There are three constants in life ... change, choice and principles.

—Stephen Covey

Plastic and reconstructive surgeons maintain the broadest scope of practice among their surgical colleagues, operating from head to toe on patients of all ages. Encountering a unique spectrum of functional and cosmetic concerns on a daily basis, plastic surgeons rely on overarching principles rather than absolutisms to guide their practice. First described nearly five centuries ago, the principles of plastic surgery remain paramount to operative success today; while adhering to central tenets of reconstruction, the modern surgeon relies on an intimate knowledge of native anatomy and technical finesse to restore form and function.

Frenchman Ambroise Paré was, to our knowledge, the first to define a set of reconstructive surgical principles, outlining five central tenets in 1564.1 Building on these, Millard reported on his mentor Sir Harold Gillies’ “ten commandments of plastic surgery” in 1950,2 codifying a set of principles encompassing practical, technical, and ethical axioms to guide the reconstructive efforts of plastic surgeons (Table 1). Millard later expanded on these commandments to define 33 fundamental principles of plastic surgery in his report Principlization of Plastic Surgery, categorizing each as either a preoperational, executional, innovative, contributational, or inspirational principle.1,3

As with any principles, Gillies’ ten commandments merit a revisit. Most ring true today, each contributing to a cohesive narrative: plan ahead, but remain flexible; focus on the task at hand, but always be thinking about what’s down the road; restore normal anatomy, while respecting that you will often create abnormal anatomy in the process. Although we are not in agreement regarding putting off all that one is able to until tomorrow, the remainder of these principles bear relevance to the practice of plastic surgery nearly 70 years after their definition. Knowledge of anatomy, the reconstructive ladder, surgical planning, and the need for foresight are all components of modern surgical education. Many have written on surgical technique in plastic surgery4,5; however, few have attempted to consolidate this information into a series of operative principles. In addition to the general principles previously outlined, we offer 15 fundamental operative principles that we believe are broadly applicable to the practice of plastic surgery today.

THE 15 FUNDAMENTAL OPERATIVE PRINCIPLES OF PLASTIC SURGERY

Principle 1: Plan Carefully and Precisely before You Operate

Although some decisions must be made intraoperatively, the majority of one’s surgical planning should be performed before the procedure. This is not unlike knowing one’s final destination, and mapping the course to get there. The operative plan should also include a backup plan: one can never predict whether and when the primary plan might fail or need alteration.6 Attention to detail preoperatively prevents wasting precious time in the operating room and is safer for the patient.
**Table 1. Principles of Plastic Surgery by Paré and Millard/Gillies**

<table>
<thead>
<tr>
<th>Paré (1564)</th>
<th>Millard/Gillies (1950)</th>
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<tbody>
<tr>
<td>1. Take away what is superfluous.</td>
<td>1. Thou shalt make a plan.</td>
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<td>2. Restore to their places things which are displaced.</td>
<td>2. Thou shalt have a style.</td>
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<td>3. Separate tissues which are joined together.</td>
<td>3. Honor that which is normal and return it to normal position.</td>
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<tr>
<td>4. Join those tissues which are separate.</td>
<td>4. Thou shalt not throw away a living thing.</td>
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<td>5. Supply the defects of nature.</td>
<td>5. Thou shalt not bear false witness against thy defect.</td>
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<td></td>
<td>6. Thou shalt treat thy primary defect before worrying about the second one.</td>
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<td></td>
<td>7. Thou shalt provide thyself with a lifeboat.</td>
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<td></td>
<td>8. Thou shalt not do today what thou canst put off until tomorrow.</td>
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<td></td>
<td>9. Thou shalt not have a routine.</td>
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<td></td>
<td>10. Thou shalt not covet thy neighbor’s plastic unit, handmaidens, forehead flaps, Thiersch grafts, cartilage nor anything that is thy neighbor’s.</td>
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**Principle 2: Ensure That Your Operative Goals Are in Alignment with the Patient’s Preoperatively**

Use your time from the initial consultation to the day of surgery to define and articulate the patient’s goals, and find common ground on what can be achieved reasonably. Focus on the patient’s top three goals or concerns that he or she wishes to address, and be honest with the patient and yourself about the limitations. Note the patient’s goals in the chart explicitly as they are articulated, and let these goals guide your operative plan. Establishing open communication and clear expectations is key to gaining happy and satisfied patients. Ask the patient immediately preoperatively to reiterate the top three goals that must be achieved for him or her to be happy or consider the operation to be a success.

**Principle 3: When in Doubt, Don’t**

Hesitancy regarding whether to perform a procedure or make some kind of change in the operating room usually stems from some subconscious warning that what you are considering is not the right thing to do. Let your training, experience, and expertise guide you: when in doubt, don’t. Always side with patient safety, as you never want to risk a patient’s care, life, or outcome.

**Principle 4: Incise Skin under Tension, and Close with No Tension**

Measure twice and incise once. When incising the skin, do so under tension, which allows for more precision, and minimizes tissue trauma and the need to connect multiple shorter hesitation cuts. Sometimes it is difficult, inconvenient, or ergonomically awkward to incise under tension. Stop; readjust your position, retractors, or your assistant; and incise the tissue precisely. Precision in this step sets you up for success in the ensuing portions of the operation. Reapproximate the skin edges with minimal to no tension after a layered closure. This is a fundamental principle in plastic surgery, which contributes to optimal wound healing and final scar appearance. Address dog-ears in the operating room, as they rarely subside. The sole exception may be a dog-ear in the scalp masked by hair that may subside in the long term.

**Principle 5: Close Wounds in Layers, and Approximate Wound Edges Meticulously**

Skin closure is ultimately the only part of your work that the patient sees directly. Close wounds meticulously and in layers to optimize wound healing. Use pear-shaped deep layer sutures (fascia or dermis only) to minimize any tension on your skin closure. Approximate but do not strangle wound edges with slight eversion. In most cases, simple yet carefully placed interrupted sutures achieve an appropriate amount of tissue eversion. Overereversion of wound edges does not necessarily produce better cosmesis and can be problematic. Precise approximation of the wound edges with uniformity and without palpable edges or irregularities yields optimal outcomes. Remember that 90 percent of how a patient heals is genetic, and 10 percent is the closure and thus dependent on the surgeon’s skill—we can all appreciate how much that 10 percent contributes to the final outcome.

**Principle 6: Close Dead Space**

Closing dead space is important in all of surgery; however, it is exceptionally important in plastic surgery. This principle aids in the prevention of hematomas, seromas, and other collections, and optimizes wound healing by avoiding undue tension. This is particularly important in precision procedures such as a rhinoplasty or face lift. When in doubt, use a drain to evacuate fluid from dissected tissue planes and encourage tissue adherence. Focus on closing dead space before complications and undesirable outcomes force you to later.

**Principle 7: Respect the Soft Tissue and Visualize the Tissue Planes**

Handle tissue gently, and always be mindful of how you treat the soft tissues. Rough handling
can damage soft tissues and impair wound healing, so be mindful of how much tension is on your retractors, or how hard you are squeezing the skin between your forceps. Minimizing tissue trauma will optimize wound healing and contribute to better outcomes. Furthermore, when dissecting in tissue planes or elevating flaps, be precise and maintain the appropriate plane. This involves appropriate exposure with the right retractors so that the surgeon can focus on cutting precisely while the tissue is under tension. Operative approaches that allow for safe access to underlying structures have been described; however, the safety of each approach is reliant on dissecting within a known plane.8

Principle 8: Achieve Meticulous Hemostasis and Irrigate the Wound before Closure

Obtain meticulous hemostasis at the end of your procedure. This is essential for minimizing postoperative complications and optimizing wound healing. Close the skin with the patient normotensive to identify any additional areas requiring coagulation. When in doubt, use a drain to maximize tissue layer adherence and diminish early postoperative swelling and bruising. Remember, drains do not prevent hematomas, but meticulous hemostasis does. Irrigation of the wound following meticulous hemostasis will aid in the removal of any residual debris, and potentially identify residual bleeding that may require further hemostasis.

Principle 9: Repeat and Refine Your Technique Continuously—Being Self-Critical Is Essential to Becoming an Expert

Repetition is essential to technical refinement and innovation—but change and refinement are essential to avoid complacency in technique.9 Continue asking how an operation can be performed better. Ensure that your operative procedure is not limited by your knowledge alone—study the masters of individual techniques to develop a deeper understanding.10 Even Michelangelo, recognized for his artistic mastery at age 14, selected a mentor who pushed him to improve his technique and evolve as an artist over the course of his career.11 Engaging with other talented plastic surgeons in an open forum is also crucial to becoming a master. Present your work and your results honestly, and accept criticism with an open mind. At the highest level, ego is often what holds one back from achieving his or her best possible results. Those who remain humble and honest will rise above the rest.

Principle 10: Missteps in Plastic Surgery Are Unforgiving

Many procedures in plastic surgery are operations of millimeters. Even the smallest errors can have catastrophic consequences; thus, meticulous attention to detail is essential in both cosmetic and reconstructive plastic surgery. Remember, revision procedures are exponentially more difficult and more challenging. Appropriate planning and execution will facilitate the avoidance of missteps. Do everything you can to get it right the first time.

Principle 11: Just Because You Can Doesn’t Mean You Should

Plastic surgeons must use their best discretion in determining “how much,” “how big,” or “how far.” Should more skin be resected? Add more tip projection? Use larger implants? Just because you can, doesn’t mean you should (Rohrich et al., in press). Consider all aspects of the decision, and always use your best judgment to do what’s right for the patient.

Principle 12: If It Doesn’t Look Good on the Operating Table, It Won’t Look Any Better Later

In most reconstructive and cosmetic plastic surgery procedures, the result you see on the operating table is about as good as you can expect later after the resolution of swelling. Make sure that you are happy with your result before concluding the procedure, as one can never rely on the assumption that the result will improve postoperatively. Never leave the operating room unless the result is as good as it can be with your very best effort. Plastic surgery is not a race or a timed event; however, optimal preparation allows for proper sequencing to maximize intraoperative effort and time.

Principle 13: Apply Dressings Meticulously

Dressings are often the only thing visible to a patient or his or her family following a procedure. Messy dressings, regardless of how fastidious you might have been in the operating room, convey sloppiness and lack of attention to detail to those who see them. Ensure that dressings and incisions are clean, and if possible, remove all blood stains before the family sees the patient. An extra minute or two spent dressing surgical wounds postoperatively can make a considerable difference in the perceived outcome.

Principle 14: Keep the Patient’s Family Informed during and after Surgery

The circulating nurse should update the family hourly during the procedure so that they know that their family member is safe. After concluding the
procedure, speak with the family in a timely manner to let them know how the procedure went. Maintaining this line of communication is an essential component of the trust that exists between the surgeon and the patient/families under his or her care.

**Principle 15: Underpromise and Overdeliver—Honesty Is the Best Policy**

In life and in plastic surgery, always underpromise and overdeliver. We live in a digital era where anyone can be famous on the Internet. Although many promote their own celebrity on their Web sites or social media platforms, you must be honest with yourself and the patient when it comes to what you can do, and more importantly, what you cannot do. You are a surgeon, not a magician, and you operate with a scalpel, not a wand. Advise your patient that you will do your very best, but can never guarantee a result. Furthermore, medicine and plastic surgery demand the utmost honesty and integrity. Honesty and integrity will gain the confidence of your patients and colleagues alike.

Although nothing can guarantee success in plastic surgery (see principle 15), adhering to these principles will guide you along the path to success. Remember how privileged we are to care for our patients, and relish the opportunity to help those who cannot help themselves.

It is right that we should stand by and act on our principles; but not right to hold them in obstinate blindness, or retain them when proved to be erroneous.

—Michael Faraday

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**REFERENCES**