

# Fundamental Principles of Plastic Surgery

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# Introduction:

- **Plastic surgery** is an **incredibly diverse specialty** that is challenging to define because its scope cannot simply be characterized by patient age, gender, organ system, or pathology.
- There is an inexorable **connection between cosmetic surgery and reconstruction surgery** because every plastic surgery operation aims to restore both **form and function**.
- In this lecture will talk about **10 of the most essential fundamental principles of plastic surgery** and provides relevant examples of how plastic surgeons utilize these principles in a wide range of clinical scenarios.

# Principle I: Make an Informed Decision to Operate or Not Operate

- Some types of plastic surgery are **mandatory**. A wound resulting from **resection of a sarcoma** with exposed bone requires a reconstructive operation that provides soft tissue coverage over the defect durable enough to withstand the infliction of adjuvant radiation therapy.
- However, in many situations, the plastic surgeon must make an informed decision whether **to perform an operation or not based on a thorough evaluation of the potential benefits against the potential risks**. Although this is conspicuously germane to cosmetic surgery, the same thought process is necessary for reconstructive surgery. **For example**, a large but **clean traumatic wound** on a patient's thigh could be treated reasonably with one of several options, from nonsurgical strategies such as dressing changes to surgical intervention such as local tissue rearrangement.
- **Success** is also subjectively gauged by patient satisfaction and is influenced by patient expectations.

# Principle II: Optimize Modifiable Patient Factors

- Deliberate **identification and management of patient risk factors** will decrease the chances of complications and increase the likelihood of successful surgical outcomes.
- For example, **smoking** is a commonly encountered modifiable risk factor.
- Other modifiable medical risk factors that also exacerbate poor wound healing include **uncontrolled diabetes, obesity, infection, steroid use, certain homeopathic medications, and malnutrition.**
- For a majority of plastic surgeons, **smoking is an absolute contraindication** to any body contouring operation.
- The plastic surgeon should inquire about the **social support available** to the patient and ensure that the patient's postoperative safety is entrusted to either family members or a rehabilitation center.

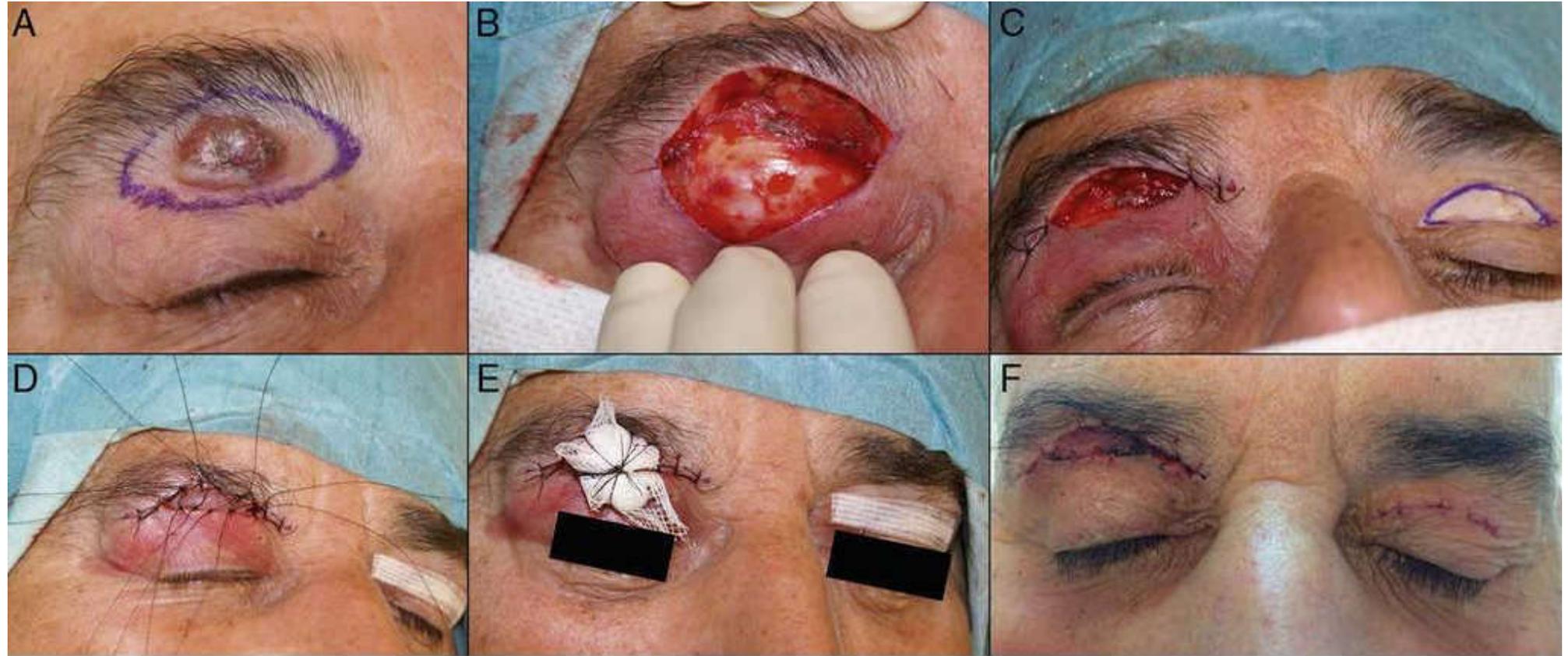
# Principle III: Perform Adequate Debridement Prior to Reconstruction

- Debridement is performed to physically **remove any barriers to tissue growth**, such as infection, biofilm, and senescent cells.
- The plastic surgeon may choose one of **many forms of debridement**, from **dressing** changes to **operative excision** of the wound.
- Although adequate debridement is usually a term associated with the management of **chronic wounds**, this essential principle also applies to acute wounds. **Acute traumatic** wounds, such as open fractures of the lower extremity or lacerations from bite injury.
- it may even be applied to clean surgical wounds. For example, during **reduction mammoplasty**.



# Principle IV: If Possible, Replace Like With Like; If Not Possible, Create It

- The plastic surgeon **examines the defect carefully and determines the best donor tissues necessary** to optimally achieve both a **durable reconstruction and an optimal aesthetic outcome.**
- For instance, when primary skin closure is not possible after excision of a **cutaneous tumor from an upper eyelid**, a frequently chosen donor site is full-thickness skin from the opposite upper eyelid. 12 This option is elegant because it **replaces the missing tissue with tissue of the same thickness, color match, pliability, and elasticity.**
- When such an ideal donor site is **unavailable**, the **next most similar tissue substitute is selected**; in this example, skin for eyelid reconstruction can be harvested from **postauricular skin or supraclavicular skin.**



- In some cases, no suitable donor sites exist, and innovative strategies must be employed to create sufficient replacement tissues of similar quality. One example of this is the **use of tissue expanders to induce growth of tissues through cellular proliferation.**

# Principle V: Optimize Vasculature at Every Opportunity

- Vasculature is paramount to **tissue viability** and therefore to the **success of healing**
- For example, **knowledge** of the vastness of the **subdermal plexus** allows a plastic surgeon to **reliably raise thin flaps of skin during a facelift operation**
- For instance, surgery may be **postponed to await smoking cessation** or time may be given for other specialists to help optimize blood flow. An illustration of the latter is when a patient with arterial insufficiency and a **chronic lower extremity wound is referred to a vascular surgeon** for revascularization prior to surgical treatment of the wound.

- Vascularity of a particular flap may also be **enhanced by performing a delay procedure.....** A delay period **allows choke vessels to physiologically dilate** within the flap and results in greater flap reliability.
- Additionally, at many points during an operation, the plastic surgeon will **tailor numerous surgical techniques to maximize vascularity**

# Principle VI: Preserve Form and Function

- In many instances, the goals of surgery are both cosmetic and reconstructive. Patients with **excess upper eyelid skin**, for example, may describe dissatisfaction with their **appearance as well as visual field deficits**.
- During the preoperative consultation, the plastic surgeon must establish that the objectives of **upper lid blepharoplasty** are to both rejuvenate the upper eyelids and expand the visual field



# Principle VII: Minimize Donor Site Morbidity

- When donor tissues are required, the plastic surgeon must focus on **minimizing the functional and cosmetic sacrifices to the patient.** Each operation already possesses inherent risks relating to the surgical site, such as hematoma, infection, or abnormal scarring.
- The **donor site** adds an **additional anatomic area where complications may arise**, and the plastic surgeon must weigh the possibility of **donor site morbidity** against the **benefits of the use** of that tissue for reconstruction.

- For example, during a **rhinoplasty operation**, **structural support** can be augmented by performing autologous cartilage grafting to the nasal framework. 22 Cartilage grafts can be harvested from the **nasal septum**, from the **conchal bowl of the ear**, or from the **cartilaginous portion of a rib**. The nasal septum would be an **ideal donor site** if septoplasty is also being performed, but use of this cartilage may cause further destabilization of the nasal framework and has a small risk of **septal perforation**. Harvest of conchal cartilage can provide adequate grafting material but may be complicated by **hematoma, keloid formation, or ear asymmetry**. The rib donor site offers an abundance of high-quality cartilage, but its indications must warrant the additional scar and added **potential for pneumothorax**

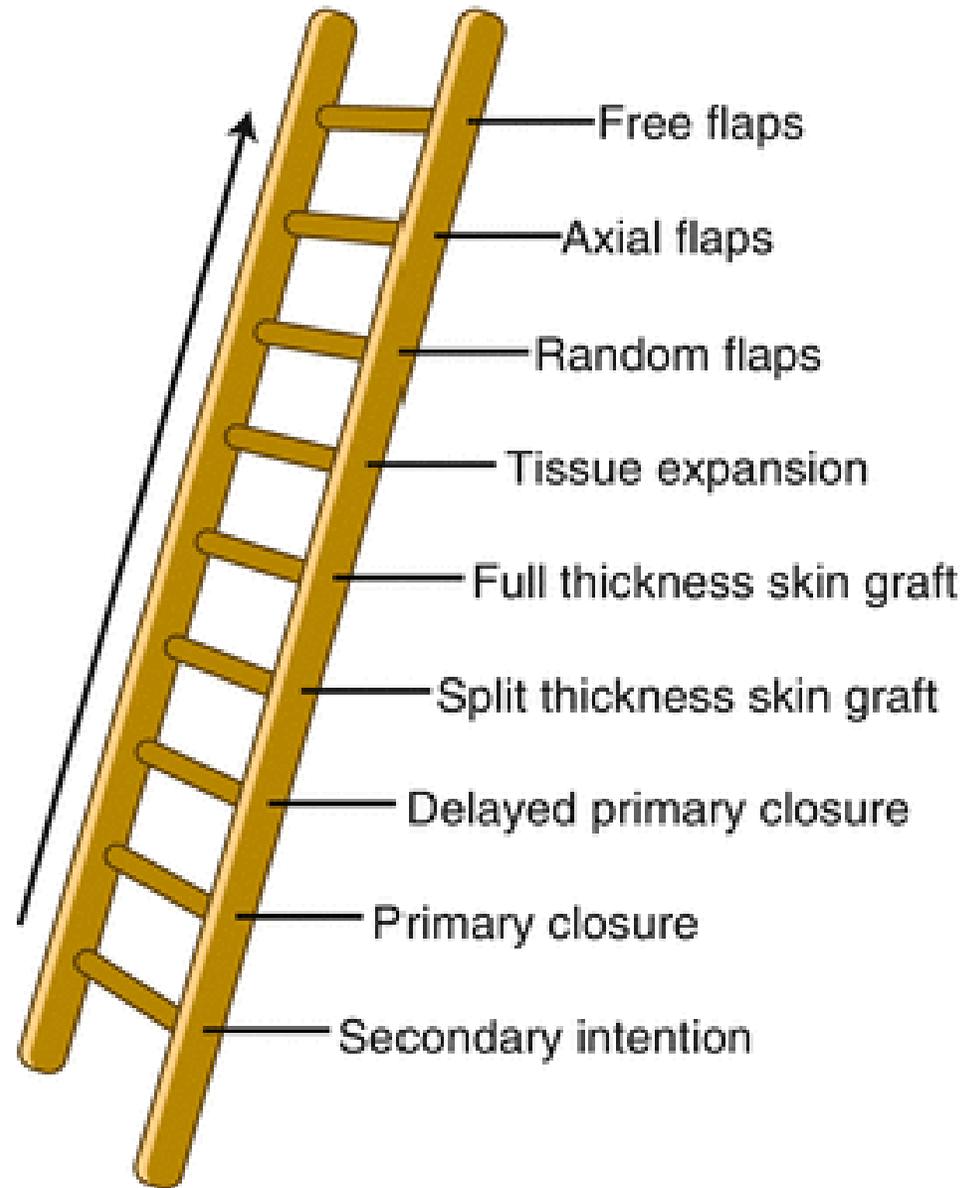
# Principle VIII: Protect the Surgical Site Postoperatively

- In plastic surgery, an **operation cannot be deemed fully successful at the time of its completion**; instead, this evaluation can only be made several weeks to months after the operation.
- During this critical time, the surgical site must be protected diligently to facilitate recovery and to **prevent injury to the healing tissues**. The plastic surgeon must actively **counsel patients to follow strict activity restrictions** and help patients understand the rationale behind the necessary postoperative protocols

# Principle IX: Have a Backup Plan (and a Backup Plan for THAT Backup Plan)

- Complications will always arise, and the prepared plastic surgeon will be ready with multiple contingency plans. Most commonly, complications such as **wound infection, marginal flap necrosis, or dehiscence** can be successfully managed with straightforward and standardized treatment protocols. However, occasionally, the first operative plan fails to adequately address the goals of surgery, and a new plan is necessary.

- **In reconstructive surgery, an old paradigm** known as the **reconstructive ladder** advocates for a **linear, stepwise approach to surgical problems** whereby less-complicated surgical techniques are initially attempted, and progression up the ladder to more complex strategies is pursued **only when needed**. More recently, significant advancements in the field of plastic surgery have led to a **shift away from this paradigm** in favor of a treatment algorithm that **encourages selection of the most definitive method** for reconstruction even if it means picking a more complex one first.



- Reconstruction of upper extremity defects frequently exemplifies this fundamental principle. For example, a dorsal hand wound from a full-thickness burn injury with several exposed extensor tendons and metacarpal bones can be reconstructed by numerous techniques.

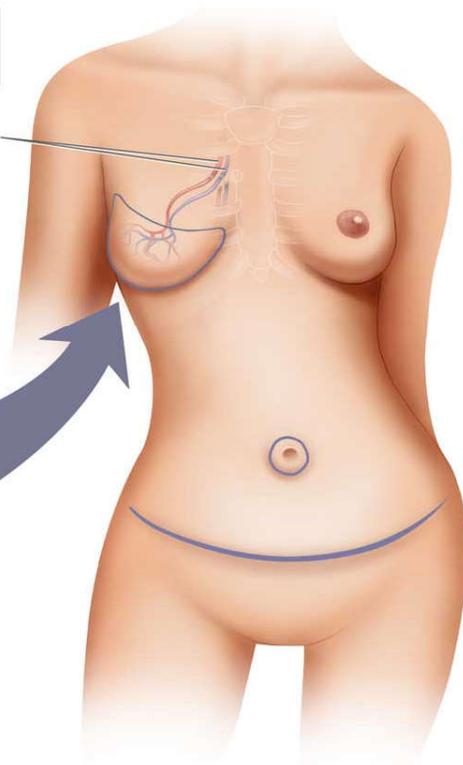
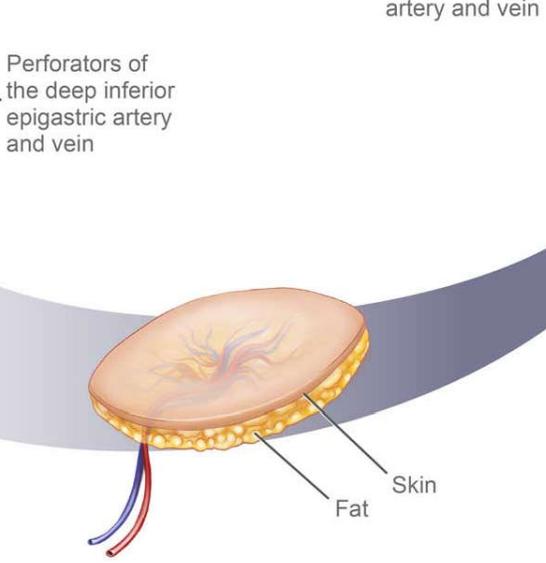
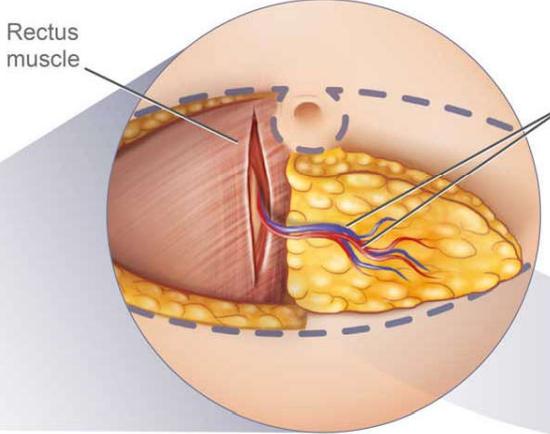
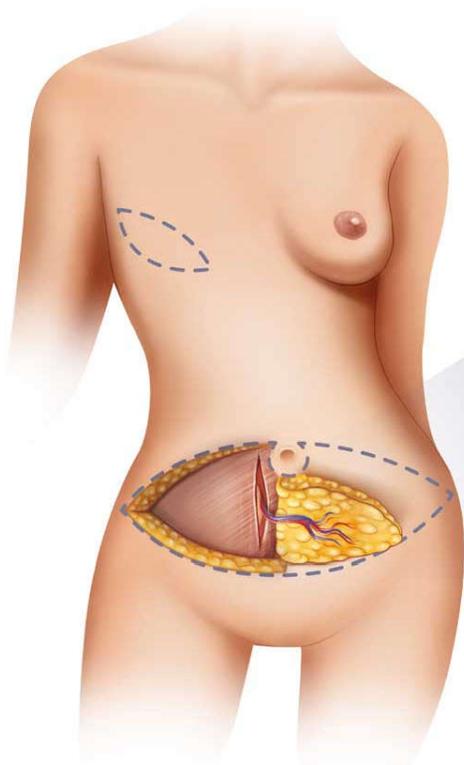


**Figure 1** (a) The defect of the dorsum of the hand in a 67 years old woman. (b) Flap dimensions are

# Deep Inferior Epigastric Perforator (DIEP) Flap

Vessels are gently dissected so rectus muscle is preserved

DIEP flap vessels are attached to internal mammary artery and vein in chest



# Principle X: Innovate New Solutions to Old Problems

- Each surgery is individualized according to the clinical situation and specific patient needs. Thus, the **plastic surgeon must strive to tailor every operation and often makes numerous adjustments to the accepted standard techniques**. For example, a **cleft lip repair** for one child is never precisely the same as that for another child. Although the basic tenets are constant, such as restoring continuity of the orbicularis oris and re-establishing labial subunits, the surgeon must remain flexible during the operation and modify the repair technique to account for the unique abnormalities present in each patient.

- This spirit of adaptation and creative problem-solving is a large part of what distinguishes plastic surgery from other surgical disciplines and contributes to the constant evolution of the specialty. Over the course of the last century, plastic surgery has undergone enormous cycles of change that has resulted in significant paradigm shifts in patient care. One of the most profound examples is the advent of microsurgery.
- The ability to raise and transfer a variety of tissue types as free flaps opened an entire realm of reconstructive solutions for problems that were once deemed impossible. For instance, **distal third injuries of the lower extremity** that commonly resulted in amputation could now be **reconstructed with a free flap**

**THANK YOU**