, while Part 2.2 turned to the investigations relevant to a chronic ulcer, including the ankle-brachial pressure index, wound swabs, and biopsy. Part 2.3 covered the treatment of venous, arterial, neuropathic, and pressure ulcers according to their underlying cause, and Part 2.4 closed with the complications of ulcer treatment, infection, malignant transformation, and recurrence.

You should now be able to discuss the principles of ulcer management, list the relevant investigations, describe treatment by underlying cause, and recognise and manage the complications covered across all four Parts, meeting the outcomes set for this Series. Series 3 turns next to burns, covering their assessment, management, and complications.

Glossary of Terms

1. **Ankle-brachial pressure index:** a bedside test comparing ankle and arm blood pressure to assess arterial disease.
2. **Compression therapy:** graduated bandaging or stockings used as the mainstay treatment for venous ulcers.
3. **Debridement:** the removal of non-viable tissue from a wound bed.
4. **Marjolin's ulcer:** squamous cell carcinoma arising within a chronic wound or scar.
5. **Multidisciplinary approach:** coordinated input from several specialties in managing a complex condition.
6. **Neuropathic ulcer:** an ulcer arising from repeated unrecognised trauma to an insensate area.
7. **Offloading:** redistributing pressure away from an ulcer using footwear, casting, or orthotics.
8. **Osteomyelitis:** infection extending to bone, a serious complication of chronic ulceration.
9. **Pressure ulcer:** an ulcer arising from sustained pressure over a bony prominence.
10. **Revascularisation:** restoring blood supply through angioplasty, stenting, or surgical bypass.
11. **Wound bed preparation:** the systematic optimisation of a chronic wound to support healing.
12. **Wound swab:** a sample taken to identify the causative organism in a clinically infected wound.



Concept Check Questions [Series 2]

Objective questions

- The TIME framework addresses Tissue, Infection, Moisture, and Epithelial edge _____. (Linked to SLO 2.1)
- The ankle-brachial pressure index result directly determines whether _____ therapy can be safely applied. (Linked to SLO 2.3)
- A Marjolin's ulcer is squamous cell carcinoma arising within a chronic wound or _____. (Linked to SLO 2.4)
- Compression therapy should only be applied once significant _____ disease has been excluded. (Linked to SLO 2.6)
- Deep infection extending to bone is known as _____ and requires prolonged antibiotic therapy. (Linked to SLO 2.7)

Short-answer questions

1. Explain the purpose of debridement in wound bed preparation. (Linked to SLO 2.1)
2. Explain why routine wound swabbing is not recommended for every chronic wound. (Linked to SLO 2.3)
3. Explain why revascularisation is prioritised in arterial ulcer management. (Linked to SLO 2.5)
4. Describe the principle of offloading in neuropathic ulcer management. (Linked to SLO 2.5)
5. Explain when malignant transformation should be suspected in a chronic ulcer. (Linked to SLO 2.8)

Long-answer questions

6. Discuss the principles of wound bed preparation and the multidisciplinary approach to chronic ulcer care. (Linked to SLO 2.1, 2.2)
7. Describe the investigations relevant to a patient presenting with a chronic ulcer, including the indications for biopsy. (Linked to SLO 2.3, 2.4)
8. Discuss the treatment of venous, arterial, neuropathic, and pressure ulcers according to their underlying cause. (Linked to SLO 2.5, 2.6)
9. Describe the complications that can arise during ulcer treatment. (Linked to SLO 2.7)
10. Discuss the management of malignant transformation and recurrence in a chronic ulcer. (Linked to SLO 2.8)



Answers to Concept Check Questions [Series 2]

Objective questions

11. Advancement.
12. Compression.
13. Scar.
14. Arterial.
15. Osteomyelitis.

Short-answer questions

16. Debridement removes non-viable tissue that provides a nutrient source for bacteria and obstructs healing.
17. All chronic wounds are colonised with bacteria, so a positive swab without clinical infection does not indicate a need for antibiotic treatment.
18. Healing cannot generally be expected until blood supply is improved, so revascularisation is prioritised ahead of local wound care alone.
19. Offloading redistributes pressure away from the ulcer using specialised footwear, casting, or orthotic devices.
20. Malignant transformation should be suspected when an ulcer shows an everted or rolled edge, rapid growth, or friable tissue, or fails to heal despite appropriate treatment.

Long-answer questions

21. **Basic response:** Wound bed preparation follows the TIME framework addressing tissue, infection, moisture, and epithelial edge advancement; multidisciplinary care draws on surgeons, wound nurses, vascular specialists, and dietitians for complex, slow-healing wounds.

Value-added response: A value-added response notes that regular multidisciplinary review allows the overall plan to be reassessed as a whole rather than adjusted piecemeal by individual specialists.

22. **Basic response:** The ankle-brachial pressure index distinguishes venous from arterial disease; wound swabs identify organisms when infection signs are present; biopsy is indicated for non-healing ulcers or atypical features to exclude malignant transformation.

Value-added response: A value-added response notes that biopsy should be taken from the ulcer edge, where viable tissue is most likely to be found, for the best diagnostic yield.



23. **Basic response:** Venous ulcers are treated with compression therapy after arterial disease is excluded; arterial ulcers require revascularisation; neuropathic ulcers require offloading; pressure ulcers are best managed through prevention.

Value-added response: A value-added response notes that patient adherence to compression therapy is a genuinely significant determinant of ultimate healing success.

24. **Basic response:** Complications include infection, which can extend to osteomyelitis, malignant transformation presenting as a Marjolin's ulcer, and recurrence, particularly of venous ulcers where underlying venous hypertension persists.

Value-added response: A value-added response notes that osteomyelitis should be actively suspected in any chronic ulcer overlying a bony prominence that fails to improve despite adequate treatment.

25. **Basic response:** Malignant transformation requires oncological surgical excision with clear margins once confirmed histologically; recurrence, particularly of venous ulcers, is managed with ongoing compression and addressing modifiable risk factors.

Value-added response: A value-added response notes that maintaining vigilance for malignant transformation throughout treatment, not just at initial assessment, genuinely matters given how easily it can be missed.

Answers to Pilot Questions [Series 2]

Part 2.1

1. The four elements are Tissue debridement, Infection or inflammation control, Moisture balance, and Epithelial edge advancement.
2. Debridement removes non-viable tissue that feeds bacteria and obstructs the healing process.
3. Dressing choice should match the wound's exudate level, using absorbent dressings for wet wounds and moisture-donating dressings for dry wounds.
4. Topical antimicrobial dressings are used when there are signs of critical colonisation or local infection, not routinely.
5. Specialists commonly involved include vascular specialists, diabetes specialists, dietitians, and physiotherapists.



Part 2.2

6. The ankle-brachial pressure index distinguishes venous from arterial disease and determines whether compression is safe.
7. Duplex ultrasound is indicated when the ankle-brachial pressure index is abnormal or borderline.
8. All chronic wounds are colonised with bacteria, so routine swabbing without clinical infection signs is not useful.
9. Biopsy is indicated for ulcers that fail to heal despite appropriate treatment or show atypical features.
10. The edge of the ulcer contains viable, representative tissue, giving a better diagnostic yield than the necrotic centre.

Part 2.3

11. Compression therapy reduces venous hypertension and oedema, creating favourable conditions for healing.
12. Graduated compression applies greater pressure at the ankle, mimicking natural venous return and improving healing rates.
13. Healing cannot be expected until blood supply improves, so revascularisation takes priority over local wound care alone.
14. Offloading redistributes pressure away from the ulcer using specialised footwear, casting, or orthotic devices.
15. Prevention is far more effective than treating an established pressure ulcer, making it a genuine clinical priority.

Part 2.4

1. Features include increasing pain, spreading erythema, purulent discharge, malodour, and systemic signs such as fever.
2. Osteomyelitis is deep infection extending to bone, requiring prolonged antibiotic therapy and often surgical debridement.
3. Malignant transformation should be suspected with an everted or rolled edge, rapid growth, or friable tissue.
4. Management shifts from conventional wound care to oncological surgical excision with clear margins.
5. Underlying venous hypertension persists unless definitively treated, so ongoing compression prevents recurrence.



References and Attributions [Series 2]

1. Williams, N. S., Bulstrode, C. J. K., & O'Connell, P. R. (2018). Bailey and Love's Short Practice of Surgery (27th ed.). CRC Press.
2. Bosanquet, D. C., & Harding, K. G. (2014). Wound Bed Preparation. In Ferri's Clinical Advisor. Elsevier.
3. Thorne, C. H., Chung, K. C., Gosain, A. K., Gurtner, G. C., Mehrara, B. J., Rubin, J. P., & Spear, S. L. (2013). Grabb and Smith's Plastic Surgery (7th ed.). Wolters Kluwer.
4. National Institute for Health and Care Excellence (2013). Venous Leg Ulcer: Management (Clinical Knowledge Summary). NICE.

Figures, Plates, Tables, and Boxes

1. Figure 2.1: A wound care nurse debriding and dressing a chronic leg ulcer. AI-generated using the prompt: "Create a realistic clinical illustration titled Debriding and Dressing a Chronic Ulcer, showing a wound care nurse in gloves carefully cleaning and dressing a leg ulcer, patient seated with leg elevated, treatment room setting. Clean clinical illustration style, no text."
2. Table 2.1: Indications for investigation in a chronic ulcer. AI-generated using the prompt: "Create a clean reference table titled Indications for Investigation in a Chronic Ulcer, listing investigation, purpose, and key indication. Simple clinical reference table style with outside border."
3. Figure 2.2: A clinician applying multilayer compression bandaging for venous ulcer treatment. AI-generated using the prompt: "Create a realistic clinical illustration titled Applying Compression Bandaging for a Venous Ulcer, showing a clinician wrapping layered compression bandage around a patient's lower leg, patient seated with leg elevated, treatment room setting. Clean clinical illustration style, no text."
4. Table 2.2: Complications of ulcer treatment and their management focus. AI-generated using the prompt: "Create a clean reference table titled Complications of Ulcer Treatment and Their Management Focus, listing complication, key warning feature, and management focus. Simple clinical reference table style with outside border."



Course code: SUG 601

Course title: Plastic Surgery and Burns

Course credit load: 2 Units

Series 3: Burns: Assessment, Management, and Complications

- **Part 3.1: Assessment of Burns**
 - Sub Part 3.1.1: Classifying burn depth
 - Sub Part 3.1.2: Estimating burn surface area
 - Sub Part 3.1.3: Initial assessment and triage of the burns patient
- **Part 3.2: Fluid Resuscitation and Early Management**
 - Sub Part 3.2.1: Principles of fluid resuscitation in burns
 - Sub Part 3.2.2: Airway and inhalational injury management
 - Sub Part 3.2.3: Pain management and initial wound care in burns
- **Part 3.3: Surgical Management of Burns**
 - Sub Part 3.3.1: Escharotomy and fasciotomy
 - Sub Part 3.3.2: Burn wound excision and debridement
 - Sub Part 3.3.3: Skin grafting and wound closure in burns
- **Part 3.4: Complications of Burns**
 - Sub Part 3.4.1: Infection and sepsis in burns
 - Sub Part 3.4.2: Hypertrophic scarring and contractures
 - Sub Part 3.4.3: Systemic and long-term complications of burns



Introduction

Few injuries demand as much rapid, coordinated clinical judgement as a major burn, where the first hour of assessment and resuscitation can determine the difference between survival and death, and between a manageable recovery and a lifetime of disfiguring contracture. This Series turns to **burns**, working through their assessment, early management, surgical treatment, and the complications that can follow, building on the wound care principles already established in the earlier Series of this course.

The aim of this Series is to equip you with the ability to assess a burn accurately, manage the immediate physiological threat it poses through fluid resuscitation and airway care, understand the surgical options for burn wound closure, and recognise and manage the complications, both early and long-term, that burns can produce. Burns present a genuinely unique combination of local wound and systemic physiological insult that sets them apart from the other lesions covered elsewhere in this course, and this Series reflects that distinct clinical demand.

This Series opens with the **assessment of burns**, moves through **fluid resuscitation and early management** and **surgical management of burns**, and closes with **complications of burns**, tracing the patient's journey from the moment of injury through to long-term recovery.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 3.1:** classify burn depth and estimate the total burn surface area
- **SLO 3.2:** describe the initial assessment and triage of a patient with burns
- **SLO 3.3:** discuss the principles of fluid resuscitation in burns
- **SLO 3.4:** describe the management of airway compromise, inhalational injury, and pain in burns
- **SLO 3.5:** describe the surgical management of burns, including escharotomy and burn wound excision
- **SLO 3.6:** discuss the role of skin grafting in burn wound closure
- **SLO 3.7:** list the complications of burns, including infection and scarring
- **SLO 3.8:** describe the systemic and long-term complications of burns



3.1 Assessment of Burns

3.1.1 classifying burn depth

Reading the skin to gauge the injury

Burn depth is classified according to the layers of skin affected: **superficial burns** involve only the epidermis, presenting as red, painful skin without blistering, similar to sunburn, and typically heal within a week without scarring. **Superficial partial-thickness burns** extend into the upper dermis, presenting with painful, blistered, weeping skin that blanches on pressure, and generally heal within two to three weeks with minimal scarring given adequate care.

Deep partial-thickness burns extend further into the dermis, presenting as a mottled red or white appearance with reduced sensation and sluggish or absent capillary refill, and are prone to hypertrophic scarring even with good care, often requiring surgical intervention to achieve satisfactory healing. **Full-thickness burns** destroy the entire dermis and can extend into subcutaneous tissue, presenting as a white, leathery, or charred surface that is characteristically painless due to destruction of the nerve endings, a deceptively reassuring feature that must never be mistaken for a minor injury.

Fill in the blank: Full-thickness burns are characteristically painless due to destruction of the nerve _____.

3.1.2 estimating burn surface area

Quantifying the extent of injury accurately

Accurately estimating the **total burn surface area**, expressed as a percentage of total body surface area, is essential since it directly guides fluid resuscitation calculations and the decision to transfer a patient to a specialist burns unit. The **Wallace rule of nines** divides the adult body into anatomical regions each representing approximately nine percent, or multiples of nine percent, of total body surface area, providing a rapid estimate suitable for initial assessment, though it requires adjustment in children given their proportionally larger head and smaller limbs relative to an adult.

The **Lund and Browder chart**, which accounts for age-related differences in body proportion, provides a considerably more accurate estimate than the rule of nines and is the preferred tool wherever time and resources allow, particularly in children and in burns affecting an irregular distribution across the body. For smaller or scattered burns, the **palmar method**, using the patient's own palm and fingers as representing approximately one percent of total body surface area, offers a quick, practical estimate that complements the more formal charts.



Fill in the blank: The Wallace rule of nines requires adjustment in children given their proportionally larger head and smaller _____.

3.1.3 initial assessment and triage of the burns patient

Applying trauma principles alongside burn-specific assessment

Initial assessment of a burns patient follows standard trauma principles, an **airway, breathing, circulation** approach, with particular attention to signs suggesting airway compromise or inhalational injury, such as facial burns, singed nasal hair, soot in the mouth or nose, or a hoarse voice, since airway swelling can progress rapidly and unpredictably in the hours following a significant burn.

Triage decisions regarding transfer to a specialist burns unit are guided by established referral criteria, including burns exceeding a defined percentage of total body surface area, full-thickness burns of any size, burns involving the face, hands, feet, perineum, or major joints, circumferential burns, and burns in particularly vulnerable patients such as young children, the elderly, or those with significant comorbidities, since these categories carry disproportionate risk of complication if managed outside a specialist setting.

Fill in the blank: Circumferential burns are a recognised criterion for referral to a specialist _____ unit.





Figure 3.1: A clinician assessing burn depth and capillary refill on a patient's forearm.

Pilot questions 3.1

- Distinguish superficial from superficial partial-thickness burns. (Linked to SLO 3.1)
- Describe the typical appearance of a full-thickness burn. (Linked to SLO 3.1)
- Describe the Wallace rule of nines. (Linked to SLO 3.1)
- Explain why the Lund and Browder chart is preferred over the rule of nines in children. (Linked to SLO 3.1)
- List two signs suggesting inhalational injury. (Linked to SLO 3.2)

3.2 Fluid Resuscitation and Early Management

3.2.1 principles of fluid resuscitation in burns

Replacing what a major burn takes away

Significant burns cause substantial fluid loss through the damaged skin barrier and a systemic capillary leak response, making structured **fluid resuscitation** essential for any burn exceeding approximately fifteen to twenty percent of total body surface area in an adult, or a lower



threshold in children, to prevent hypovolaemic shock and its downstream complications, including acute kidney injury.

The **Parkland formula**, calculating the total fluid requirement over the first twenty-four hours from the time of injury based on the patient's weight and total burn surface area, remains the most widely used starting point for resuscitation, with half the calculated volume given in the first eight hours from injury and the remainder over the following sixteen hours, though the calculated volume is always a starting estimate requiring ongoing adjustment against the patient's actual physiological response.

Fill in the blank: The Parkland formula calculates fluid requirement based on patient weight and total burn surface _____.

3.2.2 airway and inhalational injury management

Protecting an airway before it is too late to do so safely

Inhalational injury should be suspected in any patient with facial burns, singed facial or nasal hair, carbonaceous sputum, or a history of injury in an enclosed space, and, given that airway swelling can progress over several hours to the point where intubation becomes technically difficult or impossible, early, proactive airway management is considerably safer than waiting for overt respiratory distress to develop before acting.

Carbon monoxide poisoning frequently accompanies inhalational injury in burns sustained within an enclosed space and should be actively considered even when the patient's oxygen saturation appears reassuring, since standard pulse oximetry cannot reliably distinguish oxyhaemoglobin from carboxyhaemoglobin, making a normal-appearing saturation reading a potentially dangerous source of false reassurance in this specific clinical context.

Fill in the blank: Standard pulse oximetry cannot reliably distinguish oxyhaemoglobin from _____.

3.2.3 pain management and initial wound care in burns

Comfort and protection in the early hours

Pain management in burns requires prompt, adequately titrated analgesia, typically intravenous opioids in significant burns, since burn pain is often severe and undertreatment causes unnecessary suffering while also complicating subsequent wound care and dressing changes if the patient's pain remains poorly controlled from the outset.



Initial wound care involves cooling the burn with room-temperature running water for approximately twenty minutes if presenting within a few hours of injury, since this reduces tissue damage and pain, followed by covering the wound with a clean, non-adherent dressing while avoiding prolonged cold water application or ice, which can worsen tissue injury through excessive cooling and contribute to hypothermia, particularly in extensive burns.

Fill in the blank: Cooling a burn with running water reduces tissue damage but should avoid _____ or ice.

Table 3.1: Comparing burn depth categories

Depth	Appearance	Sensation
Superficial	Red, no blistering	Painful
Superficial partial-thickness	Blistered, weeping, blanches	Very painful
Full-thickness	White or leathery, charred	Painless

Pilot questions 3.2

1. Explain when structured fluid resuscitation becomes necessary in a burns patient. (Linked to SLO 3.3)
2. Describe the Parkland formula and how the calculated volume is administered. (Linked to SLO 3.3)
3. List two signs suggesting inhalational injury requiring airway assessment. (Linked to SLO 3.4)
4. Explain why carbon monoxide poisoning can be missed on standard pulse oximetry. (Linked to SLO 3.4)
5. Describe the recommended initial cooling approach for a fresh burn. (Linked to SLO 3.4)

3.3 Surgical Management of Burns

3.3.1 escharotomy and fasciotomy

Releasing pressure before it causes irreversible damage

Escharotomy, a surgical incision through full-thickness burnt skin, or eschar, is indicated when a circumferential full-thickness burn of a limb, chest, or neck restricts blood flow or ventilation, since the inelastic, burnt skin cannot expand to accommodate the swelling that follows a major



burn, creating a compartment-like pressure effect that can compromise distal circulation or chest wall movement if left untreated.

Fasciotomy, extending the incision through the underlying fascia, is required in the less common situation where compartment pressure remains elevated despite adequate escharotomy, typically due to deeper tissue injury from electrical burns or associated trauma, and both procedures are time-critical interventions where clinical judgement about timing genuinely affects the eventual outcome for the affected limb.

Fill in the blank: Escharotomy is indicated when circumferential full-thickness burn restricts blood flow or _____.

3.3.2 burn wound excision and debridement

Removing dead tissue to allow healing to begin

Burn wound excision, the surgical removal of non-viable, burnt tissue, is generally performed early, often within the first few days after injury, for deep partial-thickness and full-thickness burns, since early excision reduces the risk of infection, shortens hospital stay, and improves the eventual functional and cosmetic outcome compared with allowing the burnt tissue to separate naturally over a much longer period.

Excision can be **tangential**, removing thin layers of burnt tissue sequentially until healthy, bleeding tissue is reached, preserving as much viable tissue as possible, or **fascial**, removing all tissue down to the level of the fascia in very deep burns, a more extensive approach reserved for situations where tangential excision would be unlikely to reach viable tissue within a reasonable operative timeframe.

Fill in the blank: Tangential excision removes thin layers of burnt tissue until healthy, _____ tissue is reached.

3.3.3 skin grafting and wound closure in burns

Closing the wound once excision is complete

Following excision, **skin grafting** is typically required to achieve wound closure in deep partial-thickness and full-thickness burns, most commonly using a **split-thickness skin graft** harvested from an unburnt donor site, which can be meshed to expand its surface area and cover a larger wound than the donor site alone would allow, a technique particularly valuable when donor sites are limited by the extent of the burn itself.



In extensive burns where donor sites are severely limited, techniques such as **cultured epithelial autografts**, growing sheets of the patient's own skin cells in a laboratory, or temporary biological and synthetic skin substitutes to cover the wound while donor sites heal for repeated harvesting, extend the surgeon's options considerably, though these advanced techniques carry their own specific limitations and are generally reserved for the most extensive burn injuries.

Fill in the blank: Split-thickness skin grafts can be _____ to expand their surface area and cover a larger wound.



Figure 3.2: A surgical team performing burn wound excision in an operating theatre.

Pilot questions 3.3

1. Explain the indication for escharotomy. (Linked to SLO 3.5)
2. Distinguish escharotomy from fasciotomy. (Linked to SLO 3.5)
3. Explain the benefit of early burn wound excision. (Linked to SLO 3.5)
4. Distinguish tangential from fascial excision. (Linked to SLO 3.5)
5. Describe the role of split-thickness skin grafts in burn wound closure. (Linked to SLO 3.6)



3.4 Complications of Burns

3.4.1 infection and sepsis in burns

A wound that has lost its natural barrier to infection

Burn wound infection is a significant risk given the loss of the skin's natural protective barrier over an extensive area, presenting with signs such as increasing pain, spreading erythema beyond the burn margin, discolouration or conversion of the wound to a deeper appearance, malodour, or delayed healing, and should be assessed and managed promptly given the risk of progression to invasive infection and sepsis.

Sepsis in a burns patient can present atypically compared with sepsis in other contexts, since the systemic inflammatory response to a major burn itself can mimic early sepsis, making the distinction genuinely challenging and requiring close clinical monitoring, serial assessment, and a low threshold for investigation and empirical treatment when deterioration occurs, rather than waiting for unambiguous confirmation before acting.

Fill in the blank: The systemic inflammatory response to a major burn itself can mimic early _____, complicating diagnosis.

3.4.2 hypertrophic scarring and contractures

Long-term consequences of deep burn injury

Hypertrophic scarring is common following deep partial-thickness and full-thickness burns, particularly in areas of high skin tension or where healing was prolonged, and management includes pressure garment therapy, silicone sheeting, and, in established or problematic cases, surgical scar revision, with early intervention generally producing better outcomes than delayed treatment of an established, mature scar.

Contractures, the shortening and tightening of scar tissue across a joint that restricts movement, are a particularly disabling complication when they occur across a functionally important joint, such as the hand, elbow, or neck, and prevention through early splinting, positioning, and physiotherapy during the healing phase is considerably more effective than surgical release of an established contracture after the fact.

Fill in the blank: Contractures are a particularly disabling complication when they occur across a functionally important _____.



3.4.3 systemic and long-term complications of burns

Effects reaching well beyond the wound itself

Major burns produce a marked **hypermetabolic response**, with significantly increased energy expenditure and protein catabolism persisting for weeks to months after the initial injury, making early, aggressive **nutritional support** a genuine priority in the management of significant burns rather than a secondary consideration addressed only once the wound itself is stable.

Long-term complications extend well beyond the physical wound, encompassing psychological effects such as post-traumatic stress and altered body image, particularly with visible or disfiguring burns, alongside functional limitations from scarring and contracture that can persist for years after the acute injury has fully healed, underlining why burns rehabilitation genuinely continues long after hospital discharge and requires sustained, coordinated multidisciplinary follow-up.

Fill in the blank: Major burns produce a marked hypermetabolic response, with significantly increased energy expenditure and protein _____.

Table 3.2: Complications of burns and their management focus

Complication	Key feature	Management focus
Infection and sepsis	Spreading erythema, malodour, deterioration	Close monitoring, early treatment
Hypertrophic scarring	Raised, thickened scar tissue	Pressure garments, silicone, scar revision
Contracture	Shortened scar restricting joint movement	Early splinting and physiotherapy

Pilot questions 3.4

1. List the signs suggesting burn wound infection. (Linked to SLO 3.7)
2. Explain why sepsis can be difficult to distinguish in a burns patient. (Linked to SLO 3.7)
3. Distinguish hypertrophic scarring from a contracture. (Linked to SLO 3.7)
4. Explain why prevention of contracture is emphasised over later surgical release. (Linked to SLO 3.7)
5. Explain why nutritional support is a priority in major burns. (Linked to SLO 3.8)



Series Summary

This Series traced the burns patient's journey from initial injury through to long-term recovery. Part 3.1 covered the assessment of burns, including depth classification, surface area estimation, and initial triage, while Part 3.2 turned to fluid resuscitation, airway management, and early wound care. Part 3.3 covered the surgical management of burns, escharotomy, excision, and skin grafting, and Part 3.4 closed with the complications of burns, infection, scarring, contracture, and systemic effects.

You should now be able to classify and assess a burn, describe its early and surgical management, and recognise and manage the complications covered across all four Parts, meeting the outcomes set for this Series. Series 4 turns next to skin grafts and cleft lip and palate.

Glossary of Terms

1. **Contracture:** shortening and tightening of scar tissue across a joint that restricts movement.
2. **Escharotomy:** a surgical incision through full-thickness burnt skin to relieve pressure.
3. **Fasciotomy:** a surgical incision through fascia to relieve compartment pressure.
4. **Full-thickness burn:** a burn destroying the entire dermis, characteristically painless.
5. **Hypermetabolic response:** significantly increased energy expenditure following a major burn.
6. **Inhalational injury:** airway or lung injury from inhaling heat, smoke, or toxic combustion products.
7. **Lund and Browder chart:** an age-adjusted chart for estimating total burn surface area.
8. **Parkland formula:** a formula calculating fluid resuscitation volume based on weight and burn area.
9. **Split-thickness skin graft:** a graft harvested from an unburnt donor site to close a burn wound.
10. **Tangential excision:** sequential removal of thin layers of burnt tissue until viable tissue is reached.
11. **Total burn surface area:** the percentage of body surface affected by burn injury.
12. **Wallace rule of nines:** a rapid method for estimating burn surface area using body regions of nine percent.



Concept Check Questions [Series 3]

Objective questions

- Full-thickness burns are characteristically painless due to destruction of the nerve _____. (Linked to SLO 3.1)
- The Parkland formula calculates fluid requirement based on patient weight and total burn surface _____. (Linked to SLO 3.3)
- Escharotomy is indicated when circumferential full-thickness burn restricts blood flow or _____. (Linked to SLO 3.5)
- Split-thickness skin grafts can be _____ to expand their surface area and cover a larger wound. (Linked to SLO 3.6)
- Major burns produce a marked hypermetabolic response, with significantly increased energy expenditure and protein _____. (Linked to SLO 3.8)

Short-answer questions

1. Describe the Wallace rule of nines. (Linked to SLO 3.1)
2. Explain why carbon monoxide poisoning can be missed on standard pulse oximetry. (Linked to SLO 3.4)
3. Explain the benefit of early burn wound excision. (Linked to SLO 3.5)
4. Distinguish hypertrophic scarring from a contracture. (Linked to SLO 3.7)
5. Explain why nutritional support is a priority in major burns. (Linked to SLO 3.8)

Long-answer questions

6. Discuss the classification of burn depth and the methods used to estimate burn surface area. (Linked to SLO 3.1, 3.2)
7. Describe the principles of fluid resuscitation and airway management in a burns patient. (Linked to SLO 3.3, 3.4)
8. Discuss the surgical management of burns, including escharotomy, excision, and skin grafting. (Linked to SLO 3.5, 3.6)
9. Describe the complications of burns, including infection, scarring, and contracture. (Linked to SLO 3.7)
10. Discuss the systemic and long-term complications of major burns. (Linked to SLO 3.8)



Answers to Concept Check Questions [Series 3]

Objective questions

11. Endings.
12. Area.
13. Ventilation.
14. Meshed.
15. Catabolism.

Short-answer questions

16. The Wallace rule of nines divides the adult body into regions each representing approximately nine percent of total body surface area.
17. Standard pulse oximetry cannot distinguish oxyhaemoglobin from carboxyhaemoglobin, so it can appear falsely reassuring.
18. Early excision reduces the risk of infection, shortens hospital stay, and improves functional and cosmetic outcome.
19. Hypertrophic scarring is raised, thickened scar tissue, while a contracture is shortened scar tissue restricting joint movement.
20. Major burns cause a hypermetabolic response with significantly increased energy expenditure and protein catabolism.

Long-answer questions

21. **Basic response:** Burn depth is classified as superficial, superficial partial-thickness, deep partial-thickness, and full-thickness; surface area is estimated using the Wallace rule of nines, the Lund and Browder chart, or the palmar method.

Value-added response: A value-added response notes that the Lund and Browder chart is preferred in children given their different body proportions relative to adults.

22. **Basic response:** Fluid resuscitation follows the Parkland formula based on weight and burn area, with half the volume given in the first eight hours; airway management requires early, proactive assessment given the risk of progressive swelling.

Value-added response: A value-added response notes that carbon monoxide poisoning should be actively considered even with a reassuring pulse oximetry reading.

23. **Basic response:** Escharotomy relieves pressure from circumferential full-thickness burns; excision removes non-viable tissue, tangentially or fascially; skin grafting, typically split-thickness, closes the wound following excision.



Value-added response: A value-added response notes that meshing a skin graft allows it to cover a larger area than the donor site alone would allow.

24. **Basic response:** Infection presents with spreading erythema and malodour and can progress to sepsis; hypertrophic scarring is managed with pressure garments and silicone; contractures restrict joint movement and are best prevented through early splinting.

Value-added response: A value-added response notes that sepsis in burns can present atypically due to the systemic inflammatory response of the burn itself.

25. **Basic response:** Major burns cause a hypermetabolic response requiring aggressive nutritional support, alongside long-term psychological effects and functional limitations from scarring that persist well after the wound has healed.

Value-added response: A value-added response notes that burns rehabilitation continues long after hospital discharge, requiring sustained multidisciplinary follow-up.

Answers to Pilot Questions [Series 3]

Part 3.1

1. Superficial burns involve only the epidermis with no blistering, while superficial partial-thickness burns extend into the upper dermis with blistering.
2. A full-thickness burn appears white, leathery, or charred and is characteristically painless.
3. The Wallace rule of nines divides the body into regions each representing approximately nine percent of total body surface area.
4. The Lund and Browder chart accounts for age-related differences in body proportion, giving a more accurate estimate in children.
5. Facial burns and singed nasal hair suggest inhalational injury.

Part 3.2

6. Structured resuscitation becomes necessary for burns exceeding approximately fifteen to twenty percent of total body surface area in adults.
7. The Parkland formula calculates the total fluid requirement over twenty-four hours, with half given in the first eight hours from injury.
8. Facial burns and carbonaceous sputum suggest inhalational injury requiring airway assessment.



9. Standard pulse oximetry cannot distinguish oxyhaemoglobin from carboxyhaemoglobin, giving a falsely reassuring reading.
10. The recommended approach is cooling with room-temperature running water for approximately twenty minutes, avoiding ice.

Part 3.3

11. Escharotomy is indicated when circumferential full-thickness burn restricts blood flow or ventilation.
12. Escharotomy incises skin, while fasciotomy extends the incision through the underlying fascia.
13. Early excision reduces infection risk, shortens hospital stay, and improves functional and cosmetic outcome.
14. Tangential excision removes thin layers sequentially, while fascial excision removes all tissue down to the fascia.
15. Split-thickness skin grafts are used to achieve wound closure following excision, and can be meshed to cover a larger area.

Part 3.4

1. Signs include increasing pain, spreading erythema, discolouration, malodour, and delayed healing.
2. The systemic inflammatory response to the burn itself can mimic early sepsis, complicating diagnosis.
3. Hypertrophic scarring is raised, thickened scar tissue, while a contracture is shortened scar tissue restricting joint movement.
4. Prevention through early splinting and physiotherapy is more effective than surgical release of an established contracture.
5. Nutritional support addresses the significantly increased energy expenditure and protein catabolism caused by major burns.

References and Attributions [Series 3]

1. Herndon, D. N. (2018). Total Burn Care (5th ed.). Elsevier.
2. Williams, N. S., Bulstrode, C. J. K., & O'Connell, P. R. (2018). Bailey and Love's Short Practice of Surgery (27th ed.). CRC Press.



3. Thorne, C. H., Chung, K. C., Gosain, A. K., Gurtner, G. C., Mehrara, B. J., Rubin, J. P., & Spear, S. L. (2013). *Grabb and Smith's Plastic Surgery* (7th ed.). Wolters Kluwer.
4. American Burn Association (2018). *Advanced Burn Life Support Course Manual*. American Burn Association.

Figures, Plates, Tables, and Boxes

1. Figure 3.1: A clinician assessing burn depth and capillary refill on a patient's forearm. AI-generated using the prompt: "Create a realistic clinical illustration titled Assessing a Burn Injury, showing a clinician in gloves carefully examining a burn wound on a patient's forearm, checking capillary refill with gentle pressure, emergency department setting. Clean clinical illustration style, no text."
2. Table 3.1: Comparing burn depth categories. AI-generated using the prompt: "Create a clean reference table titled Comparing Burn Depth Categories, listing depth, appearance, and sensation. Simple clinical reference table style with outside border."
3. Figure 3.2: A surgical team performing burn wound excision in an operating theatre. AI-generated using the prompt: "Create a realistic clinical illustration titled Burn Wound Excision in the Operating Theatre, showing a surgical team in theatre gowns and masks performing excision on a patient's burn wound, operating theatre setting with surgical instruments visible. Clean clinical illustration style, no text."
4. Table 3.2: Complications of burns and their management focus. AI-generated using the prompt: "Create a clean reference table titled Complications of Burns and Their Management Focus, listing complication, key feature, and management focus. Simple clinical reference table style with outside border."



Course code: SUG 601

Course title: Plastic Surgery and Burns

Course credit load: 2 Units

Series 4: Skin Grafts and Cleft Lip and Palate

- **Part 4.1: Principles and Types of Skin Grafts**
 - Sub Part 4.1.1: Split-thickness versus full-thickness skin grafts
 - Sub Part 4.1.2: Graft take and the phases of graft survival
 - Sub Part 4.1.3: Donor site selection and management
- **Part 4.2: Investigation and Treatment Planning for Skin Grafting**
 - Sub Part 4.2.1: Assessing the recipient bed before grafting
 - Sub Part 4.2.2: Investigations relevant to skin graft planning
 - Sub Part 4.2.3: Flaps as an alternative to grafting
- **Part 4.3: Complications of Skin Grafting**
 - Sub Part 4.3.1: Graft failure and its causes
 - Sub Part 4.3.2: Donor site complications
 - Sub Part 4.3.3: Long-term graft outcomes and contour deformity
- **Part 4.4: Cleft Lip and Palate**
 - Sub Part 4.4.1: Embryology and classification of cleft lip and palate
 - Sub Part 4.4.2: Clinical presentation and associated problems
 - Sub Part 4.4.3: Surgical timing and principles of repair

Introduction

A wound too large to close directly, a burn wound already excised and waiting for cover, an infant born with a visible gap in the lip, these are two very different clinical problems that nonetheless both sit at the heart of reconstructive plastic surgery. This Series turns to **skin grafts**,



the workhorse technique for closing many such wounds, and to **cleft lip and palate**, one of the most common congenital conditions a plastic surgeon will manage.

The aim of this Series is to equip you with an understanding of the types and principles of skin grafts, the assessment and investigation required before grafting, the complications that can follow, and the embryology, classification, presentation, and surgical timing of cleft lip and palate. Though these two topics might initially seem unrelated, both demand the same careful, structured surgical thinking that has run through this entire course, matching the technique precisely to the specific defect in front of you.

This Series opens with the **principles and types of skin grafts**, moves through **investigation and treatment planning for skin grafting** and **complications of skin grafting**, and closes with **cleft lip and palate**.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 4.1:** distinguish split-thickness from full-thickness skin grafts
- **SLO 4.2:** describe the phases of skin graft survival
- **SLO 4.3:** describe the assessment and investigation of a patient before skin grafting
- **SLO 4.4:** discuss flaps as an alternative to skin grafting
- **SLO 4.5:** list the causes and signs of skin graft failure
- **SLO 4.6:** describe donor site complications following skin grafting
- **SLO 4.7:** describe the classification and clinical presentation of cleft lip and palate
- **SLO 4.8:** discuss the timing and principles of surgical repair of cleft lip and palate

4.1 Principles and Types of Skin Grafts

4.1.1 split-thickness versus full-thickness skin grafts

Choosing how much skin to take, and why it matters

A **split-thickness skin graft** consists of the epidermis and a variable portion of the dermis, harvested using a dermatome, and offers the advantage of a donor site that can heal by re-epithelialisation from remaining dermal appendages, allowing the same site to be re-harvested if needed for extensive wounds. Split-thickness grafts can also be meshed to expand their surface area, making them well suited to covering large wounds such as extensive burns.



A **full-thickness skin graft** consists of the entire epidermis and dermis, leaving the donor site requiring direct closure or its own skin graft, since no dermal appendages remain to allow spontaneous re-epithelialisation. Full-thickness grafts contract less than split-thickness grafts after healing and provide a better colour and texture match, making them the preferred choice for smaller, cosmetically sensitive areas such as the face and hands, where the superior aesthetic outcome outweighs the more limited donor site options available.

Fill in the blank: A full-thickness skin graft leaves a donor site requiring direct closure or its own skin _____.

4.1.2 graft take and the phases of graft survival

How a graft actually becomes living tissue again

Successful **graft take** progresses through three overlapping phases: **plasmatic imbibition**, in the first two to three days, during which the graft absorbs nutrients passively from the underlying wound bed by diffusion before any new blood supply has formed; **inosculation**, from around day two to five, during which the graft's own vessels align and connect with the recipient bed's vessels; and **neovascularisation**, from around day four onwards, during which new blood vessels grow into the graft, establishing a genuinely independent blood supply.

Graft take depends critically on close, immobile contact between the graft and the underlying wound bed throughout these early phases, since any shearing movement or the accumulation of fluid or blood beneath the graft physically separates it from the bed and prevents the vascular connections from establishing properly, a mechanical principle that underlies most of the practical techniques used to dress and immobilise a fresh graft.

Fill in the blank: During plasmatic imbibition, the graft absorbs nutrients passively from the wound bed by _____.

4.1.3 donor site selection and management

Choosing where to take from and caring for it afterwards

Donor site selection balances several practical factors, including the required graft size and thickness, colour and texture match to the recipient site, and the donor site's own capacity to heal without unacceptable scarring or functional impairment, with the thigh, buttock, and scalp commonly used for split-thickness grafts, and the postauricular, supraclavicular, and groin regions commonly used for full-thickness grafts given their favourable skin quality and relatively inconspicuous scarring.



Donor site management for split-thickness grafts focuses on providing a moist, protected environment to support re-epithelialisation, typically using a semi-occlusive dressing left undisturbed for several days, since repeated dressing changes disturb the delicate new epithelium forming across the donor site and can meaningfully prolong the time to healing and increase discomfort for the patient.

Fill in the blank: Donor site management for split-thickness grafts aims to provide a moist, protected environment to support _____.



Figure 4.1: A meshed split-thickness skin graft applied over a prepared wound bed.

Pilot questions 4.1

- Distinguish split-thickness from full-thickness skin grafts. (Linked to SLO 4.1)
- Explain why full-thickness grafts are preferred for the face. (Linked to SLO 4.1)
- List the three phases of graft take in order. (Linked to SLO 4.2)
- Explain why immobility of the graft matters during the early phases of take. (Linked to SLO 4.2)
- List common donor sites for split-thickness and full-thickness grafts. (Linked to SLO 4.1)



4.2 Investigation and Treatment Planning for Skin Grafting

4.2.1 assessing the recipient bed before grafting

A graft is only as good as the bed it lands on

A successful skin graft depends fundamentally on a well-vascularised **recipient bed**, and structures with poor intrinsic blood supply, such as exposed bone without periosteum, exposed tendon without paratenon, or cartilage without perichondrium, generally cannot support a skin graft directly and require an alternative reconstructive option, typically a flap, instead.

The recipient bed should also be free of significant infection, since bacterial counts above a certain threshold prevent reliable graft take regardless of otherwise favourable conditions, and a period of wound bed preparation, applying the same principles covered earlier in this course, is frequently required before grafting can proceed with a reasonable expectation of success.

Fill in the blank: Exposed bone without periosteum generally cannot support a skin graft directly and instead requires a _____.

4.2.2 investigations relevant to skin graft planning

Confirming readiness before committing to surgery

Relevant investigations before skin grafting include wound swab or tissue culture to confirm the absence of significant bacterial burden, assessment of the patient's nutritional status, since adequate protein intake supports graft take, and, in patients with relevant risk factors, assessment of vascular supply to the recipient area, particularly in the lower limb, where poor perfusion can undermine graft survival regardless of technique.

Correcting any identified deficiency, whether infection, poor nutrition, or inadequate blood supply, before proceeding to grafting meaningfully improves the likelihood of successful take, and rushing to graft a bed that has not been adequately optimised is a recognised and avoidable cause of graft failure that thorough preoperative investigation and correction can largely prevent.

Fill in the blank: Adequate protein intake supports graft take, making nutritional status a relevant preoperative _____.



4.2.3 flaps as an alternative to grafting

When a graft simply will not do the job

A **flap**, unlike a graft, brings its own blood supply with it, either through a direct vascular pedicle or through microsurgical anastomosis to vessels at the recipient site, allowing it to survive on structures with poor intrinsic vascularity where a simple graft would fail, and to provide bulk, contour, and functional tissue, such as muscle, that a thin skin graft alone cannot replicate.

Flaps are broadly classified as local, regional, or free, depending on how far the tissue travels and whether the vascular pedicle is preserved intact or divided and reconnected microsurgically at the recipient site, and the choice between a graft and a flap depends on the nature of the defect, the quality of the recipient bed, and the functional and cosmetic demands of the specific reconstructive problem being addressed.

Fill in the blank: Unlike a graft, a flap brings its own _____ supply with it to the recipient site.

Table 4.1: Comparing skin grafts and flaps

Feature	Skin graft	Flap
Blood supply	Relies on recipient bed	Brings its own supply
Suitable recipient bed	Must be well vascularised	Can cover poorly vascularised structures
Tissue provided	Thin skin only	Can include bulk, muscle, or other tissue

Pilot questions 4.2

1. List structures that generally cannot support a skin graft directly. (Linked to SLO 4.3)
2. Explain why wound bed preparation may be required before grafting. (Linked to SLO 4.3)
3. List two investigations relevant to planning a skin graft. (Linked to SLO 4.3)
4. Explain how a flap differs fundamentally from a graft in terms of blood supply. (Linked to SLO 4.4)
5. Describe the classification of flaps as local, regional, or free. (Linked to SLO 4.4)



4.3 Complications of Skin Grafting

4.3.1 graft failure and its causes

Recognising the signs before the graft is lost entirely

Graft failure most commonly results from **haematoma** or **seroma** formation beneath the graft, physically separating it from the recipient bed and preventing the vascular connections required for take, or from **shearing**, movement between the graft and the bed that disrupts the delicate early vascular connections before they have had time to strengthen and mature.

Infection of the recipient bed is a further important cause of graft failure, since bacterial proliferation beneath the graft interferes directly with the processes of plasmatic imbibition and inosculation, and a failing graft typically appears dusky, dark, or black rather than the healthy pink colour of a taking graft, becomes non-adherent to the underlying bed, and may develop a foul odour if secondary infection is present, features that together should prompt prompt reassessment and, where appropriate, debridement and regrafting.

Fill in the blank: A failing graft typically appears dusky or dark rather than the healthy _____ colour of a taking graft.

4.3.2 donor site complications

The forgotten wound that also needs attention

Donor site complications include infection, delayed healing, and, particularly in split-thickness donor sites harvested too deeply, hypertrophic scarring or altered pigmentation, complications that are sometimes overlooked clinically because attention naturally focuses on the recipient site where the primary reconstructive problem was located.

Persistent pain at the donor site, out of proportion to what is typically expected, can indicate infection or a harvest depth deeper than intended, and should prompt reassessment of the donor site dressing and wound rather than being dismissed as ordinary postoperative discomfort, since untreated donor site problems can ultimately cause as much long-term morbidity for the patient as complications at the primary recipient site.

Fill in the blank: Persistent, out-of-proportion donor site pain can indicate infection or excessive harvest _____.



4.3.3 long-term graft outcomes and contour deformity

What a healed graft looks like months and years later

Even a successfully taken graft can produce a suboptimal long-term outcome, including noticeable **contour deformity**, where the grafted skin sits differently to the surrounding native skin due to differences in thickness, colour, or texture, an outcome more pronounced with split-thickness grafts than full-thickness grafts given the closer match the latter typically provides to the recipient site.

Graft contracture, progressive tightening of the healed graft over months, is more marked in split-thickness grafts and can be functionally significant when it occurs across a joint or the face, sometimes requiring later surgical revision, such as scar release or graft replacement with a full-thickness graft or flap, to restore acceptable function or appearance, underlining why the graft chosen at the outset genuinely matters for the patient's long-term outcome, not just the immediate closure of the wound.

Fill in the blank: Graft contracture, progressive tightening of the healed graft, is more marked in _____-thickness grafts.



Figure 4.2: A failing skin graft showing dusky discolouration and non-adherence.



Pilot questions 4.3

1. List two causes of skin graft failure. (Linked to SLO 4.5)
2. Describe the clinical appearance of a failing skin graft. (Linked to SLO 4.5)
3. List complications that can occur at a donor site. (Linked to SLO 4.6)
4. Explain the significance of persistent, out-of-proportion donor site pain. (Linked to SLO 4.6)
5. Explain why contour deformity is more pronounced with split-thickness than full-thickness grafts. (Linked to SLO 4.5)

4.4 Cleft Lip and Palate

4.4.1 embryology and classification of cleft lip and palate

How the face forms, and where things can go wrong

Cleft lip results from failure of fusion between the medial nasal and maxillary processes during early facial embryological development, typically around the fifth to sixth week of gestation, while **cleft palate** results from failure of fusion of the palatal shelves, occurring somewhat later in development, around the eighth to twelfth week, explaining why the two conditions, though often occurring together, arise from genuinely distinct embryological events and can occur independently of one another.

Cleft lip is classified as unilateral or bilateral, and as complete, extending through the full height of the lip into the nostril floor, or incomplete, where a bridge of tissue remains intact, while cleft palate is classified according to which structures are involved, ranging from an isolated cleft of the soft palate alone to a complete cleft extending through both the soft and hard palate, a classification system that directly informs the specific surgical approach eventually required for repair.

Fill in the blank: Cleft lip results from failure of fusion between the medial nasal and _____ processes.



4.4.2 clinical presentation and associated problems

More than a visible gap in the lip

Cleft lip is visibly apparent at birth, and cleft palate, particularly when isolated, can be less immediately obvious and is sometimes only identified on careful examination of the palate during the newborn check, underlining why a thorough oral examination is a genuinely essential part of routine newborn assessment rather than something that can safely be assumed normal without direct inspection.

Infants with cleft palate frequently experience significant **feeding difficulty**, since the cleft prevents the negative pressure required for effective breastfeeding or standard bottle feeding, and specialised feeding equipment or techniques are typically required from birth. Associated problems extend well beyond feeding, including a significantly increased risk of otitis media due to eustachian tube dysfunction, speech and language difficulties related to palatal function, and dental and orthodontic problems as the child grows, making cleft lip and palate a genuinely multidisciplinary condition requiring input well beyond surgery alone.

Fill in the blank: Infants with cleft palate frequently experience significant feeding _____ from birth.

4.4.3 surgical timing and principles of repair

Balancing developmental windows against surgical safety

Cleft lip repair is typically performed at around three months of age, once the infant has grown sufficiently to tolerate anaesthesia safely and gained adequate weight, following the informal but widely cited **rule of tens** as a rough guide, weight of at least ten pounds, haemoglobin of at least ten grams per decilitre, and age of at least ten weeks, though modern practice increasingly relies on individualised assessment rather than these figures alone.

Cleft palate repair is typically performed somewhat later, around nine to twelve months of age, balancing the benefit of earlier repair for speech development against the technical challenges and growth-related risks of operating on a very young infant, and the precise timing, technique, and staging of repair, whether the lip and palate are addressed in one or several planned procedures, varies between centres and is guided by established, multidisciplinary cleft care protocols developed specifically to optimise the child's long-term functional and aesthetic outcome.

Fill in the blank: Cleft palate repair is typically performed later than cleft lip repair, balancing speech development against surgical _____.



Table 4.2: Comparing cleft lip and cleft palate

Feature	Cleft lip	Cleft palate
Embryological timing	Fifth to sixth week of gestation	Eighth to twelfth week of gestation
Visibility at birth	Immediately visible	May require deliberate oral examination
Typical repair age	Around three months	Around nine to twelve months

Pilot questions 4.4

1. Explain the embryological basis of cleft lip. (Linked to SLO 4.7)
2. Distinguish complete from incomplete cleft lip. (Linked to SLO 4.7)
3. Describe the feeding difficulty associated with cleft palate. (Linked to SLO 4.7)
4. List an associated problem of cleft palate beyond feeding. (Linked to SLO 4.7)
5. Describe the rule of tens used to guide timing of cleft lip repair. (Linked to SLO 4.8)

Series Summary

This Series covered two distinct but equally important areas of reconstructive plastic surgery. Part 4.1 covered the principles and types of skin grafts, including graft take and donor site management, while Part 4.2 turned to assessment, investigation, and flaps as an alternative to grafting. Part 4.3 covered the complications of skin grafting, both at the recipient and donor sites, and Part 4.4 closed with the embryology, presentation, and surgical timing of cleft lip and palate.

You should now be able to distinguish types of skin graft, describe graft survival and complications, discuss flaps as an alternative, and describe the classification, presentation, and management timing of cleft lip and palate, meeting the outcomes set for this Series. Series 5 turns next to common cutaneous lesions and cosmetic surgery.

Glossary of Terms

1. **Cleft lip:** a congenital gap in the lip from failure of fusion of the medial nasal and maxillary processes.



2. **Cleft palate:** a congenital gap in the palate from failure of fusion of the palatal shelves.
3. **Contour deformity:** a visible difference between grafted skin and surrounding native skin.
4. **Flap:** reconstructive tissue transferred with its own intact or reconnected blood supply.
5. **Full-thickness skin graft:** a graft consisting of the entire epidermis and dermis.
6. **Graft contracture:** progressive tightening of a healed skin graft over months.
7. **Inosculation:** the phase of graft take during which graft and recipient vessels align and connect.
8. **Neovascularisation:** the phase of graft take during which new blood vessels grow into the graft.
9. **Plasmatic imbibition:** the early phase of graft take during which the graft absorbs nutrients by diffusion.
10. **Recipient bed:** the wound surface onto which a skin graft is applied.
11. **Rule of tens:** an informal guide for timing cleft lip repair based on weight, haemoglobin, and age.
12. **Split-thickness skin graft:** a graft consisting of the epidermis and a variable portion of the dermis.

Concept Check Questions [Series 4]

Objective questions

- A full-thickness skin graft leaves a donor site requiring direct closure or its own skin _____. (Linked to SLO 4.1)
- During plasmatic imbibition, the graft absorbs nutrients passively from the wound bed by _____. (Linked to SLO 4.2)
- Unlike a graft, a flap brings its own _____ supply with it to the recipient site. (Linked to SLO 4.4)
- A failing graft typically appears dusky or dark rather than the healthy _____ colour of a taking graft. (Linked to SLO 4.5)
- Cleft lip results from failure of fusion between the medial nasal and _____ processes. (Linked to SLO 4.7)

Short-answer questions

1. Explain why full-thickness grafts are preferred for the face. (Linked to SLO 4.1)
2. List structures that generally cannot support a skin graft directly. (Linked to SLO 4.3)
3. Describe the clinical appearance of a failing skin graft. (Linked to SLO 4.5)



4. Explain the significance of persistent, out-of-proportion donor site pain. (Linked to SLO 4.6)
5. Describe the feeding difficulty associated with cleft palate. (Linked to SLO 4.7)

Long-answer questions

6. Discuss the differences between split-thickness and full-thickness skin grafts and the phases of graft take. (Linked to SLO 4.1, 4.2)
7. Describe the assessment of the recipient bed before grafting and discuss flaps as an alternative to grafting. (Linked to SLO 4.3, 4.4)
8. Discuss the causes and clinical features of skin graft failure and donor site complications. (Linked to SLO 4.5, 4.6)
9. Describe the embryology and classification of cleft lip and palate. (Linked to SLO 4.7)
10. Discuss the surgical timing and principles of repair of cleft lip and palate. (Linked to SLO 4.8)

Answers to Concept Check Questions [Series 4]

Objective questions

11. Graft.
12. Diffusion.
13. Blood.
14. Pink.
15. Maxillary.

Short-answer questions

16. Full-thickness grafts contract less and provide a better colour and texture match, giving a superior cosmetic outcome on the face.
17. Exposed bone without periosteum, exposed tendon without paratenon, and cartilage without perichondrium cannot generally support a graft.
18. A failing graft appears dusky or dark, becomes non-adherent to the bed, and may develop a foul odour if infected.
19. Persistent, disproportionate pain can indicate donor site infection or excessive harvest depth requiring reassessment.
20. Cleft palate prevents the negative pressure required for effective breastfeeding or standard bottle feeding.



Long-answer questions

21. **Basic response:** Split-thickness grafts include epidermis and partial dermis with a re-epithelialising donor site; full-thickness grafts include full dermis with a donor site requiring closure; graft take proceeds through plasmatic imbibition, inosculation, and neovascularisation.

Value-added response: A value-added response notes that immobility between graft and bed is essential throughout these early phases to allow vascular connections to establish.

22. **Basic response:** The recipient bed must be well vascularised and free of significant infection; flaps bring their own blood supply and can cover poorly vascularised structures or provide bulk tissue that grafts cannot.

Value-added response: A value-added response notes that correcting infection, poor nutrition, or inadequate blood supply before grafting meaningfully improves the likelihood of successful take.

23. **Basic response:** Graft failure results from haematoma, seroma, shearing, or infection, presenting as dusky, non-adherent tissue; donor site complications include infection, delayed healing, and scarring, particularly with deep harvest.

Value-added response: A value-added response notes that donor site problems are sometimes overlooked because attention focuses on the recipient site, yet can cause equal long-term morbidity.

24. **Basic response:** Cleft lip results from failure of fusion of the medial nasal and maxillary processes around weeks five to six; cleft palate results from failure of palatal shelf fusion around weeks eight to twelve; both are classified by extent and laterality.

Value-added response: A value-added response notes that the two conditions arise from distinct embryological events and can occur independently of one another.

25. **Basic response:** Cleft lip repair typically occurs around three months, guided informally by the rule of tens; cleft palate repair typically occurs around nine to twelve months, balancing speech development against surgical risk in a young infant.

Value-added response: A value-added response notes that modern practice increasingly relies on individualised assessment rather than the rule of tens figures alone.



Answers to Pilot Questions [Series 4]

Part 4.1

1. Split-thickness grafts include epidermis and partial dermis, while full-thickness grafts include the entire dermis.
2. Full-thickness grafts contract less and give a better colour and texture match on the face.
3. The three phases are plasmatic imbibition, inosculation, and neovascularisation.
4. Immobility prevents shearing that would disrupt the delicate early vascular connections.
5. The thigh, buttock, and scalp are common split-thickness donor sites; the postauricular and groin regions are common full-thickness donor sites.

Part 4.2

6. Exposed bone without periosteum, tendon without paratenon, and cartilage without perichondrium generally cannot support a graft.
7. Wound bed preparation may be required to reduce bacterial burden and optimise the bed before grafting proceeds.
8. Wound swab or tissue culture and assessment of nutritional status are relevant investigations before grafting.
9. A flap brings its own blood supply, either through an intact pedicle or microsurgical reconnection, while a graft relies on the recipient bed.
10. Local flaps stay near the defect, regional flaps travel further with an intact pedicle, and free flaps are fully detached and reconnected microscopically.

Part 4.3

11. Haematoma or seroma formation and shearing are two recognised causes of graft failure.
12. A failing graft appears dusky or dark, becomes non-adherent, and may develop a foul odour.
13. Donor site complications include infection, delayed healing, hypertrophic scarring, and altered pigmentation.
14. Persistent, disproportionate pain can indicate infection or excessive harvest depth requiring reassessment.
15. Split-thickness grafts contract more and match the surrounding skin less closely than full-thickness grafts.

Part 4.4

1. Cleft lip results from failure of fusion of the medial nasal and maxillary processes during early facial development.



2. Complete cleft lip extends through the full height of the lip into the nostril floor, while incomplete cleft lip leaves a bridge of intact tissue.
3. Cleft palate prevents the negative pressure required for effective breastfeeding or bottle feeding.
4. Increased risk of otitis media is a recognised associated problem of cleft palate beyond feeding difficulty.
5. The rule of tens suggests repair once weight reaches at least ten pounds, haemoglobin at least ten grams per decilitre, and age at least ten weeks.

References and Attributions [Series 4]

1. Thorne, C. H., Chung, K. C., Gosain, A. K., Gurtner, G. C., Mehrara, B. J., Rubin, J. P., & Spear, S. L. (2013). *Grabb and Smith's Plastic Surgery* (7th ed.). Wolters Kluwer.
2. Williams, N. S., Bulstrode, C. J. K., & O'Connell, P. R. (2018). *Bailey and Love's Short Practice of Surgery* (27th ed.). CRC Press.
3. Losee, J. E., & Kirschner, R. E. (2016). *Comprehensive Cleft Care* (2nd ed.). Thieme.
4. Mathes, S. J. (2006). *Plastic Surgery: The Skin and Soft Tissue Reconstruction* (2nd ed.). Saunders.

Figures, Plates, Tables, and Boxes

1. Figure 4.1: A meshed split-thickness skin graft applied over a prepared wound bed. AI-generated using the prompt: "Create a realistic clinical illustration titled A Meshed Split-Thickness Skin Graft, showing a close-up view of a meshed skin graft with its characteristic lattice pattern freshly applied over a granulating wound bed on a limb. Clean clinical illustration style, no text."
2. Table 4.1: Comparing skin grafts and flaps. AI-generated using the prompt: "Create a clean reference table titled Comparing Skin Grafts and Flaps, listing feature, skin graft, and flap across blood supply, suitable recipient bed, and tissue provided. Simple clinical reference table style with outside border."
3. Figure 4.2: A failing skin graft showing dusky discolouration and non-adherence. AI-generated using the prompt: "Create a realistic clinical illustration titled Signs of Skin Graft Failure, showing a close-up view of a skin graft on a limb with dusky, dark discolouration and lifted, non-adherent edges, consistent with early graft failure. Clean clinical illustration style, no text."



4. Table 4.2: Comparing cleft lip and cleft palate. AI-generated using the prompt: "Create a clean reference table titled Comparing Cleft Lip and Cleft Palate, listing feature, cleft lip, and cleft palate across embryological timing, visibility at birth, and typical repair age. Simple clinical reference table style with outside border."



Course code: SUG 601

Course title: Plastic Surgery and Burns

Course credit load: 2 Units

Series 5: Common Cutaneous Lesions and Cosmetic Surgery

- **Part 5.1: Common Cutaneous Lesions: Treatment Principles**
 - Sub Part 5.1.1: Excision biopsy technique for cutaneous lesions
 - Sub Part 5.1.2: Treatment of benign cutaneous lesions
 - Sub Part 5.1.3: Treatment of malignant skin lesions
- **Part 5.2: Complications of Cutaneous Lesion Treatment**
 - Sub Part 5.2.1: Wound infection and dehiscence after excision
 - Sub Part 5.2.2: Hypertrophic scarring after lesion excision
 - Sub Part 5.2.3: Recurrence and incomplete excision
- **Part 5.3: Principles of Cosmetic Surgery**
 - Sub Part 5.3.1: Patient selection and psychological assessment in cosmetic surgery
 - Sub Part 5.3.2: Common cosmetic surgical procedures
 - Sub Part 5.3.3: Informed consent and realistic expectation setting
- **Part 5.4: Complications of Cosmetic Surgery**
 - Sub Part 5.4.1: Early complications of cosmetic surgical procedures
 - Sub Part 5.4.2: Late and unsatisfactory cosmetic outcomes
 - Sub Part 5.4.3: Revision surgery and long-term follow-up



Introduction

This closing Series brings together two threads that have run through the entire course, the treatment of the common cutaneous lesions first recognised back in Series 1, and a field where the line between medical necessity and patient preference is drawn with particular care, **cosmetic surgery**. Treating a lesion well and treating a patient's cosmetic wishes well both demand the same underlying discipline: sound technique, honest counselling, and the ability to anticipate and manage complications before they arise.

The aim of this Series is to equip you with an understanding of the treatment of common cutaneous lesions and its complications, and the principles of cosmetic surgery, including patient selection, common procedures, informed consent, and the management of complications and unsatisfactory outcomes. Cosmetic surgery in particular carries a distinct set of ethical and communication demands that deserve careful attention alongside the surgical technique itself.

This Series opens with **common cutaneous lesions: treatment principles**, moves through **complications of cutaneous lesion treatment** and **principles of cosmetic surgery**, and closes with **complications of cosmetic surgery**.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 5.1:** describe the technique of excision biopsy for a cutaneous lesion
- **SLO 5.2:** discuss the treatment of benign and malignant cutaneous lesions
- **SLO 5.3:** list the complications of cutaneous lesion excision
- **SLO 5.4:** describe the management of recurrence and incomplete excision
- **SLO 5.5:** discuss patient selection and psychological assessment in cosmetic surgery
- **SLO 5.6:** describe common cosmetic surgical procedures
- **SLO 5.7:** list the complications of cosmetic surgery
- **SLO 5.8:** discuss the principles of informed consent and management of unsatisfactory cosmetic outcomes

5.1 Common Cutaneous Lesions: Treatment Principles

5.1.1 excision biopsy technique for cutaneous lesions



Removing a lesion correctly the first time

Excision biopsy removes a lesion in its entirety along with a margin of surrounding normal tissue, typically performed as an elliptical incision aligned with the natural skin tension lines to minimise tension on closure and optimise the eventual scar, and the excised specimen orientated for the pathologist using a marking suture so that any involved margin can be precisely localised if further treatment is required.

The width of the excision margin depends on the suspected diagnosis, with a narrow margin generally sufficient for a benign lesion, but a wider, specifically defined margin required for a confirmed or suspected malignant lesion, since an inadequate margin around a malignancy risks leaving residual disease behind even when the visible lesion itself appears to have been completely removed.

Fill in the blank: An excision biopsy specimen is orientated for the pathologist using a marking _____.

5.1.2 treatment of benign cutaneous lesions

Matching the intervention to the lesion and the patient's wishes

Treatment of **benign cutaneous lesions**, such as naevi, cysts, and lipomas already covered in Series 1, is often elective and guided as much by patient preference, cosmetic concern, or recurrent symptoms such as infection as by strict medical necessity, and simple observation without intervention remains an entirely appropriate option for a lesion that is genuinely asymptomatic and has stable, reassuring features.

Where treatment is chosen, options extend beyond excision to include cryotherapy for certain superficial lesions, curettage and cautery for others, and laser treatment for selected vascular or pigmented lesions, and selecting the most appropriate technique for a given benign lesion depends on its type, size, location, and the cosmetic priorities the individual patient brings to the consultation.

Fill in the blank: Simple observation without intervention remains appropriate for a genuinely asymptomatic lesion with stable, _____ features.

5.1.3 treatment of malignant skin lesions

Curative surgery with attention to margins and reconstruction

Treatment of confirmed **malignant skin lesions**, basal cell carcinoma, squamous cell carcinoma, and malignant melanoma, centres on complete surgical excision with clear margins, with the



specific margin width guided by lesion type, subtype, and, for melanoma, the histological depth of invasion, since deeper melanomas require progressively wider excision margins to achieve an adequate oncological result.

Following excision, wound closure options range from direct closure for small defects, through local flaps or skin grafts for larger defects, particularly in cosmetically or functionally sensitive areas such as the face, and reconstructive planning should ideally be considered before the excision itself, since the size and shape of the eventual defect, and therefore the closure technique required, can often be anticipated in advance.

Fill in the blank: Deeper melanomas require progressively _____ excision margins to achieve an adequate oncological result.



Figure 5.1: A surgeon performing an elliptical excision biopsy aligned with skin tension lines.

Pilot questions 5.1

- Describe the standard technique for excision biopsy. (Linked to SLO 5.1)
- Explain why the excision margin differs between benign and malignant lesions. (Linked to SLO 5.1)



- List treatment options for a benign cutaneous lesion beyond excision. (Linked to SLO 5.2)
- Explain when observation without treatment is appropriate for a benign lesion. (Linked to SLO 5.2)
- Explain why melanoma excision margins vary with depth of invasion. (Linked to SLO 5.2)

5.2 Complications of Cutaneous Lesion Treatment

5.2.1 wound infection and dehiscence after excision

Early problems in an otherwise routine procedure

Wound infection following lesion excision presents with increasing pain, spreading erythema, discharge, and, in more significant cases, systemic signs such as fever, and management involves wound swab, appropriate antibiotic therapy where clinically indicated, and, where a collection has formed, drainage of any localised abscess.

Wound dehiscence, separation of the closed wound edges, can result from infection, excessive tension on closure, or premature removal of sutures, and management depends on the extent and depth of separation, ranging from simple dressing and delayed healing by secondary intention for superficial dehiscence to formal surgical resuturing for more significant separation, particularly where the wound edges are widely separated or a deeper structure is exposed.

Fill in the blank: Wound dehiscence can result from infection, excessive tension, or premature suture _____.

5.2.2 hypertrophic scarring after lesion excision

A cosmetic complication with a genuine functional dimension too

Hypertrophic scarring following lesion excision, already discussed in the context of general wound healing earlier in this course, remains a relevant complication here, particularly when excision crosses areas of high skin tension or when closure was performed under excessive tension rather than along the natural skin tension lines described earlier in this Part.

Management follows the same principles established previously, silicone sheeting, pressure therapy, and, for problematic or symptomatic scars, surgical revision, though prevention through careful attention to incision placement and tension-free closure at the time of the original



excision remains considerably more effective than managing an established hypertrophic scar after the fact.

Fill in the blank: Prevention of hypertrophic scarring through careful incision placement is more effective than managing an established _____ scar.

5.2.3 recurrence and incomplete excision

When the histology reveals the job is not yet finished

Incomplete excision, identified when histopathology reports an involved margin, requires further surgery, typically a wider re-excision of the affected margin, since leaving residual malignant tissue in place carries a genuine risk of local recurrence and, for some lesion types, progression to a more advanced stage of disease if left unaddressed.

Recurrence following apparently complete excision, though less common, can still occur and underlines the importance of scheduled follow-up review after treatment of any confirmed malignant skin lesion, allowing early detection and prompt further treatment should recurrence develop, an approach considerably more effective than relying on the patient alone to notice and report a subtle change at the original excision site.

Fill in the blank: Incomplete excision, identified when histopathology reports an involved _____, requires further surgery.

Table 5.1: Complications of cutaneous lesion excision and their management

Complication	Key feature	Management
Wound infection	Erythema, discharge, pain	Swab, antibiotics, drainage if collection
Wound dehiscence	Separation of wound edges	Dressing or resuturing depending on severity
Incomplete excision	Involved margin on histopathology	Wider re-excision

Pilot questions 5.2

1. Describe the clinical features of wound infection after excision. (Linked to SLO 5.3)
2. List causes of wound dehiscence. (Linked to SLO 5.3)
3. Explain how management of dehiscence depends on its severity. (Linked to SLO 5.3)
4. Describe the management of an incomplete excision. (Linked to SLO 5.4)



5. Explain why scheduled follow-up matters after treatment of a malignant skin lesion.
(Linked to SLO 5.4)

5.3 Principles of Cosmetic Surgery

5.3.1 patient selection and psychological assessment in cosmetic surgery

Ensuring surgery is the right answer for this particular patient

Careful **patient selection** is arguably the single most important determinant of a satisfactory cosmetic surgery outcome, since technically excellent surgery performed on an unsuitable patient, one with unrealistic expectations, significant underlying psychological distress, or a specific concern surgery genuinely cannot resolve, rarely produces a satisfied patient regardless of the surgical result itself.

Body dysmorphic disorder, a preoccupation with a perceived appearance flaw that is minimal or absent to an objective observer, is a particularly important condition to screen for in cosmetic surgery consultations, since patients with this condition are characteristically dissatisfied with surgical outcomes regardless of technical success, and proceeding with surgery in an unscreened patient with significant body dysmorphic disorder is now widely recognised as a preventable cause of poor outcome and patient distress.

Fill in the blank: Body dysmorphic disorder involves preoccupation with a perceived flaw that is minimal or _____ to an observer.

5.3.2 common cosmetic surgical procedures

A broad field covering face, body, and skin

Common cosmetic surgical procedures span facial procedures such as rhytidectomy, commonly known as a facelift, blepharoplasty for the eyelids, and rhinoplasty for the nose, body contouring procedures such as liposuction and abdominoplasty, and breast procedures including augmentation, reduction, and mastopexy, each with a distinct set of indications, techniques, and expected outcomes that a patient should understand clearly before proceeding.

Minimally invasive cosmetic procedures, including botulinum toxin injections and dermal fillers, have grown considerably in popularity given their comparatively lower risk profile, shorter recovery time, and reversibility or gradual resolution of effect compared with surgical



alternatives, though they still carry their own specific risks and require the same careful patient selection and honest counselling as any surgical procedure.

Fill in the blank: Minimally invasive cosmetic procedures include botulinum toxin injections and dermal _____.

5.3.3 informed consent and realistic expectation setting

The conversation that makes or breaks patient satisfaction

Informed consent in cosmetic surgery demands a particularly thorough discussion of risks, benefits, alternatives, and realistic expected outcomes, since, unlike most other surgery, cosmetic procedures are elective and performed on patients who are, by definition, not suffering from a medical condition that makes surgery a necessity, raising the ethical bar for ensuring the patient's decision is genuinely informed and voluntary.

Setting **realistic expectations** before surgery, including honest discussion of what the procedure can and cannot achieve, the expected recovery course, and the range of possible outcomes rather than only the best-case scenario, meaningfully reduces the risk of postoperative dissatisfaction even when the surgical result itself is technically successful, since patient satisfaction depends heavily on how closely the actual outcome matches what the patient was genuinely led to expect beforehand.

Fill in the blank: Setting realistic expectations before surgery meaningfully reduces the risk of postoperative _____.





Figure 5.2: A surgeon marking preoperative incision lines ahead of a facelift procedure.

Pilot questions 5.3

1. Explain why patient selection is critical to cosmetic surgery outcomes. (Linked to SLO 5.5)
2. Describe body dysmorphic disorder and its relevance to cosmetic surgery. (Linked to SLO 5.5)
3. List three categories of common cosmetic surgical procedure. (Linked to SLO 5.6)
4. Explain the appeal of minimally invasive cosmetic procedures. (Linked to SLO 5.6)
5. Explain why informed consent carries particular ethical weight in cosmetic surgery. (Linked to SLO 5.8)

5.4 Complications of Cosmetic Surgery

5.4.1 early complications of cosmetic surgical procedures

The same surgical risks, in an elective context

Early complications of cosmetic surgery, bleeding, haematoma, infection, and wound healing problems, are broadly similar to those of any other surgical procedure, but carry particular



significance in the cosmetic setting given the elective nature of the surgery and the correspondingly heightened patient expectation of a smooth, uncomplicated recovery.

Prompt recognition and management of early complications, following the same principles established elsewhere in this course, remains essential, and clear preoperative counselling about the possibility of complications, even in a low-risk elective procedure, helps maintain patient trust and satisfaction should a complication nonetheless arise despite appropriate surgical technique.

Fill in the blank: Early complications of cosmetic surgery include bleeding, haematoma, infection, and wound healing _____.

5.4.2 late and unsatisfactory cosmetic outcomes

When healing is complete but satisfaction is not

Unsatisfactory cosmetic outcomes can occur even in the complete absence of a technical surgical complication, since patient satisfaction depends on the match between the achieved result and the patient's expectations, and a technically well-executed procedure can still leave a patient dissatisfied if their expectations were unrealistic or inadequately addressed during preoperative counselling.

Genuine technical late complications, such as asymmetry, contour irregularity, or implant-related problems in breast surgery, also occur and require careful, honest assessment to distinguish a true technical problem warranting revision from a subjective dissatisfaction better addressed through further counselling and support rather than repeat surgery, a distinction that requires considerable clinical judgement and experience to draw correctly.

Fill in the blank: A technically well-executed procedure can still leave a patient dissatisfied if expectations were _____.

5.4.3 revision surgery and long-term follow-up

Managing the patient who is not yet satisfied

Revision surgery should only be undertaken after a genuine technical problem has been carefully identified and a further honest discussion of realistic expected outcomes has taken place, since operating again in response to purely subjective dissatisfaction, without addressing the underlying expectation mismatch, risks repeating the same disappointing outcome a second time.



Long-term follow-up after cosmetic surgery allows both technical outcomes and patient satisfaction to be monitored over time, supports early identification of any genuine late complication, and provides an opportunity for ongoing counselling and support, closing the loop on the careful, patient-centred approach that should run through every stage of cosmetic surgical care from the very first consultation.

Fill in the blank: Revision surgery should only follow a carefully identified genuine _____ problem and honest further discussion.

Table 5.2: Complications of cosmetic surgery and their management approach

Complication	Timing	Management approach
Bleeding or infection	Early	Standard surgical management principles
Asymmetry or contour irregularity	Late, technical	Assessment for possible revision surgery

Pilot questions 5.4

1. List the early complications of cosmetic surgery. (Linked to SLO 5.7)
2. Explain why preoperative counselling about complications matters even for low-risk procedures. (Linked to SLO 5.7)
3. Distinguish a genuine technical complication from subjective dissatisfaction. (Linked to SLO 5.8)
4. Explain when revision surgery is appropriately considered. (Linked to SLO 5.8)
5. Describe the value of long-term follow-up after cosmetic surgery. (Linked to SLO 5.8)

Series Summary

This final Series brought the course to a close with the treatment of common cutaneous lesions and the principles of cosmetic surgery. Part 5.1 covered excision biopsy technique and the treatment of benign and malignant cutaneous lesions, while Part 5.2 turned to the complications of that treatment, infection, dehiscence, scarring, and incomplete excision. Part 5.3 covered the principles of cosmetic surgery, patient selection, common procedures, and informed consent, and



Part 5.4 closed with the complications and unsatisfactory outcomes that can follow cosmetic surgery.

You should now be able to describe excision biopsy technique, discuss lesion treatment and its complications, and describe the principles and complications of cosmetic surgery, meeting the outcomes set for this Series. Across the full course, Series 1 covered the symptoms and signs of common lesions, Series 2 covered the principles of ulcer management, Series 3 covered the assessment and management of burns, Series 4 covered skin grafts and cleft lip and palate, and this Series has closed the course with common cutaneous lesions and cosmetic surgery, together forming a comprehensive foundation in plastic surgery and burns.

Glossary of Terms

1. **Blepharoplasty:** cosmetic surgical procedure performed on the eyelids.
2. **Body dysmorphic disorder:** preoccupation with a perceived appearance flaw minimal or absent to an observer.
3. **Excision biopsy:** removal of a lesion in its entirety along with a margin of surrounding tissue.
4. **Incomplete excision:** excision in which histopathology reports an involved margin.
5. **Informed consent:** voluntary agreement to treatment based on a thorough understanding of risks and benefits.
6. **Recurrence:** the return of a lesion after apparently successful treatment.
7. **Revision surgery:** further surgery to correct a genuine technical problem from a previous procedure.
8. **Rhinoplasty:** cosmetic surgical procedure performed on the nose.
9. **Rhytidectomy:** a facelift, a cosmetic surgical procedure to address facial ageing.
10. **Skin tension lines:** natural lines of tension in the skin used to guide incision placement.
11. **Wound dehiscence:** separation of the edges of a previously closed surgical wound.
12. **Wound infection:** infection of a surgical wound presenting with erythema, discharge, and pain.

Concept Check Questions [Series 5]

Objective questions

- An excision biopsy specimen is orientated for the pathologist using a marking _____.
(Linked to SLO 5.1)



- Deeper melanomas require progressively _____ excision margins to achieve an adequate oncological result. (Linked to SLO 5.2)
- Incomplete excision is identified when histopathology reports an involved _____. (Linked to SLO 5.4)
- Body dysmorphic disorder involves preoccupation with a perceived flaw that is minimal or _____ to an observer. (Linked to SLO 5.5)
- A technically well-executed procedure can still leave a patient dissatisfied if expectations were _____. (Linked to SLO 5.8)

Short-answer questions

1. Explain why the excision margin differs between benign and malignant lesions. (Linked to SLO 5.1)
2. List causes of wound dehiscence. (Linked to SLO 5.3)
3. Describe body dysmorphic disorder and its relevance to cosmetic surgery. (Linked to SLO 5.5)
4. List three categories of common cosmetic surgical procedure. (Linked to SLO 5.6)
5. Distinguish a genuine technical complication from subjective dissatisfaction. (Linked to SLO 5.8)

Long-answer questions

6. Discuss the technique of excision biopsy and the treatment of benign and malignant cutaneous lesions. (Linked to SLO 5.1, 5.2)
7. Describe the complications of cutaneous lesion excision and the management of recurrence and incomplete excision. (Linked to SLO 5.3, 5.4)
8. Discuss patient selection and psychological assessment in cosmetic surgery, including the relevance of body dysmorphic disorder. (Linked to SLO 5.5)
9. Describe common cosmetic surgical procedures and the principles of informed consent. (Linked to SLO 5.6, 5.8)
10. Discuss the complications of cosmetic surgery and the management of unsatisfactory outcomes. (Linked to SLO 5.7, 5.8)

Answers to Concept Check Questions [Series 5]

Objective questions

11. Suture.
12. Wider.
13. Margin.



14. Absent.
15. Unrealistic.

Short-answer questions

16. A narrow margin generally suffices for benign lesions, while a wider, specifically defined margin is required for malignant lesions to avoid residual disease.
17. Infection, excessive tension on closure, and premature suture removal can all cause wound dehiscence.
18. Body dysmorphic disorder involves preoccupation with a minimal or absent flaw, and affected patients are characteristically dissatisfied regardless of surgical success.
19. Common categories include facial procedures, body contouring procedures, and breast procedures.
20. A genuine technical complication is an objective surgical problem such as asymmetry, while subjective dissatisfaction reflects a mismatch with patient expectations despite technical success.

Long-answer questions

21. **Basic response:** Excision biopsy removes a lesion with a margin, aligned with skin tension lines, and orientated with a marking suture; benign lesions may be observed or treated electively, while malignant lesions require excision with margins determined by type and depth.

Value-added response: A value-added response notes that reconstructive planning should ideally be considered before excision, since the eventual defect can often be anticipated in advance.

22. **Basic response:** Complications include wound infection, dehiscence, and hypertrophic scarring; incomplete excision with an involved margin requires wider re-excision, and recurrence requires scheduled follow-up for early detection.

Value-added response: A value-added response notes that prevention of hypertrophic scarring through careful technique at the original excision is more effective than managing an established scar.

23. **Basic response:** Patient selection is critical to outcome satisfaction; body dysmorphic disorder should be screened for, since affected patients are characteristically dissatisfied with surgery regardless of technical success.



Value-added response: A value-added response notes that proceeding with surgery in an unscreened patient with significant body dysmorphic disorder is a preventable cause of poor outcome.

24. **Basic response:** Common procedures include facial, body contouring, and breast procedures, alongside minimally invasive options; informed consent requires thorough discussion of risks, benefits, alternatives, and realistic outcomes given the elective nature of the surgery.

Value-added response: A value-added response notes that setting realistic expectations before surgery meaningfully reduces the risk of postoperative dissatisfaction even with a technically successful result.

25. **Basic response:** Early complications resemble those of any surgery; late outcomes may reflect genuine technical problems or subjective dissatisfaction, each requiring a different management approach, from revision surgery to further counselling.

Value-added response: A value-added response notes that revision surgery should only follow careful identification of a genuine technical problem, since operating in response to purely subjective dissatisfaction risks repeating the same outcome.

Answers to Pilot Questions [Series 5]

Part 5.1

1. Excision biopsy is performed as an elliptical incision along skin tension lines, with the specimen orientated using a marking suture.
2. Malignant lesions require wider margins to avoid leaving residual disease, while benign lesions require only a narrow margin.
3. Options include cryotherapy, curettage and cautery, and laser treatment.
4. Observation is appropriate when a lesion is asymptomatic with stable, reassuring features.
5. Deeper melanomas carry greater risk, requiring progressively wider margins to achieve an adequate oncological result.



Part 5.2

6. Features include increasing pain, spreading erythema, discharge, and sometimes systemic signs such as fever.
7. Infection, excessive tension, and premature suture removal can all cause dehiscence.
8. Superficial dehiscence may be managed with dressing and delayed healing, while significant separation requires formal resuturing.
9. An incomplete excision requires wider re-excision of the affected margin.
10. Scheduled follow-up allows early detection of recurrence and prompt further treatment.

Part 5.3

11. Technically excellent surgery on an unsuitable patient rarely produces a satisfied outcome, making selection critical.
12. Body dysmorphic disorder involves preoccupation with a minimal or absent flaw, and affected patients are characteristically dissatisfied regardless of surgical success.
13. Categories include facial procedures, body contouring procedures, and breast procedures.
14. Minimally invasive procedures carry lower risk, shorter recovery, and reversible or gradually resolving effects.
15. Cosmetic surgery is elective, performed on patients without medical necessity, raising the ethical bar for informed, voluntary decision-making.

Part 5.4

1. Early complications include bleeding, haematoma, infection, and wound healing problems.
2. Preoperative counselling maintains patient trust and satisfaction should a complication arise despite appropriate technique.
3. A genuine technical complication is an objective problem such as asymmetry, while subjective dissatisfaction reflects an expectation mismatch.
4. Revision surgery is appropriate only after a genuine technical problem is carefully identified and expectations are further discussed.
5. Long-term follow-up monitors outcomes and satisfaction over time and identifies genuine late complications early.



References and Attributions [Series 5]

1. Thorne, C. H., Chung, K. C., Gosain, A. K., Gurtner, G. C., Mehrara, B. J., Rubin, J. P., & Spear, S. L. (2013). *Grabb and Smith's Plastic Surgery* (7th ed.). Wolters Kluwer.
2. Williams, N. S., Bulstrode, C. J. K., & O'Connell, P. R. (2018). *Bailey and Love's Short Practice of Surgery* (27th ed.). CRC Press.
3. Weller, R., Hunter, J., & Mann, M. (2015). *Clinical Dermatology* (5th ed.). Wiley-Blackwell.
4. Neligan, P. C. (2017). *Plastic Surgery: Aesthetic Surgery* (4th ed.). Elsevier.

Figures, Plates, Tables, and Boxes

1. Figure 5.1: A surgeon performing an elliptical excision biopsy aligned with skin tension lines. AI-generated using the prompt: "Create a realistic clinical illustration titled Elliptical Excision Biopsy Technique, showing a surgeon's gloved hands making an elliptical incision around a marked skin lesion on a patient's arm, surgical instruments and drapes visible. Clean clinical illustration style, no text."
2. Table 5.1: Complications of cutaneous lesion excision and their management. AI-generated using the prompt: "Create a clean reference table titled Complications of Cutaneous Lesion Excision and Their Management, listing complication, key feature, and management. Simple clinical reference table style with outside border."
3. Figure 5.2: A surgeon marking preoperative incision lines ahead of a facelift procedure. AI-generated using the prompt: "Create a realistic clinical illustration titled Preoperative Marking for Facelift Surgery, showing a surgeon using a marking pen to draw planned incision lines along a patient's hairline and jaw before a rhytidectomy, consultation room setting. Clean clinical illustration style, no text."
4. Table 5.2: Complications of cosmetic surgery and their management approach. AI-generated using the prompt: "Create a clean reference table titled Complications of Cosmetic Surgery and Their Management Approach, listing complication, timing, and management approach. Simple clinical reference table style with outside border."

