

1905: Frozen section technique revolutionizes surgery

Three unique attributes of Minnesota – and Mayo Clinic – converged in the winter of 1905 to change the course of cancer surgery:

- A winter of below-freezing temperatures
- An embrace of scientific advances by Drs. William J. and Charles H. Mayo
- The hiring of Dr. Louis B. Wilson, who was driven to see nature revealed at the cellular level

From Kodak to Mayo

Dr. Wilson was an expert at microscope-based research and a pioneer in visualizing diseased tissues. He consulted leading image innovators of the day such as George Kodak in New York, and the Lumière brothers in France, who invented motion picture technology.

In 1893, while teaching biology at Central High School in St. Paul and attending medical school classes, Louis Wilson loaned his prized microscope to the distinguished bacteriologist and future U.S. Surgeon General, Dr. Walter L. Reed, whose mentorship helped inspire the young scientist's career. After earning his degree, Dr. Wilson worked for the Minnesota State Board of Health and served on the faculty of the University of Minnesota, where he came to the Mayo brothers' attention.

An open window to medical history

Shortly after Dr. Wilson arrived in Rochester in January 1905 as chief pathologist and director of laboratories, Dr. Will Mayo said to him: "I wish you pathologists would find a way to tell us surgeons whether a growth is cancer or not while the patient is still on the table." Dr. Will was frustrated that it involved one operation to get a tissue specimen, days to determine if it was malignant, anxiety for the patient who had to wait for answers, and a second operation if lab results showed the patient had cancer.

In response, Dr. Wilson took advantage of the Minnesota winter by placing a specimen on the hospital window ledge. After it quickly froze, he cut the tissue, applied several dyes and washes, and mounted the results on a glass slide. The results were brilliantly clear images that revealed cellular detail to an unprecedented degree. If the specimen indicated cancer, surgeons would continue to provide diagnosis and treatment in one procedure. If the tissue was benign, the operation would conclude and the patient went home with peace of mind.

By April, Dr. Wilson could freeze, cut, stain and provide a diagnosis to surgeons within five minutes, often as quickly as two minutes. This advance revolutionized surgery and accelerated the fame of the Mayos' practice.

Today, one of the distinctive attributes of Mayo Clinic is the strong collaboration of surgeons and pathologists. Diagnostic facilities are located near operating rooms, fulfilling Dr. Will's vision for a single surgical session to minimize trauma to the patient, speed treatment and improve outcomes.

SOURCES

1. Brataas, Anne. 2010. "Louis B. Wilson and Visualizing Healing: The Creative Arc and Long Reach of a Mayo Physician's Life." Mayo Clinic History of Medicine Presentation. Mayo Clinic, Rochester, Minnesota.
2. Clapesattle, Helen. 1941. *The Doctors Mayo*. The University of Minnesota Press.
3. Gal, Anthony, M.D. 2005. "The Centennial Anniversary of the Frozen Section Technique at the Mayo Clinic." *Archives of Pathology & Laboratory Medicine*. Vol. 129:12; p.1532.
4. Heilbron, Bertha L. 1943. "Walter Reed in Minnesota." *Minnesota History, Journal of the Minnesota Historical Society*. Vol. 24:4; p. 207.