



History of plastic surgery: sir Harold Gillies, a pioneer of reconstructive plastic surgery

História da Cirurgia Plástica: sir Harold Gillies, pioneiro da cirurgia plástica reconstrutiva

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■ ABSTRACT

Historically, wars have been among the greatest catalysts for advances in medicine in general, and surgery in particular. Without doubt, the greatest practitioner of plastic surgery in the early decades of the twentieth century was Sir Harold Delf Gillies, a New Zealander living in England, who advocated the treatment of patients with facial injuries in the context of the First World War. This article examines Gillies' personal life and the legacy he left for modern plastic and reconstructive surgery; many of his teachings are timeless and serve as an inspiration for the surgeons of today.

Keywords: History of medicine; Surgical reconstructive procedures; Surgery, plastic; Warfare; Trauma.

■ RESUMO

Historicamente, as guerras foram um dos maiores catalisadores para o avanço da Medicina, e especialmente da cirurgia. Sem dúvida, a maior autoridade da Cirurgia Plástica nas primeiras décadas do século XX foi o neozelandês radicado na Inglaterra Sir Harold Delf Gillies, que se destacou pelo tratamento de pacientes com lesões faciais no contexto da I Guerra Mundial. Nosso artigo faz uma análise da vida pessoal e do legado que Gillies deixou para a cirurgia plástica e reconstrutiva moderna; muitos de seus ensinamentos são atemporais e servem de reflexão para cirurgiões da atualidade.

Descritores: História da medicina; Procedimentos cirúrgicos reconstrutivos; Cirurgia plástica; Guerra; Trauma.

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INTRODUCTION

The interest of Sir Harold Gillies, Commander of the British Empire, Fellow of the Royal College of Surgeons (Figure 1), in the treatment of nasal deformities and other facial abnormalities led him to become one of the pioneers of facial plastic surgery at the beginning of the 20th century. Despite no formal training in Plastic Surgery, he distinguished himself by treating numerous patients with facial injuries during the First World War.



Figure 1. Sir Harold Gillies (right, sitting in the operating room, Queen's Hospital, Sidcup (courtesy of Dr. Andrew Bamji, Gillies Archivist, BAPRAS).

Gillies developed his interest in facial lesions using a dental approach. He later visited the French plastic surgeon Hippolyte Morestin, who was performing the most advanced reconstructive surgeries of the time at the Val de Grâce Hospital, Paris¹. From these experiences, he became aware of the many jaw and cranioencephalic injuries that trench warfare had produced^{2,3}.

To address the need to treat these injuries, Gillies used his persuasive skills to promote development of a multidisciplinary approach to facial injury treatment at Cambridge Military Hospital in 1916, and at Queen's Hospital the following year (Figures 2 and 3). This model was so successful that subunits were established to provide care for injured Commonwealth personnel in Canada, New Zealand, and Australia.

Between 1917 and 1923, he and his team of surgeons and dentists operated on more than 5,000 patients. Some of the traumatic lesions had similarities to developmental clefts and other congenital deformities, and thus provided experience for corrective treatment. The files are stored in the Gillies Archives, Queen Mary's Hospital, Sidcup, located in the original hospital complex that included recovery and rehabilitation facilities⁴.

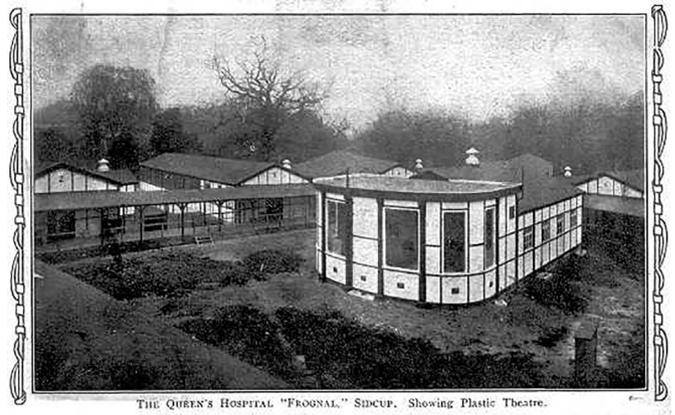


Figure 2. Plastic surgery operating room, Queen's Hospital, Sidcup (courtesy of Dr. Andrew Bamji, Gillies Archivist, BAPRAS).



Figure 3. Ward at Queen's Hospital (courtesy of Dr. Andrew Bamji, Gillies Archivist, BAPRAS).

Severe traumatic facial deformities were corrected with surgical procedures that are now part of history (such as free bone grafts for mandibular reconstruction, rotational flaps, and pedicled tubular grafts). As noted by several authors, there is no doubt that the wounded of the Western Front of World War I were the subjects of experiments that allowed the development of modern Plastic Surgery⁵.

After World War I, Gillies was appointed to the clinical staff of St. Bartholomew's Hospital as one of the few British plastic surgeons of the time, emerging as the leader in his field⁵. He eventually became a consultant, a top position for a physician in the British health care system, to the Navy, Royal Air Force, Ministry of Health, and six other hospitals.

In contrast with the success of plastic surgeons in North America during the period between the wars, British plastic surgeons failed to promote the specialty in England. Despite his extensive surgical experience and reputation, Gillies was able to achieve very little during this period.

He had difficulty finding sufficient work to support his practice, let alone train new specialists. He also had difficulty maintaining his popularity, as his attempt to increase the number of surgical cases by performing purely cosmetic procedures led him to be falsely portrayed as a charlatan^{6,7}.

With the beginning of the Second World War, Gillies converted the private wing of the Park Prewett hospital, Basingstoke, into a plastic surgery hospital with 120 beds. At that time, there were four plastic surgeons in the United Kingdom⁸, with around 60 in the United States⁹.

A lifelong smoker, Gillies remained active as a teacher until his death, and died suddenly in 1960, at 78 years of age, from coronary artery disease⁵.

OBJECTIVE

The aim is to discuss the contribution of Gillies to the emergence of plastic surgery as a specialty from a historic point of view. Gillies was described as a brilliant teacher. Many of his teachings were summarized in the famous “Principles of Gillies” (Annex 1). Those who were under his tutelage and had been trained to use their hands to feel or point out a defect in a patient were criticized and told: “Use your eyes first to assess the problem and keep those dirty fingers away from the patient!”¹⁰ As a master craftsman in the operating room, he emphasized the vital importance of meticulous hemostasis in flap reconstruction; one of his maxims was “a teaspoon of blood today is worth a bucket tomorrow.”

METHODS

This review was based on online database searches in PubMed, SciELO, and LILACS, using ununified terms, for historical information relevant to the life of Harold Gillies and his contribution to the rise of plastic surgery as a specialty.

RESULTS

Legacy and contributions to modern plastic surgery

Born in Dunedin, New Zealand, in 1882, his father was a member of the New Zealand Parliament and his mother was from a prominent family (Figure 4). He was educated at Wanganui College, New Zealand, where he was captain of the cricket team. Later, he studied at Gonville and Caius College, and attended medical school at the University of Cambridge, England^{5,10,11}.

He overcame the difficulties caused by a stiff elbow after a childhood accident and managed to row for Cambridge in the famous boat race against Oxford in 1904, as well as play for England against Scotland,



Figure 4. Gillies at approximately 8 years of age (courtesy of Dr. Andrew Bamji, Gillies Archivist, BAPRAS).

winning at the Royal St George Grand Challenge Cup, in Sandwich, in 1913.

He graduated in Otorhinolaryngology at St Bartholomew's Hospital in 1906 and became a Fellow of the Royal College of Surgeons in 1910¹¹.

After the outbreak of the First World War, in 1914, he joined the Royal Army Medical Corps (entering as a captain and ended his career as a major). In 1915, he volunteered for the Red Cross in the French village of Wimereux, where he met a Franco-American dentist named Charles Valadier, who worked in a British field hospital. Gillies was surprised by Valadier's approach to treating jaw injuries. Inspired by this dental approach to facial lesions, Gillies decided to visit the French plastic surgeon Hippolyte Morestin, who was performing the most advanced reconstructive surgeries of the time at Val de Grâce Hospital, Paris¹.

At the end of the war, American observers came to Sidcup; the most significant of these was Vilray Blair, who, together with Varaztad Kazanjian, the “miracle worker of the Western Front,” worked as a dentist in French hospitals.¹² Blair then returned to the United States to virtually found plastic and maxillofacial

surgery in that country. Gillies, in his book «Principles and Art of Plastic Surgery, coauthored with Millard, contrasted the enthusiasm with which the American medical establishment embraced plastic surgery with the difficulties and obstacles it faced in the UK (without disguising some envy)⁶.

In 1917, he described a series of cases in which the temporal muscle was used as a transposition flap for deformities caused by zygomatic loss. His inspiration for this technique came from German surgeons who used temporal fascia flaps to treat facial paralysis. Many surgeons started to use this flap to support and reconstruct the orbit¹³.

Two anesthetists who worked with Gillies, Stanley Rowbotham and Ivan McGill, became leaders in their specialty, and were the originators of the nasotracheal intubation technique, which later became widespread¹².

The working conditions in the initial period of development of his work were difficult, prior to the advent of antibiotics (sulfonamides became available in the late 1930s, and penicillin was introduced in 1943). Without knowledge of the need for adequate hygiene, several patients had multiple dental infections. Given this limited pharmacological environment, one of the precepts preached by Gillies and adopted by Cushing was early surgical debridement of craniofacial lesions, which helped reduce local infection and brain abscesses⁹.

The artist Henry Tonks, who began his career as a surgeon and was also a member of the Royal College of Surgeons, was recruited to record the cases by means of beautiful paintings and sketches (now on display in the Hunterian Museum at the Royal College of Surgeons, London), and to assist in the planning of repair work.

One of Gillies' pupils was his distant cousin, Sir Archibald McIndoe, who was one of his collaborators during the Second World War, and one of the proponents of British plastic surgery in this period. McIndoe was later recognized as Britain's leading burn authority for his treatment of aviators at the Royal Air Force Hospital in East Grinstead^{5,14}, and was knighted in 1930.

Gillies was considered an excellent golfer (Figure 5), with a handicap of +2, having played three times for England against Scotland (including at St. Andrew's, the cradle of golf), which led him to be the object of a cartoon in *The Daily Mail* for his ability to tee off cleanly from a bottle of beer. His passion for the sport was such that he sometimes neglected his duties, even keeping members of the nobility waiting¹⁰. Gillies was also a great fisherman and promoted the benefits of outdoor living (Figure 6).

He reported and extensively demonstrated rhinoplasty techniques, which he applied in his private aesthetic practice^{15,16}. In 1932, he described the use of direct pedicle flaps, rather than tubular flaps, which entailed only two surgical interventions¹⁷. He treated



Figure 5. Harold Gillies card contained in packet of Wills cigarettes in series celebrating great British golfers (courtesy of Dr. Andrew Bamji, Gillies Archivist, BAPRAS).

and described the management of congenital and traumatically acquired palatal clefts¹⁸ (Figure 7). In 1947, with the founding of the British Association of Plastic Surgeons, Gillies was chosen as its first president. He was awarded honorary degrees at multiple universities and plastic surgery associations all over the world, having travelled extensively throughout South America.

As for his versatility, one can highlight significant activities, such as his collaboration with the American Harvey Cushing - a great pioneer of neurosurgery - in complex cases of combined facial and cranioencephalic lesions^{6,9,12}.

In addition to his role in reconstructive facial surgery, Gillies is also considered a pioneer in reconstructive genital surgery, including genital reassignment. Jacques Joseph had already performed, in the interwar period, a sex change from male to female, but the opposite procedure had not yet been performed.

Gillies was persuaded to perform the procedure on Laura Dillon, a medical student at that time. She had already been submitted to a double mastectomy and the use of exogenous androgens, and changed her name to Michael. The initial surgery was in 1946, and achieved



Figure 6. Gillies on a fishing trip, practicing one of his favorite hobbies (courtesy of Dr. Andrew Bamji, Gillies Archivist, BAPRAS).



Figure 7. Seaman Vicarage. First tubular pedicle flap performed by Gillies (From Gillies: "Plastic Surgery of the Face", London, 1920).

some degree of success, despite the imperfect form of the neo-penis¹¹.

Of all the facial plastic surgeries, he considered rhinoplasty to be the most difficult, "except perhaps otoplasty, in which I do not have much experience," the reason being that these would be, in his opinion, "final organs" (body extremities). As in the current literature, he identified the three elements that needed to be reconstructed: 1) the outer layer, the skin; 2) cartilage and bone support; and 3) the inner lining mucous membrane. These principles are still applicable^{16,19}. Nevertheless, when described as a pioneer in the field of plastic surgery, his humility forced him to argue that it was an ancient art¹⁴.

One of his best-known phrases is that "restorative surgery is an attempt to return the patient to normality; aesthetic surgery, an attempt to overcome normality"³.

DISCUSSION

Although focusing primarily on facial plastic surgery and repair, the interests of Gillies expanded to the use of flaps, microvascular surgery, and correction of limb amputations. Like other surgeons, Gillies acknowledged that science sometimes needs wars to evolve¹⁴. In addition, he was also interested in surgical treatment using pedicled grafts and flaps in patients who had undergone external radiotherapy, a modality that at the time was used for diverse pathologies, including cosmetic removal of axillary hair, exophthalmic goiter, lupus, psoriasis, and abdominal and gynecological tumors^{6,20}.

He was a great proponent of the multidisciplinary approach in the pre- and postoperative care of patients. One of Gillies' best-known aphorisms is "never do today what can be honestly done tomorrow," that is, he reiterated the need for adequate preoperative preparation to optimize outcomes¹. What may have been his most important advice was "keep records," including medical history, detailed and well-described physical examinations, and pre- and post-operative photographs, which were all relevant, especially for use in medical education, knowledge dissemination, and medicolegal matters^{11,19,21}.

His maxim of "never throw away anything until you are sure you will not need it" is a doctrine that perpetuates itself in all areas of plastic surgery and repair. Gillies was constantly developing new techniques to deal with common problems. His technique for the treatment of eyelid ectropion integrated the Esser epithelial inlay, which was used to deepen the labiogingival groove, with Thiersch grafting. He used this technique in other cases,

notably for burn-induced adhesions between the pinna and scalp¹⁰.

Several surgical instruments were also developed or improved by Gillies, among them forceps, the zygomatic elevator, skin hooks, needle holders and scissors, which remain in use today. It is speculated that his eponymous, more ergonomic needle holder is the result of the elbow fracture sustained in childhood, which limited his ability to pronate and supinate; however, parallels are drawn between the ergonomics of the needle holder and a golf club handle²².

From all the above and the countless reports on the life and works of Gillies, his contribution to plastic surgery is undeniable. He was a versatile and innovative surgeon and a pioneer in restorative surgery, providing a theoretical basis for the development of cosmetic surgery as we know it today.

His work in various fields of restorative surgery - pedicle flaps, genital alterations, craniofacial correction, microvascular repair - designates him as the complete surgeon, with extensive knowledge in overlapping areas that serve as the basis for the current training curriculum of a plastic surgeon.

CONCLUSION

In reviewing the life of Sir Harold Gillies, the enormous contribution he made to modern reconstructive plastic surgery becomes evident. His legacy comprises a diversity of techniques and concepts developed on the French battlefields in 1915 that proved their relevance to the principles in use today, a century later. The foundation of knowledge left by Gillies made it possible to achieve advances such as heterologous dermal matrices, magnetic resonance, and microsurgical reconstructions.

Finally, as in the famous quote by Sir Isaac Newton attributed to Bernard de Chartres - "If I have seen further, it is by standing on the shoulders of giants" - it is essential to bear in mind that future progress in surgery must build on the techniques developed by pioneers who preceded us.

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COLLABORATIONS

PSP Analysis and/or interpretation of data; final approval of the manuscript; conception and design of the study; writing the manuscript or critical review of its contents.

PG Final approval of the manuscript; conception and design of the study; writing the manuscript or critical review of its contents.

GFD Final approval of the manuscript; conception and design of the study; writing the manuscript or critical review of its contents.

GBC Conception and design of the study; writing the manuscript or critical review of its contents.

RFMR Analysis and/or interpretation of data; final approval of the manuscript; conception and design of the study.

COU Analysis and/or interpretation of data; final approval of the manuscript; conception and design of the study; writing the manuscript or critical review of its contents.

MPO Analysis and/or interpretation of data; final approval of the manuscript; conception and design of the study; writing the manuscript or critical review of its contents.

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Annex 1. Gillies' Principles: excerpts from: Bamji A. Sir Harold Gillies: surgical pioneer. Trauma. 2006;8(3):143-56¹¹.

Gillies' Principles
1) Observation is the basis of surgical diagnosis. There is no better training for the surgeon than being taught by accompanying a doctor more senior.
2) Diagnose accurately before you treat.
3) Make a plan for surgery; use paper or bandages to draw the defect and a mirror-image. Do not expect to run in to work with a piece of skin.
4) Keep records. Start with diagrams. While you operate, have an artist or someone with a camera record the procedure. Following surgery, take photographs.
5) Always have a backup. It is good to have a plan.
6) Good technique will overcome many problems. Surgical technique is an expression of personality and training displayed by movements of the fingers. Your brand is dexterity and care with tissue.
7) Reconstruct what is normal and hold it there. If some of the facial bones are out of place, put them back and secure them. If a tissue defect is too large for primary closure without distortion, it is best to keep what remains in normal position to define the defect to be corrected.
8) Treat the primary defect first. Borrow from Peter to pay Paul only when Peter can afford it. When Mohammed is far from the mountain, try to bring the mountain to Mohammed.
9) Losses should be replaced by a similar tissue. Thus, the scalp should be used for the eyebrow, thin skin for an eyelid, and thick skin for the palm.
10) Do something positive. When a lacerated lip looks like a puzzle, look for anatomical landmarks. If you find two pieces that definitely fit together, join them. You will at least have made an important first move.
11) Never discard anything. In plastic surgery, never discard something until you are sure you will not need it.
12) Never allow routine methods to become your master. Routine methods should be mastered, but never let them dominate you. The answer to the question "how do I do this or do I rebuild it?" should be, as in every surgery, "show me the case!"
13) Consult other experts. A man's mind is sharpened by the urge to share common problems.
14) Speed in surgery is not doing the same thing twice. It is the old story of the hare running back and forth with great speed, as the turtle, without having to retrace steps, slowly reaches the finish line.
15) Postoperative care is as important as the planning of the surgery itself. How futile it is to lose a graft or flap for lack of good postoperative care.
16) Never do today what can be left for tomorrow in an honest way. When in doubt, do not operate. It is good to remember that time - despite being the greatest critic of the plastic surgeon - is also his greatest ally.