

Surgical Replacement of the Breast

Gillies H. *Proc R Soc Med* 52:597-602, 1959

Reviewed by Anna F. Tyson, MD, MPH

This plea for the replacement of the breast contour after excision is presented for what it is worth to the surgeon and to the patient. It has for its object the removal of the tell-tale scar, a constant reminder of her disaster, and creation of a make-believe substitute. Reconstruction of the mammary prominence is indicated after local or radical removal, after atrophy following radiation, or when the gland has failed to develop. It is difficult to appreciate the amount of psychological trauma such a loss entails on the female outlook.¹

Research Question Can breast reconstruction be accomplished with the autologous tissue of tubed pedicled flaps, introducing new tissues from a distance?

Historical Context Sir Harold Gillies,² one of the prominent pioneers of early reconstructive surgery, is in many respects the founder of the modern field of plastic surgery. Born in New Zealand in 1882, he was educated at Cambridge and received his surgical training at St. Bartholomew's Hospital in London.² Originally trained as an ear, nose and throat surgeon, his career trajectory changed dramatically with the onset of the First World War.³ Gillies was sent to France with the Red Cross and placed into service with Auguste Valadier, an informally trained practitioner with a special interest in facial reconstruction.² Valadier's groundbreaking work with jaw reconstruction sparked Gillies' imagination. At the time, few resources and little energy were devoted to reconstructive surgery. However, Gillies persuaded the War Office to open the first hospital devoted to the treatment of facial injuries, even going so far as to distribute preprinted address labels to facilitate the delivery of patients to his hospital.^{2,4}

Much of Gillies' early surgical work involved the treatment of complex burn and blast injuries sustained during the war. In particular, he popularized use of the tube pedicle flap.^{2,5} Before antibiotics, the exposed surface of a flap almost invariably became infected, resulting in high complication and failure rates. By wrapping the flap into a tube and suturing the exposed edges together, surgeons were able to protect the exposed surface during the period of vascularization. The use of a tube pedicle flap was

first described in the medical literature by a Ukrainian ophthalmologist, Vladimir Filatov.⁵ However, Gillies likely discovered the tube pedicle flap independently because this previous report was published in a Russian language ophthalmology journal. Gillies¹ used tube pedicle flaps extensively in facial reconstruction and later expanded the technique to address the growing field of breast reconstruction.

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Study Dates 1942, 1946, 1951, and 1958

Publishing Date 1959

Location London, England

Overview of Design This highlighted case series describes a novel approach to breast reconstruction with the use of a tube pedicle flap from periumbilical skin and fat. The author first explains the necessity of the new procedure and outlines the limitations of previous procedures. He then answers several questions about the timing of reconstruction in the setting of mastectomy for breast cancer. He illustrates the procedure in a series of drawings, including the timing between intervals. Finally, he presents four case reports of female patients who underwent staged reconstruction with tube pedicle flaps from the periumbilical region.

Intervention Breast reconstruction with a tube pedicle flap begins at the initial mastectomy. In the initial stage the pedicle is prepared, creating a 6-inch by 3-inch straight flap that extends from the anterior axillary line toward the umbilicus. A circular “pancake” flap, measuring 6 inches in diameter, is drawn surrounding the umbilicus. The pedicle is raised, and the exposed edges are sutured together, forming a 6-inch long tube (Fig. 3-1). The donor site is closed primarily or grafted. The surgeon then allows 2 weeks for the pedicle to mature. During the second stage, the “pancake” flap is partially raised, leaving a 2-inch base at the medial edge (Fig. 3-2). After waiting 1 additional week, the surgeon returns to the operating room to complete the flap excision and implant the “pancake” flap at the breast site. The pedicle remains attached to its lateral mooring (Fig. 3-3). The abdominal defect is closed primarily or with a skin graft. The surgeon then waits 3 weeks for the flap to become well vascularized. During the final stage of the procedure, the pedicle is divided and the breast mound is constructed (Fig. 3-4). The excess pedicle may be used to enhance the breast mound if needed. With proper positioning, the umbilicus is fashioned into a nipple, with cartilage or other implantable material used to provide prominence. The full procedure takes 5 to 6 weeks to complete and leaves some secondary defect and scarring on the abdomen. However, the final product provides an acceptable restoration of the breast mound and a near-symmetrical chest.

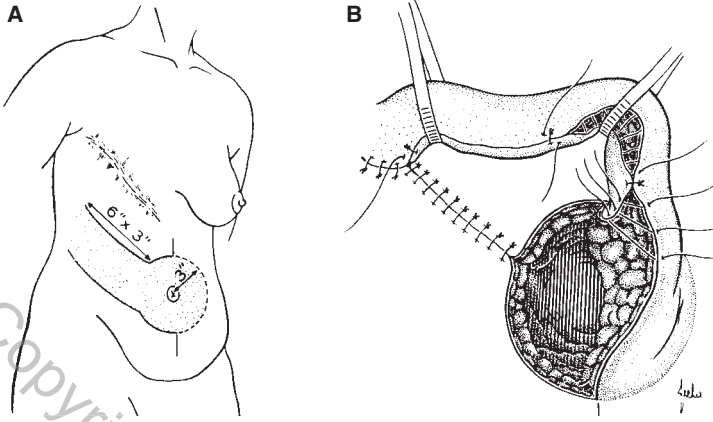


Fig. 3-1 A, Plan and incision. B, Pedicle tubed to midline. Donor area closed or grafted. Wait two weeks. (From Gillies H. *Surgical replacement of the breast*. Proc R Soc Med 52:597-602, 1959.)

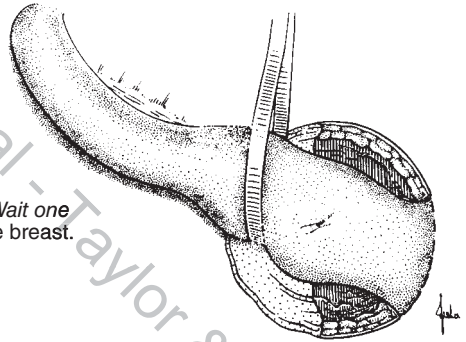


Fig. 3-2 Extension of tube leaving 2 inch base. Wait one week. (From Gillies H. *Surgical replacement of the breast*. Proc R Soc Med 52:597-602, 1959.)

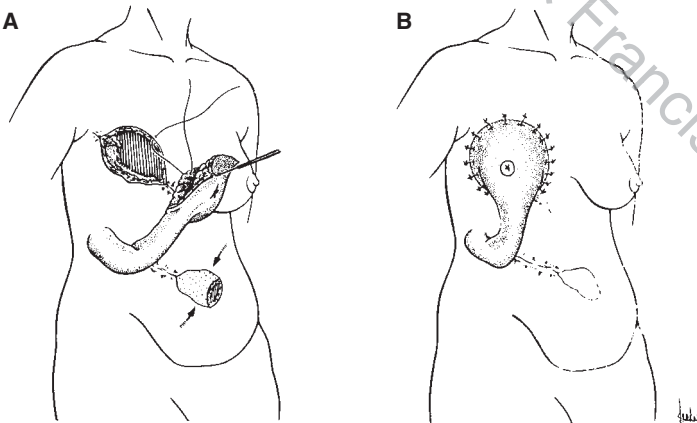


Fig. 3-3 A, Freeing of medial end of flap. Excision of scar. B, Implantation in mammary position. Wait three weeks. (From Gillies H. *Surgical replacement of the breast*. Proc R Soc Med 52:597-602, 1959.)

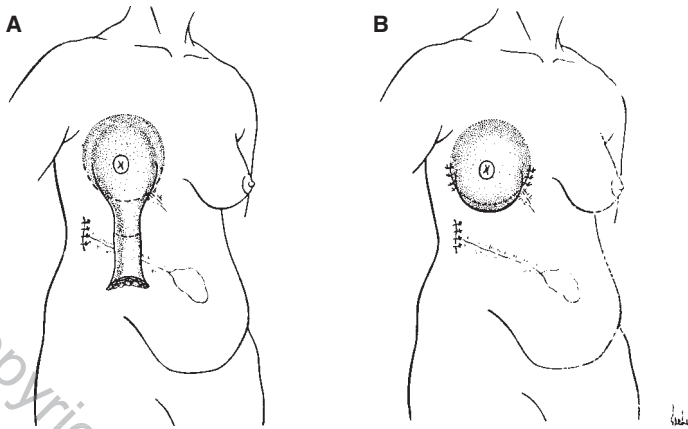


Fig. 3-4 A, Division of pedicle. B, Skin and fat fitted in. (From Gillies H. Surgical replacement of the breast. *Proc R Soc Med* 52:597-602, 1959.)

Endpoints The management of breast cancer has changed dramatically over the years.⁶ When Halsted first introduced the radical mastectomy in 1889, many surgeons feared that reconstruction of the breast would hide a recurrence.^{6,7} Ultimately, these fears were unfounded, but these beliefs delayed the acceptance and advancement of breast reconstruction. Early surgeons obtained coverage with the use of split-thickness or full-thickness skin grafts or local advancement flaps, although these solutions often resulted in undue tension, contracture, and disfigurement.^{5,6} In the early twentieth century, European surgeons attempted true reconstruction with musculocutaneous flaps from the latissimus dorsi or pectoral muscles.^{7,8} Although effective to some degree, many of these procedures were extensive and deforming.⁸

Gillies' popularization of the tube pedicle flap after World War I led to multiple variations in pedicle flap reconstruction. In the 1940s and 1950s, surgeons used pedicle flaps from the contralateral breast, abdomen, or buttocks to create breast mounds, with mixed results.^{5,8} Gillies' use of the tube pedicle flap from the periumbilical region allowed acceptable reconstruction with minimal secondary deformity.⁸ Although still time-consuming and prone to flap failure, this work paved the way for future improvements in breast reconstruction.⁷

As breast reconstruction gained in popularity and acceptance, improved cosmesis became a top priority. Technologic developments beginning in the 1960s allowed silicone implants and tissue expanders to increase in size and improve symmetry. The 1970s saw the reintroduction of flap reconstruction with the latissimus dorsi muscle with much better results because of improved infection control and surgical technique.⁷ Gillies' use of abdominal tissue for reconstruction was revisited in 1982 when

Hartrampf, Schlefman, and Black introduced the pedicled transversely oriented abdominal musculocutaneous (TRAM) flap.⁷ The TRAM flap has remained popular, and advances in microsurgery have now allowed free TRAM flap reconstruction, further improving cosmesis.

Breast cancer remains one of the most common cancers in the world and affects thousands of women every year. Breast reconstruction affords the woman the opportunity for psychological recovery. Advances in the detection and treatment have allowed more conservative surgical management and improved cosmetic results. In the future we will continue to refine our technique, but we should not lose sight of the foundation of breast reconstruction, which was begun by the early pioneers of plastic surgery.

Summary Sir Harold Gillies' work during the First World War and the years after was instrumental in the recognition of plastic surgery as a specialty. His introduction of the tube pedicle flap revolutionized the field of reconstructive surgery and set the stage for our current use of distant musculocutaneous flaps for breast reconstruction.

Implications Sir Harold Gillies' contributions to the field of plastic surgery were not limited to technical innovation. His determination to achieve good cosmetic and functional results and his insistence that reconstructive surgery is important for a patient's psychological recovery opened many doors in the acceptance of plastic surgery as a bona fide specialty.³ His collaboration with dentists, physicians, radiologists, and artists set the stage for the formation of the multidisciplinary team.² Gillies' dedication to his patients and enthusiasm about the art and science of plastic surgery made him a favorite among his students and peers.

Gillies was also instrumental in the initiation of international collaborative meetings. As early as 1923, he helped organize meetings between American, British, and French surgeons, and in the 1930s, he was one of the founding members of the society that eventually became the International Confederation of Plastic and Reconstructive Surgeons.³ This collaboration between plastic surgeons across countries was invaluable in gaining official recognition of the specialty.³

In the years after Gillies' death in 1960, former students and colleagues paid tribute to his many teachings. His "commandments," which outlined the principles of plastic surgery, are repeated, revered, and obeyed even today.^{1,2} Among them he stressed the importance of careful observation, thorough planning, and meticulous postoperative care.⁹ His adage "never do today what can honourably be put off until tomorrow" has proved sound not only in plastic surgery but also in other fields.^{2,9} His instruction to "replace what is normal in a normal position and retain it there" has become a tenet of reconstructive surgery.^{2,10}

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EXPERT COMMENTARY

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Plastic surgery is a perpetual battle of beauty versus blood supply.
—Sir Harold Gillies

This quote was a favorite of Dr. Larry Gottlieb during my plastic surgery training at the University of Chicago. He was an unabashed admirer of one of the founding fathers of plastic surgery, Sir Harold Gillies. Gillies was a surgeon during World War I, a war in which defensive trench warfare became prevalent. Heads exposed over the trench were at risk of injury. The wearing of helmets grew in popularity, which allowed improved survival. As a result, soldiers sustained and survived facial trauma in increasing numbers. Gillies described and popularized early head and neck reconstruction and the unmatched value of forehead flaps for nasal reconstruction. His tube pedicle flaps incorporate the fundamental principles of plastic surgery such as the “delay phenomenon” and “replacing like-with-like.” Plastic surgery is a discipline that is known for problem-solving and progress. Improved survival in warfare even today has opened the door for innovation such as limb and face transplant and prosthetics that were just fantasy in the day of Sir Gillies.
