COURSE OUTLINE

DermEX Skin Cancer Surgical Bootcamp

FOUNDATIONAL & INTERMEDIATE SKILLS

phn NORTHERN QUEENSLAND
An Australian Government Initiative

CHECKUP

Course Overview

This course is designed to take participants from foundational procedural dermatologic surgery skills through to structured reconstructive decision-making using local flaps and skin grafts. It combines core surgical principles, anatomy-based planning, technical execution, complication recognition, and practical clinical judgment.

The curriculum utilises a staged delivery model combining theory, case-based discussion, simulation, supervised hands-on practice, and reflective assessment. The structure emphasises safe progression from elliptical excision and suturing to advanced flap design, grafting and real-world surgical planning.

Target Audience and Prerequisites

Target Audience: General practitioners, skin cancer clinicians, dermatology trainees, surgical trainees, and other medical practitioners undertaking office-based skin surgery or wishing to extend their reconstructive capability within an appropriately governed scope of practice.

Required Prerequisites:

- Working knowledge of skin anatomy, lesion assessment, aseptic technique, informed consent, and local anaesthesia (All expected)
- Existing familiarity with basic instrument handling and simple interrupted suturing (All expected)
- Prior experience performing shave, punch, or simple excision procedures (Helpful)
- Understanding of pathology workflows, specimen orientation, margins and post-operative wound care (Helpful)

Course Learning Outcomes

1. **Select** the most appropriate biopsy or excision technique for a given lesion and anatomical site.
2. **Design and execute** elliptical excisions aligned to relaxed skin tension lines (RSTLs) or BEST lines, demonstrating precise blade handling and tissue respect.
3. **Apply** effective haemostasis using pressure, electrosurgery, topical agents and suture ligation.

4. **Undermine** safely in the correct anatomical plane while protecting vital structures and improving wound mobility.
5. **Choose** appropriate suture materials and perform layered closure with secure knot technique.
6. **Formulate** comprehensive reconstruction options before incision, including primary closure, flap, graft and referral pathways.
7. **Recognise** intraoperative red flags and decide when to modify, abandon, or escalate a surgical plan.
8. **Design and execute** a range of local flaps with an understanding of tissue biomechanics, vascularity, and tension redistribution.
9. **Explain** the indications, planning, harvest, fixation and aftercare of split-thickness and full-thickness skin grafts.
10. **Reflect** on personal limitations, complication prevention, and safe scope of practice in skin surgery.

Skin Cancer Surgery Bootcamp Modules

- **Module 1:** Pre-Operative Triangulation & Oncological Foundations
- **Module 2:** Foundational Surgical Mechanics
- **Module 3:** Reconstructive Cognitive Frameworks
- **Module 4:** The Technical Directory (Flaps Mechanics)
- **Module 5:** Skin Grafting Fundamentals
- **Module 6:** Post-Operative Rehabilitation, Scar Optimisation and Future Horizons

Module 1: Holistic approach

Before picking up a marking pen, a holistic surgeon must assess the intersection of the patient's systemic health, psychological readiness, and tumour biology. Definitive clearance is the primary goal; inadequate margins result in recurrence, complicating secondary reconstructions.

1. Patient Factors: Beyond the Skin

- **The Anticoagulation Conundrum:** Modern dermatological surgery guidelines advocate for continuing medically necessary anticoagulants (e.g., Aspirin, Clopidogrel, Warfarin, DOACs) for minor skin surgery. The risk of a life-threatening embolic event from stopping these medications far outweighs the risk of a manageable intraoperative or postoperative hematoma.
- **Cognitive & Social Context:** Assess the patient's ability to comply with postoperative wound care. A complex local flap requiring meticulous daily cleaning might fail in a patient with cognitive decline or a lack of social support; a split-skin graft or healing by secondary intention may be a safer, more compassionate choice.
- **Anatomical Reserves & Age:** As skin ages, it loses elasticity but gains laxity. Paradoxically, older patients often provide much better tissue reservoirs for local flaps than younger patients with taut, sun-damaged skin.

2. Tumour Dynamics & Standard Oncological Surgical Margins

Always evaluate the pathology report for high-risk features that dictate wider margins or staging (e.g., perineural invasion, poorly differentiated SCC, infiltrative or micronodular BCC variants).

Tumour Type	Clinical Features	Recommended Surgical Margin
Low-Risk BCC	Well-demarcated, nodular, < 2 cm on trunk/limbs	4 mm
High-Risk BCC	Ill-defined, infiltrative, recurrent, or located on central face	5 mm+ (or consider Mohs Micrographic Surgery)
Low-Risk SCC	Well-differentiated, < 2 cm, no high-risk locations	4 mm

Tumour Type	Clinical Features	Recommended Surgical Margin
High-Risk SCC	> 2 cm, poorly differentiated, lip/ear location, thick	6 mm–10 mm
Melanoma in Situ	Lentigo maligna / superficial spreading	5 mm–10 mm

3. Aesthetic Subunit Preservation

When planning the reconstruction, always respect the facial aesthetic subunits (forehead, eyelids, nose, cheeks, lips, chin).

- **The Golden Rule:** If a defect covers more than 50% of an aesthetic subunit, it is often visually superior to excise the remaining normal tissue of that subunit and reconstruct the entire unit as a single entity, rather than leaving a patchwork scar.
- **Hiding Scars:** Always attempt to place the free margins of your flaps or ellipses along the junction lines between cosmetic subunits to mask the resulting scars.

4. The Multidisciplinary Web (When to Step Back)

A vital aspect of surgical self-awareness is knowing when to refer. Transition to a multidisciplinary team (MDT) approach if you encounter:

- Positive deep margins (tumour tracking into deep fascia, muscle, or periosteum).
- Perineural invasion (PNI), especially if involving named nerves, which requires adjuvant radiotherapy.
- Palpable lymphadenopathy, indicating the need for regional staging, fine-needle aspiration, or sentinel lymph node biopsy (SLNB).

Module 2: Foundational Surgical Mechanics

1. Biopsies: Clinical Intent & Execution

Choosing the right biopsy technique directly impacts histological accuracy and definitive treatment planning.

- **Shave Biopsy / Saucerisation:**
    - *Indications:* Suspected superficial basal cell carcinomas (BCCs), actinic keratoses, and low-risk squamous cell carcinomas (SCCs).
    - *Technique:* Flex the blade to match the contour of the lesion; use a smooth, horizontal sweeping motion through the upper dermis.
- **Punch Biopsy:**
    - *Indications:* Inflammatory dermatoses, dermal lesions, or tracking the depth of a suspected invasive process.
    - *Technique:* Stretch the skin perpendicular to the Relaxed Skin Tension Lines (RSTLs) before rotating the punch. This transforms a round defect into an ellipse upon release, optimising closure.
- **Incisional vs. Excisional Biopsy:**
    - *Incisional:* Used for large tumours where definitive margins require complex reconstruction (e.g., large facial tumours). Sample the thickest part of the lesion, including a margin of normal skin.
    - *Excisional:* The gold standard for suspected melanocytic lesions. It involves a narrow margin (1–2 mm) to completely remove the lesion for accurate microstaging without compromising definitive wide local excision vectors.

2. Making the Cut: Geometry & Ergonomics

- **The Simple Ellipse:** Must be designed with a 3:1 length-to-width ratio to avoid dog-ear formation. The apical angles must be 30 degrees or less.
- **Orientation Along RSTLs:** Incisions must run parallel to wrinkles and natural skin creases. Cutting across RSTLs multiplies wound closure tension, leading to wider scars and potential dehiscence.
- **Blade Handling:** Use a pencil grip for fine control and a palmar grip for long incisions. The scalpel blade must enter the skin at a strict 90-degree angle to ensure square wound edges; bevelling the blade creates uneven edges that compromise healing.

3. Haemostasis: Active Management

- **Electrosurgery:** Use monopolar for dry, rapid coagulation of small vessels. Use bipolar cautery for precise pinpoint coagulation near delicate neurovascular bundles to minimise lateral thermal damage.
- **Chemical Agents:** Aluminium chloride (20%) solution for minor ooze post-shave biopsy. *Avoid Monsel's on suspected melanomas* as it leaves a pigment artifact that interferes with pathology.
- **Suture Ligation:** For brisk, high-pressure arterial bleeders. Use a figure-of-eight suture with an absorbable material (e.g., 4-0 or 5-0 Vicryl) to securely tie off the vessel.

4. Undermining: Planes & Safety

Undermining reduces wound tension by separating the skin and immediate subcutaneous fat from deep attachments.

- **Surgical Planes:** On the face, undermine in the upper subcutaneous fat plane (just beneath the subdermal plexus) to safeguard the muscles of facial expression and the facial nerve. On the scalp, undermine in the subgaleal loose areolar tissue plane to achieve maximum mobility.
- **Technique:** Use blunt-tipped iris or Metzenbaum scissors. Push the scissors into the correct plane closed, then open them while withdrawing to create a uniform pocket.

5. Suturing Mechanics

Clinical Rule: Deep dermal sutures do the heavy lifting; superficial epidermal sutures do the fine tuning.

Suture Material	**Type**	**Tensile Strength Retention**	**Tissue Reactivity**	**Primary Indication**
Monocryl *(Poliglecaprone 25)*	Monofilament Absorbable	50% at 7–14 days	Low	Deep dermal closure in low-to-moderate tension wounds
Vicryl *(Polyglactin 910)*	Braided Absorbable	50% at 21 days	Moderate	Deep dermal closure in high-tension

Suture Material	Type	Tensile Strength Retention	Tissue Reactivity	Primary Indication
				areas (back, chest)
Nylon *(Ethilon)*	Monofilament Non-absorbable	Loses ~15–20% per year	Low	Superficial epidermal closure (requires removal)
Prolene *(Polypropylene)*	Monofilament Non-absorbable	Indefinite	Minimal	Running subcuticular closures; high-visibility facial skin

- **Deep Dermal Placement:** The needle must enter from deep to superficial (bottom to top) on the first side, and superficial to deep (top to bottom) on the second side. This ensures the knot is buried at the base of the wound, preventing extrusion.
- **Knot Security:** Instrument ties must consist of a double throw (surgeon's knot) followed by opposing single throws to create true square knots. Avoid pulling upwards while tying; flatten your hands to keep the tension parallel to the wound beds.

6. Standing Cone (Dog-Ear) Management

- **Correction Mechanics:** When wound edges are of unequal length, a standing cone forms at the apex. Mastery of basic dog-ear corrections (hockey stick repair, apical excision, and tangent excision) is required before moving to flap adjustments.

Module 3: Reconstructive Cognitive Frameworks

Faculty Panel:

1. The "Rule of Three"

Before making the first incision, every operator must document and verbalise three distinct plans:

- **Plan A:** The ideal primary closure or simple local flap that balances cosmetic units and preserves margins.
- **Plan B:** A secondary option (e.g., a different flap orientation or full-thickness skin graft) if intraoperative tissue mobility is less than expected.
- **Plan C:** The "bailout" plan—leaving the wound to heal by secondary intention, placing a temporary split-thickness graft, or closing the wound loosely and arranging an immediate referral to a specialist.

2. Bail-out Criteria: Intraoperative Red Flags

Stop and pivot to your backup plan immediately if you encounter:

- **Flap Blanching:** Severe pallor of the flap tip that does not resolve within 3 minutes of warm saline compresses indicates microvascular compromise.
- **Undue Tension:** If the wound edges require significant force to reapproximate, continuing with primary closure will result in tissue necrosis or wound dehiscence.
- **Uncontrolled Deep Haemorrhage:** Hematoma formation guarantees flap failure. Do not close until the surgical bed is completely dry.
- **Margin Uncertainty:** If intraoperative macroscopic inspection suggests the clinical tumour boundaries extend further than anticipated, halt definitive reconstruction. Perform a temporary closure and await formal histopathology.

3. Surgical Self-Awareness & Site Thinking

- **The Competency Matrix:** Matching personal technical capability to case complexity, site risk, and consequence of failure. This includes judgment about when to proceed independently, when to seek senior supervision, and when to refer.
- **Anatomical-Site Thinking:** Tailoring closure choices to convex versus concave surfaces, facial subunits, scalp rigidity, extremity tension, and the critical need to protect function alongside cosmesis.

Module 4: The Technical Directory (Flaps Mechanics)

A. Design Principles & Tissue Dynamics

- **Tissue Reservoirs:** Always identify areas of redundant skin. Primary facial reservoirs include the glabella, preauricular crease, temple, and lower neck.
- **Primary vs. Secondary Tissue Distortion:**
    - *Primary Movement:* The displacement of the flap into the defect.
    - *Secondary Movement:* The reciprocal pulling of the surrounding donor tissue toward the defect. Flaps must be designed so that secondary movement does not distort free margins, such as the eyelids (ectropion) or lips (eclabium).

B. Standard & Intermediate Flaps

[Defect] ---> Plan Vector ---> Recruit Reservoir ---> Minimise Secondary Distortion

1. Rotation Flaps (Franz)

Pivotal flaps that move along a linear arc around a fixed pivot point to close adjacent semicircular defects.

- **Design:** The arc length must be 4 to 5 times the width of the defect.
- **Back-cutting & Alternatives:** If tension is encountered along the outer border, a short back-cut toward the pivot point can release restriction, though this reduces the flap's vascular supply. Alternatively, excise a Burow's triangle at the base of the arc, or use a Z-plasty modification at the trailing edge.

2. Rhombic / Transposition Flaps

A precise geometric transposition flap used to shift tissue into a 60/120-degree rhomboid defect.

- **Mechanics:** Four potential flaps can be designed around a single rhomboid defect (Limberg principles). Select the variant that recruits tissue from a high-laxity zone and places the primary donor closure line parallel to RSTLs.

3. H-Plasty & O-to-Z Modifications

- **H-Plasty:** Double bilateral advancement flaps that are ideal for square or rectangular defects on the forehead or eyebrows.
- **O-to-Z / O-to-S:** Double rotation flaps designed to close round defects, particularly on the scalp or shin, where tissue elasticity is minimal. This technique splits the closure tension into two opposing vectors.

4. Keystone Flaps

A reliable, tissue-sparing, trapezoidal fasciocutaneous advancement flap based on hyper-perfusion from underlying musculocutaneous perforators.

5. Advancement Flaps

Linear flaps that slide directly forward into a defect without lateral rotation.

- **V-to-Y Advancement:** A triangular island of skin is incised; as it is advanced forward into the defect, the donor tract is closed linearly, creating a 'Y' shape. Excellent for the nasal ala and upper lip.
- **Island Pedicle Flaps:** Dissected entirely down to a central subcutaneous vascular pedicle, allowing excellent omnidirectional mobility while preserving perfusion.
- **Burow's Wedge Exchange:** To resolve the "dog-ear" discrepancy created when advancing tissue, excise a triangle of skin at the base of the advancement line to equalise the lengths of the wound edges.

C. Specialised Regional Closures

- **Helical Rim Advancement:** An advancement flap used for posterior-lateral ear defects. The helix is mobilised by incising through the anterior skin and cartilage but leaving the posterior ear skin intact to maintain vascular supply, allowing the two poles to slide together.

Module 5: Skin Grafting Fundamentals

When local flaps are unavailable or counter-indicated, skin grafting provides a reliable alternative closure option.

1. Split-Thickness Skin Grafts (STSG)

- **Harvesting:** Use a dermatome or silver knife to harvest the epidermis and a variable portion of the upper dermis, typically from the thigh or upper arm.
- **Meshing:** Pass the graft through a mesher (e.g., 1.5:1 ratio) to allow expansion and provide drainage pathways for exudate, preventing graft lifting from fluid accumulation.
- **Fixation:** Secure the graft to the wound edges with staples or running sutures, then apply a continuous tie-over bolster dressing left undisturbed for 5 to 7 days.

2. Full-Thickness Skin Grafts (FTSG)

- **Donor Selection:** Match the texture, colour, and sun exposure of the recipient site. Ideal facial donor sites include post-auricular, supraclavicular, and preauricular skin.
- **Defatting Technique:** After excision, drape the graft over an index finger (dermis side up) and use curved iris scissors to trim away all yellow subcutaneous fat until the pearly white, dimpled dermis is visible. Remaining fat prevents revascularisation, leading to graft failure.
- **Graft Fixation:** Score the graft with small "pie-crust" incisions to prevent seroma accumulation. Suture the graft into the defect under physiological tension using non-absorbable or fast-absorbing sutures, and secure it with a non-adherent tie-over bolster dressing for 7 days.

3. Graft Take and Aftercare

- **The Physiology of Take:** Understand the phases of graft survival: plasmatic imbibition (first 24-48 hours), inosculation (days 2-3), and formal revascularisation (days 4-7).
- **Troubleshooting:** Implementing active strategies to mitigate graft loss caused by hematoma/seroma formation, shear forces, and localised infection.

Module 6: Post-Operative Rehabilitation, Scar Optimisation & Future Horizons

1. Immediate Wound Dynamics & Complications

- **Tension Management:** If a wound feels tight, utilise silicone scar sheets or microporous tape for 8 to 12 weeks post-operatively to mechanically unload the wound bed and prevent hypertrophic scar formation.
- **Moist Wound Healing:** Eradicate the old myth of "letting the wound air out to form a scab." Scabs act as mechanical barriers to epithelialisation. Instruct patients to keep the wound covered with an ointment like plain petrolatum under an occlusive dressing; this accelerates healing by up to 50%.
- **Post-Op Complication Protocols:** Systematic evaluation and management of postoperative hematomas, flap-tip congestion, wound infection, and partial graft necrosis.

2. The Holistic Prevention Plan

Skin cancer is rarely an isolated event; it is an indicator of chronic field cancerisation.

- **Total Body Photography & Surveillance:** Implement structured 3, 6, or 12-month full-body skin checks depending on the patient's risk profile.
- **Field Treatments:** Treat the surrounding sun-damaged "field" (not just the surgical spot) using topical therapies like 5-Fluorouracil (5-FU), Imiquimod, or Photodynamic Therapy (PDT) to reduce the emergence of future primary tumours.
- **Systemic Chemoprevention:** For patients forming multiple high-rate squamous cell carcinomas annually, discuss systemic options like oral Nicotinamide (Vitamin B3, 500 mg twice daily) or low-dose Acitretin.

3. Advanced Flaps & Specialty Closures: Masterclass Preview

(Concept overview only; topics fully developed in the Masterclass Curriculum)

- **Bilobed Flaps:** A double-transposition pivotal flap. Modern geometry restricts the total arc of rotation to 90–100 degrees (45–50 degrees per lobe) rather than the historical 180-degree design to minimise trapdoor deformities.
- **Reading Man Flap:** Uses two opposing, asymmetric transposition arcs to close large circular defects with minimal surrounding tissue distortion.
- **Nasalis & Rieger Flaps:** Large, modified rotation-advancement flaps utilising redundant tissue from the glabella and upper nasal dorsum to resurface defects of the lower two-thirds of the nose.

- **Lip and Ear Wedges:** Full-thickness repairs used for lesions involving >30% of the structural margin, executed as a sharp 'V' or 'W' shape.

Assessment Strategy

- **Knowledge Assessment:** Pre- and post-course multiple-choice or short-answer assessments covering margins, surgical planes, and pharmacology.
- **Technical Assessment:** Structured skills checklists for biopsy execution, ellipse design, undermining execution, layered closure, knot tying, and selected flap/graft tasks.
- **Clinical Reasoning Assessment:** Written or viva-based reconstruction planning using clinical case scenarios and intraoperative decision/bailout points.
- **Observed Performance:** Presenters review during simulation or supervised clinical practice sessions using validated Global Rating Scales (GRS).
- **Portfolio/Logbook:** Documentation of procedures observed, simulated, assisted, and performed, complete with reflective notes and supervisor sign-off.