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The Gross clinic, the Agnew clinic, and the Listerian revolution.

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The Gross Clinic, The Agnew Clinic, and the Listerian Revolution

Thomas Eakins was an American artist whose unique and prolific style set him apart from other artists of the late 19th century.[1] He chose to portray his subjects with intense objectivity, never deviating from reality. Even during his era when art was expected to be always beautiful, demonstrating Victorian morals of decency and decorum, Eakins chose to paint the naked truth.[1] Walt Whitman was noted to have said, "I never knew of but one artist, and that's Tom Eakins, who would resist the temptation to see what they ought to be rather than what it is."[2] It was Eakins' rigid adherence to painting reality that contributes to the present understanding of surgical practices in the late 19th century. Eakins' attention to detail is exemplified in both *The Gross Clinic* (1875) (Fig. 1) and *The Agnew Clinic* (1889) (Fig. 2).

In 1875, with the anticipation of the upcoming U.S. Centennial International Exhibition, Thomas Eakins painted a portrait of Dr. Samuel D. Gross, arguably the most famous surgeon of the day.[3] The artist wanted the portrait to portray not only one of the country's most outstanding surgeons, but he also wanted to highlight the scientific advances in surgery.[3] To do so, he painted Professor Gross in his surgical amphitheater performing a somewhat novel operation: removing necrotic bone in a case of osteomyelitis as opposed to lower extremity amputation. Fourteen years later, it was 25 students from the University of Pennsylvania who approached Thomas Eakins, offering him $750 to paint a portrait of their beloved, retiring professor, Dr. Hayes Agnew.[3] Eakins accepted their offer and, for no additional charge, chose to greatly expand the piece. His largest piece yet, *The Agnew Clinic*, was a three-panel panorama of a surgical amphitheater picturing Dr. Agnew and his medical team performing a mastectomy surrounded by a theater full of vividly portrayed medical students.

In contrasting the two paintings, it becomes evident that surgical technique had dramatically changed over 14 years. Whereas Dr. Agnew is portrayed embracing Dr. Joseph Lister's principles of antisepsis, Dr. Gross is quite obviously not. Dr. Lister was a revolutionary in his day. At a time in which surgeons believed the presence of pus in a wound was a positive sign, believing that the draining purulent matter signified the expulsion of dead tissue, Dr. Lister argued that a healthy wound, in fact, contained no pus.[4] He took Louis Pasteur's theories of bacterial contamination and applied them to surgical infections.[4] Dr. Lister aimed to prevent microbial entrance into an injury and stressed an antiseptic system of surgery, one that included soaking surgical sponges and bandages in a solution of carbolic acid, spraying a wound with an antiseptic solution during the operation, washing all surgical instruments, rinsing hands before beginning an operation, and wearing appropriate surgical gowns.[4] Dr. Agnew was one of the first surgeons in the United States to pioneer antiseptic technique.[2] As manifested in 1889 in *The Agnew Clinic*, Dr. Agnew, holding a clean scalpel, and his staff are dressed in white, starched, aseptic gowns without a trace of blood. The patient is without street clothes and is draped in a sterile fashion. The surgical instruments are clean and arranged carefully on a surgical tray. Fourteen years prior, in 1875, Dr. Gross demonstrated no such antiseptic technique, although Dr. Lister's ideas were presented in the mid-1860s. In fact, when Dr. Lister gave his 3-hour discourse to the International Medical Congress in 1876, Dr. Gross remarked, "Little, if any, faith is placed by any enlightened or experienced surgeon on this side of the Atlantic in the so-called carbolic acid treatment of Professor Lister. . . "[1] Dr. Gross and colleagues are portrayed wearing ordinary dark street coats over their shirts and ties. The coats were the same ones worn in every operation and were rarely, if ever, devoid of blood or pus.[4] In Dr. Gross' time, it

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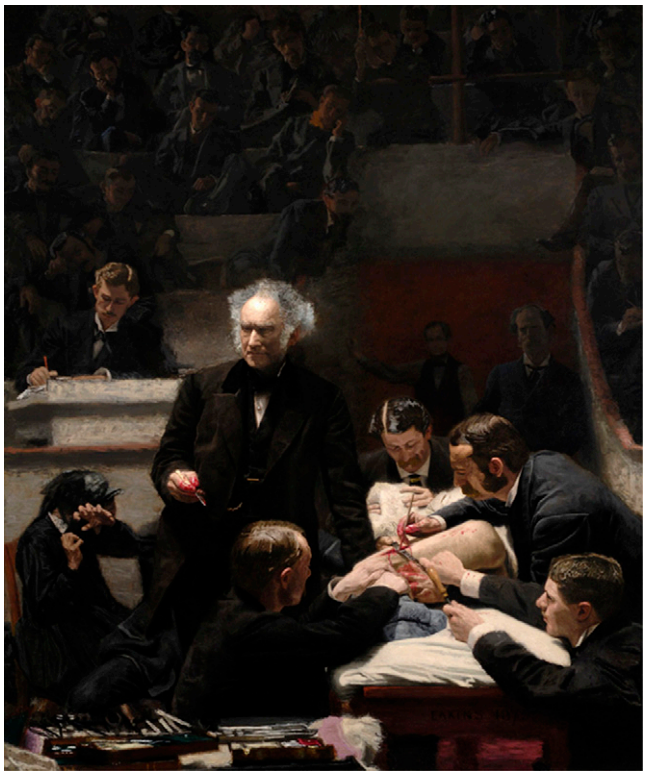

FIG. 1. Greiffenstein P, O'Leary JP. Eakins' clinics: snapshots of surgery on the threshold of modernity. Arch Surg 2008;143: 1121–5.

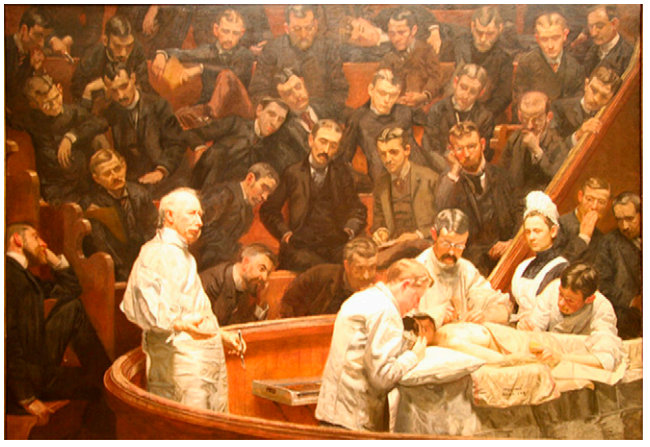

FIG. 2. *The Agnew Clinic,* 1889.

was actually a mark of distinction if a coat was so saturated with old, dried blood that it could actually stand on its own.[1] Unlike Dr. Agnew, Dr. Gross holds a bloody scalpel in his hand while his assistant probes the wound of the patient with his bare, bloody hand. The patient is not draped and is instead wearing the same socks he wore in from the street. The blood-stained surgical instruments are seen coming from a carrying case and are arranged haphazardly in the foreground.

If Dr. Lister's theories of antisepsis were presented before the periods of both Dr. Gross and Dr. Agnew, what prompted the acceptance of the Listerian theory between *The Gross Clinic* and *The Agnew Clinic*? Even in 1889 when Dr. Agnew's portrait was completed, he had only recently adopted an aseptic technique. A photograph of Dr. Agnew's clinic taken in 1888 showed him dressed in a buttoned-up street coat, not unlike that of Dr. Gross.[2] Perhaps the change was prompted by Dr. Agnew's surgical assistant, J. William White, pictured closing the mastectomy incision in *The Agnew Clinic*.[2] White had recently spent a year studying under Dr. Lister, who was traveling across America determined to convince American surgeons of the need for surgical cleanliness.[4] Whereas his younger pupils, like William White, may have been persuaded, the older doctors remained skeptical and unchanged.[4] Then, on July 2, 1881, President James A. Garfield was shot in the back in a railroad station in Washington, DC.[4] Luckily, the bullet's trajectory damaged no vital organs, and his injury was originally nonlethal.[4] Sadly, the team of physicians called on to care for the President, one of whom was Dr. Agnew, did not subscribe to the theory of antisepsis at that time.[4] The physicians probed the wound with unwashed hands and dirty silver probes.[4] As the President developed abscesses, Dr. Agnew incised and drained the wounds with unclean hands and instruments.[4] Two months after his injury, the President died, and an autopsy of his body revealed multiple abscesses along the trajectory of the bullet, yet not one vital organ was injured.[4] European surgeons criticized the American physicians, saying that his death was caused not by the bullet itself, but by the lack of adherence to Listerian principles.[1] The younger generation of American surgeons saw Garfield's death as an opportunity to encourage their elders to embrace the new sciences of bacteriology and pathology and to realize that microbes can cause catastrophic outcomes when introduced into a wound. Robert Morris was a young surgeon who authored *How We Treat Wounds Today: A Treatment on the Subject of Antiseptic Surgery Which Can Be Understood by Beginners* in 1886.[1] His book was one of many that would lead America's surgeons into a new era of surgical practice at the dawn of a new century.

Thomas Eakins' *The Gross Clinic* and *The Agnew Clinic* are masterpieces in and of themselves. However, they also provide insight into a pivotal transition in surgery's history thanks to Eakins' obsession and ability to paint the truth.

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