

History of Surgery

United States Excerpted from the Illustrated History of Surgery

Dr. Mostafa Jaberansari*

William Halsted (1852–1922) was born into a prosperous merchant family in New York City, his ancestry tracing back to English émigrés from the 1640s. He completed his undergraduate education at Yale University in 1874 and consecutively excelled in the entrance examinations for the College of Physicians and Surgeons in New York. Recognized as one of the foremost students of his time, Halsted graduated in 1877, ranking among the top ten in his medical school cohort. In accordance with the college's regulations, each student was required to engage in studies and practical work under the mentorship of a faculty member. Halsted's mentor was the esteemed anatomist, Henry Sands (1830–1888), a surgeon of significant repute. Additionally, Halsted assisted John Dalton (1825–1889), a pioneering experimental physiologist. The influence of these two remarkable professors played a crucial role in Halsted's evolution into a skilled surgeon.

He completed an 18-month internship at Bellevue Hospital and subsequently served briefly as a resident surgeon at New York Hospital. Following the acquisition of financial support, he journeyed to Europe to pursue further studies. In correspondence with his close friend and confidant, William Welch (1850–1934)—who held the position of professor of pathology at Johns Hopkins—Halsted articulated his beliefs, experiences, and observations during his travels.

* General and Pediatric Surgery Specialist, Mehrad Hospital

Corresponding author: Dr. Mostafa Jaberansari

Tel: 88505595-7

E-mail: ansari_17@yahoo.com



Image 1 - *The Agnew Clinic*: Portrait of David Hayes Agnew, 1889, by Thomas Eakins (1844-1916). This painting, created fourteen years after Eakins' renowned work, *The Gross Clinic*, represents a significant evolution in the depiction of surgical practice. In this piece (dimensions: 30.5 x 74.5 inches), Agnew and his team are depicted in surgical attire, underscoring the growing acceptance of antiseptic techniques. In contrast to the era of *The Gross Clinic*, when antiseptic measures were not widely implemented in America, Agnew's team utilized sterilized instruments. At the time of this painting, the use of surgical gloves and face masks remained uncommon. The procedure illustrated is a mastectomy performed due to breast cancer, notably featuring a female operating room nurse as an integral member of the surgical team, in contrast to the previous painting, which solely included a female relative of the patient.

He noted, "In the autumn of 1878, I embarked for Europe by ship... My primary focus was on anatomy... I traveled by train to Vienna, where I attended Billroth's clinic... My collaboration with embryologist Schenck proved exceedingly valuable, fostering a friendly association with Wolfler, Billroth's first assistant. We often dined together, allowing me unrestricted access to the surgical wards... I was especially impressed by the volume of surgical procedures performed, the skill of Billroth and his assistants—particularly Mikulicz—and the extensive use of arterial forceps... In the

spring of 1879, I departed Vienna for Würzburg, where I regularly attended Von Bergmann's clinic... I returned to Vienna in the autumn and, shortly after Easter, journeyed to Leipzig... I gained much from attending Thiersch's clinic, despite his focus on minor procedures... I spent several productive weeks in Halle with Volkmann, who kindly invited me to his home multiple times... From Halle, I traveled to Berlin, Hamburg, and I believe Kiel with Esmarch... By early September 1880, I was back in London, passing through Paris before returning to New York..."

The two years that Halsted spent in Europe profoundly influenced his perspective on surgical education. He became acutely aware of the significant disparities in surgical training between Germany and the United States, although he felt powerless to initiate reform. Despite the existence of numerous training hospitals in the U.S., the prevailing model of surgical education remained largely confined to operating room work, exhibiting minimal integration of foundational sciences with clinical diagnosis and treatment.

Consequently, many American surgeons relied on self-education, often unwilling to share their acquired skills with aspiring practitioners who could potentially evolve into competitors. It is difficult to identify a singular German surgeon as the principal influence on Halsted's educational philosophy; instead, it was the overall educational and research environment in Germany during the mid-nineteenth century that left a profound impact on his views regarding surgery and education. This perceptive American surgeon could not overlook the remarkable success of the German educational system in cultivating highly skilled surgeons during his initial experiences in German-speaking countries. Ultimately, these influences played a pivotal role in the establishment of a modern surgical education system in America, firmly rooted in Halsted's principles.

William Halsted returned to New York in September 1880, promptly receiving an appointment as an instructor of practical anatomy at the College of Physicians and Surgeons, his alma mater. He also accepted an offer from his mentor, Henry Sands, to assist in surgical procedures at Roosevelt Hospital. At this institution, Halsted further distinguished himself by establishing the outpatient department and undertaking pioneering work with cocaine and local anesthetics.

The early 1880s represented a remarkable period in Halsted's life. In contrast to the latter years of the decade, when his cocaine addiction would profoundly alter his personality and lead to social isolation, these initial years were characterized by a vibrant social life in New York. Between 1882 and 1886, he authored or presented over twenty articles on a variety of surgical topics. However, by late 1884 or early 1885, he and several colleagues at Roosevelt College inadvertently developed a dependency on cocaine, a consequence of their innocent exploration of its medical applications. As the grip of addiction tightened, Halsted's professional life began to deteriorate. During episodes of anxiety induced by the drug, he increasingly turned to morphine and alcohol, leading to a noticeable decline in his attendance at meetings and conferences. By April 1885, he found himself unable to deliver the lecture series essential for competing for a surgical position at his former institution. As Halsted's health continued to decline, he embarked on a lengthy sea voyage to the Windward Islands in February 1886, hoping it would restore his well-being. Unfortunately, this attempt proved futile. In May of that year, encouraged by friends and family, he voluntarily admitted himself to Butler Hospital in Rhode Island, a renowned facility for the treatment of mental health and psychological disorders, including substance abuse.



***Image 2 - *The Johns Hopkins School of Medicine and Hospital*:* This image portrays the institution shortly after its establishment in 1893 by John Shaw Billings. The collaborative efforts of innovative medical and surgical faculty yielded remarkable achievements in medicine and surgery almost immediately following the school's inauguration. The notable founding figures of the School of Medicine included William Osler, Professor of Medicine; William H. Welch, Professor of Pathology; Howard A. Kelly, Professor of Gynecology and Obstetrics; and William S. Halsted, Professor of Surgery (Archives of the Allen M. Chen Medical Institute, Johns Hopkins Medicine, Baltimore).**

After seven months of insufficient treatment, he was discharged in November 1886; although he likely overcame his cocaine dependence, he developed a new reliance on morphine. Convinced that his career in New York was effectively over, Halsted accepted an invitation from his old friend William Welch to relocate to Baltimore and assist in the establishment of a new laboratory at Johns Hopkins University. Remarkably, upon his arrival in Baltimore, he did not seek a professorship or an official position within the university; rather, he came solely to support a friend during a challenging period. Welch, well aware of Halsted's struggles, recognized his exceptional abilities as a surgeon. Despite the tumultuous conditions, Halsted's initial progress was impeded when he was readmitted to Butler Hospital in April 1887 after pausing his studies on circular intestinal sutures at Harvard Medical School, which emphasized the significance of the submucosal layer. This hospitalization lasted nine months, during which his issues were addressed, and he was ultimately classified among those who

had successfully overcome drug addiction. He returned to Baltimore in January 1888, resuming his work in Welch's laboratory, as well as visiting patients and performing surgeries at various hospitals throughout the city, all while aspiring to secure a position at the soon-to-be-opened Johns Hopkins Hospital. The search for a surgical professor proved challenging for the institution; however, as Halsted's health improved, he was appointed chief surgeon of the outpatient clinic and a hospital surgeon in February 1889. Later that same year, he was promoted to assistant professor of surgery, although he would not attain a full professorship until 1892. Despite ongoing speculation regarding his habits, it is crucial to note that Halsted continued to utilize morphine throughout his career. Although he experienced significant personality changes and withdrawal symptoms, his physical and mental condition did not exhibit a noticeable decline during his 40-year struggle with addiction. From 1889 until his death in 1922, Halsted led a department that nurtured numerous talented and influential figures in American surgery, who subsequently disseminated his educational philosophy across various surgical departments nationwide.

William Halsted did not author a textbook, monograph, or thesis; instead, all of his written contributions were published in various academic journals and periodicals. In 1889, he developed an innovative technique for the treatment of inguinal hernias, which significantly advanced surgical procedures. Throughout the 1890s, he provided a comprehensive account of the radical mastectomy procedure for breast cancer through a series of influential publications, thereby making substantial contributions to the field. In 1892, Halsted achieved a remarkable milestone by successfully ligating the left subclavian artery for the first time. Fifteen years later, in 1909, he introduced a metallic band designed for arterial ligation and conducted pioneering research on the autotransplantation and isotransplantation of the parathyroid gland. Additionally, Halsted is recognized for his development of the subcuticular stitch, a technique that facilitates the neat apposition of skin incision edges.

Halsted fundamentally transformed surgical education by pioneering the residency system at Johns Hopkins Hospital, marking the inception of the first program of its kind in the United States. His vision extended beyond the mere training of proficient surgeons; he aspired to cultivate future leaders in surgery, thereby establishing a comprehensive school of surgical principles and practices that would resonate throughout the medical community. Over the course of his 33-year tenure directing the surgical training program, Halsted mentored 17 surgical residents, seven of whom subsequently achieved professorships at prestigious institutions. These distinguished individuals included Harvey Cushing (1869-1939) at Harvard, Stephen Watts (1877-1953) in Virginia, George Hauer (1882-1950) in Cincinnati and Cornell, Mont Reid (1889-1943) in Cincinnati, John Churchman (1877-1937) at Yale, Robert Miller (1886-1960) in Pittsburgh, and Emile Holman (1890-1977) at Stanford.

Additionally, Roy McClure (1882-1951) became the chief surgeon at Henry Ford Hospital in Detroit, while James Mitchell (1871-1961) attained a professorship in clinical surgery at George Washington University. Joseph Bloodgood (1867-1935) and Walter Dandy (1886-1946) continued their impactful careers at Johns Hopkins University. In total, 55 individuals who served as assistant professors and surgical residents under Halsted went on to make significant contributions to the field of surgery in America, particularly within surgical specialties. Among these notable figures were Hue Young (1870-1945), a professor of urology; William Baer (1872-1931), a professor of orthopedic surgery; and Samuel Crowe (1883-1955), a professor of otolaryngology—all of whom remained affiliated with Johns Hopkins University.

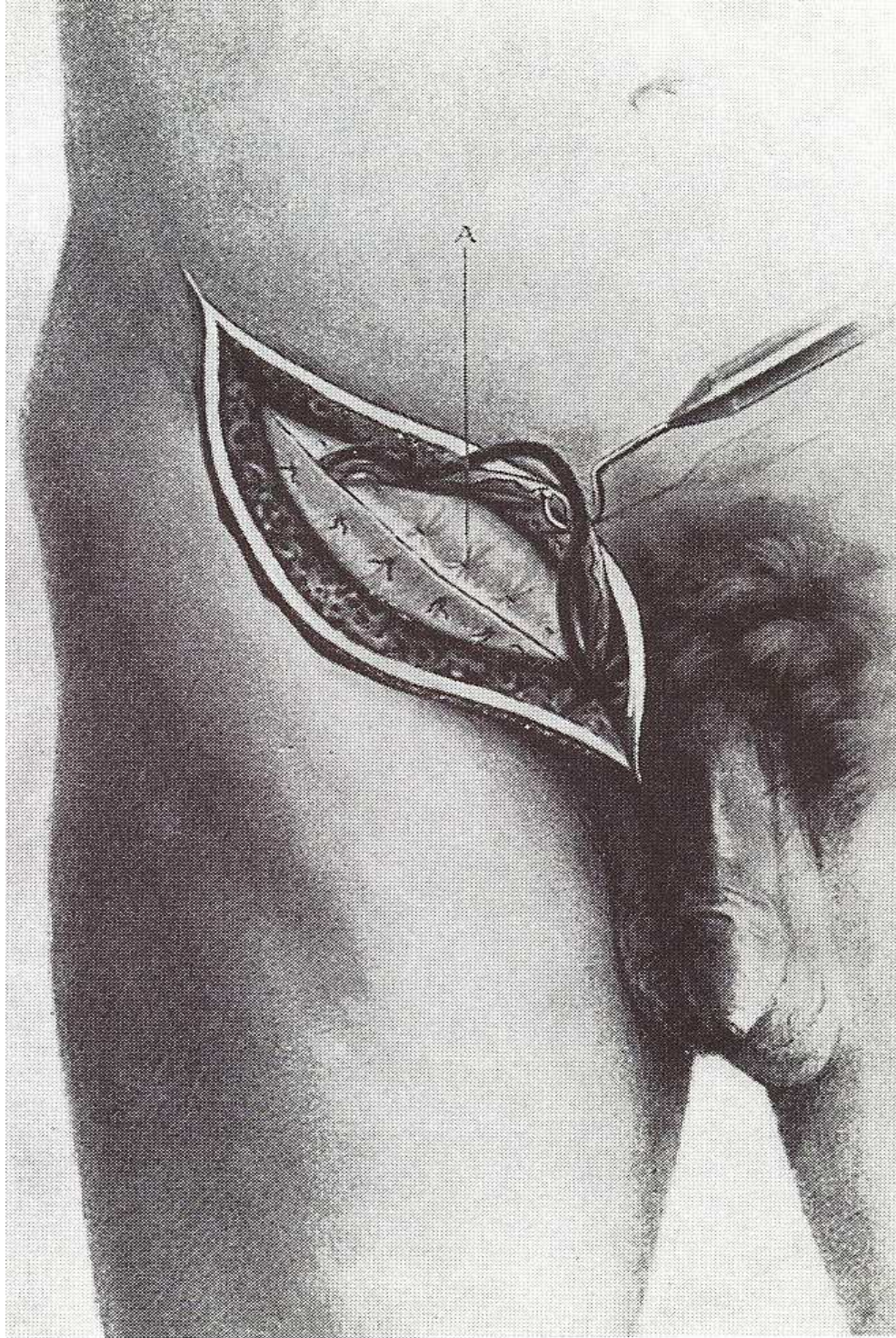


Image 3 - The repair of an inguinal hernia employing the technique developed by William S. Halsted, which remains among his most controversial and frequently misconstrued innovations. This image depicts the edges of the aponeurosis of the external oblique muscle, which have been approximated and sutured together utilizing interrupted (non-continuous) stitches. Subsequently, the spermatic cord is positioned atop this layer, thereby concluding Halsted's method of hernia repair (Johns Hopkins Hospital Bulletin, Volume 4, Pages 24-17, 1893).