

# Medicine in Stamps

## William Stewart Halsted (1852–1922): father of American surgery

Tan S Y, MD, JD and Uyehara P\*

Professor of Medicine, John A Burns School of Medicine, University of Hawaii

\*Research carried out during senior elective, John A Burns School of Medicine, University of Hawaii

**W**illiam Halsted is not remembered as an affectionate man. He was neither a beloved teacher nor a particularly compassionate surgeon. But his accomplishments were many, and his revolutionary surgical education and techniques vastly improved patient outcomes. To many in American academia, he is the unquestioned father of modern day surgery.

**FIRST GIFT** Any nurse, operating room technician, medical student or physician would appreciate an early example of a Halsted contribution, the latex glove. The story of its genesis is perhaps the only glimpse of sentimentality in this man's life. Halsted had been working with Caroline Hampton, an able first assistant in the operating theatre at Johns Hopkins University Hospital when he noticed that her hands were chaffed and raw from the strong disinfectant mercuric chloride. Accordingly, he approached the Goodyear Rubber Company for custom-made protective gloves. It was an intervention conceived in romance and ending in marriage. Surgical gloves, meanwhile, became an effective and trendy ritual in the operating room.

**FRAMEWORK** Having been born to a well-heeled family, Halsted received a privileged education, first supervised by a governess until age ten, then attending Andover and Yale. His initial interest was in sports, and it was not until his senior year at Yale that he decided to become a physician. Perhaps it had something to do with his college dormitory being located next door to a medical clinic. He attended the New York College of Physicians and Surgeons, and upon graduation in 1876, travelled to Europe to further expand his medical education. As was then the tradition, Germany was the favoured destination. During his travels, Halsted met many European pioneers, among whom were Rudolf Virchow and Theodor Billroth. He befriended Billroth's assistant Anton Wülfler

in Vienna, and mastered human anatomy and pathology, which served him well in his future surgical innovations. His German exposure heavily influenced the overhaul of medical education at John Hopkins, whose curriculum was promptly embraced as the gold standard for residency programmes throughout America.

In 1880, Halsted returned to New York and established a reputation as a skilled surgeon, a daring experimenter and a productive researcher, performing some of the earlier experiments on blood transfusions. Alas, within a few years, he fell prey to cocaine addiction. Just as Freud had so catastrophically experimented with cocaine to determine its effect on the central nervous system, Halsted was attracted by the prospect of its anaesthetic potential. After Karl Koller showed that a few drops of cocaine could anaesthetise the surface of the eye, Halsted began to experiment with its effect on the buccal mucosa. In 1884, he persuaded some of his students to undertake the experiment with him and most promptly became addicted. He himself succumbed, and battled this demon for the rest of his life.

**LEGACY AT JOHNS HOPKINS** Halsted's greatest triumphs came after he was recruited to Johns Hopkins in 1888 by his friend and guardian William Welch, Professor of Pathology. Originator of the Halsted School of Surgery, Halsted modelled it after the German system, filling it with many assistants, a few residents and one chief resident who held the position for two years. The chief resident was taught by Halsted himself, and was in turn responsible for teaching those below him. It has been estimated that a dozen of Halsted's chief residents went on to become professors of surgery in medical schools such as Yale and Stanford. Harvey Cushing, the father of neurosurgery, was probably his most notable trainee.



Johns Hopkins, boasting “the contagious companionship of excellence,” became the Mecca of American medicine. Its winning formula: insistence on an affiliated university teaching hospital, postgraduate qualifications for entering medical students, a rightful place for women applicants, and uncompromising quality centring on the triad of patient care, teaching and research.

**HALSTEDIAN APPROACH** Halsted took pride in his careful and meticulous surgical techniques. One of the most lasting fruits of the countless evenings that he spent in the anatomy lab was his respect for human tissue. It taught him that gentle handling of lacerated tissues would aid healing by causing less damage to the blood and nerve supply in the operative field. In an age of catgut suture, he proposed instead, the use of fine silk to better approximate the intricate histology of the human body. Halsted emphasised respect for suture placement, and his mantra of “don’t strangle the tissue with suture” continues to echo in countless operating theatres today. He also hypothesised that infections following surgery may be reduced if the superficial layers were closed one at a time, the aim being to reduce the dead space that could serve as a nidus of infection. His careful attention to detail in this manner greatly reduced incidences of site infections, suture breakdown, skin breakdown and postoperative abdominal abscess formation. The sum of these recommendations became known at Johns Hopkins as the legendary Halstedian approach to surgery.

**NOVEL PROCEDURES** In 1889, Halsted described the first radical mastectomy. Breast cancer, at the turn of the twentieth century, was a devastating disease with no documented successful treatment, surgical or otherwise. In addition, it was uncommon to operate for palliation, and as a result, most women suffered greatly with their cancerous growths spreading and invading the chest wall. Halsted devised the en bloc method of removing the breast, lymph nodes and muscles of the chest wall. This had the immediate impact of removing the necrotic foul-smelling tumour, even if cure was not always possible. Although Halsted’s radical mastectomy is no longer in vogue today, it offered real hope for victims of breast cancer at the time. At the American Surgical Association meeting in 1898, Halsted described his series of 133 patients, 76 of whom had survived for three years, and 52% were disease free. Halsted also gets the credit for the working definition of a successful cancer treatment as one which maintained the patient in a disease-free state for a period of five years.

In 1890, Halsted published “The Radical Cure of Inguinal Hernia in the Male,” which evolved into the Halsted II procedure. Many careful dissections had convinced him

of the complex but orderly nature of the abdominal wall, and this knowledge enabled him to tackle hernia repair, hitherto without satisfactory surgical treatment. In 1907, Halsted described the first successful surgical treatment of hyperparathyroidism. He also contributed greatly to thyroid surgery, doubtlessly being influenced by his European friend, Theodor Kocher, the Nobel-prize winning Swiss thyroid surgeon. Coupled with many years of research on the anatomy and physiology of the thyroid gland in dogs, Halsted authored “The Operative Story of Goitre, the Author’s Operation” in 1920. In it, he chronicled his experiences with 650 operations for hyperthyroidism.

**ADDICTION** For all his brilliance, Halsted was a hapless drug addict, first to cocaine and later, to morphine. Through the haze of drug intoxication, he continued to operate, at one point serving as an attending surgeon at five different area hospitals as well as being Chief of Surgery at Hopkins. By all accounts, he remained fully functional. Yet, addiction did render him a social recluse, who would steal away to brief meetings or extended summer sojourn in Europe, presumably to feed his drug habit. While Halsted was a vibrant and enthusiastic teacher and practitioner in his earlier days in New York, he was now an uninterested chief, aloof and despondent. He made several attempts at drug rehabilitation, including hospital stints at Butler Hospital, a private psychiatric facility, but was unable to completely kick the habit.

Throughout his life, Halsted was plagued by multiple minor illnesses, and a serious bout of bronchitis in 1919 caused him to be house-bound for two months. Before he could fully recover, he developed abdominal symptoms indicative of gallstone disease. Surgery was followed by a prolonged and incomplete recovery, with recurrent bouts of colic. In 1922, Halsted developed fever, abdominal pain and jaundice. Two of his former surgical trainees were summoned to Baltimore to operate on the professor. They removed a large obstructing stone, but his postoperative course was complicated by gastrointestinal bleeding and pneumonia. William Halsted died on September 7, 1922, his remains buried in New York, where his illustrious surgical career began.

#### BIBLIOGRAPHY

- Hamman SA. The magnificent seven: a history of modern thyroid surgery. *Int J Surg* 2006; 4:187-91.
- Jarcho S. William Halsted on refusion of blood in carbon monoxide poisoning (1883). *Am J Cardiol* 1961; 7:589-97.
- MacCallum WG. William Stewart Halsted – Surgeon. Baltimore: The Johns Hopkins Press, 1930.
- Nuland SB. Doctors: The Biography of Medicine. New York: Vintage Books, 1988.
- Sakorafas GH. The origins of radical mastectomy. *AORN J* 2008; 88:605-8.
- Thorwald, J. The Century of the Surgeon. New York: Panteon Books, 1956.