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Time me, gentlemen! The bravado and bravery of Robert Liston



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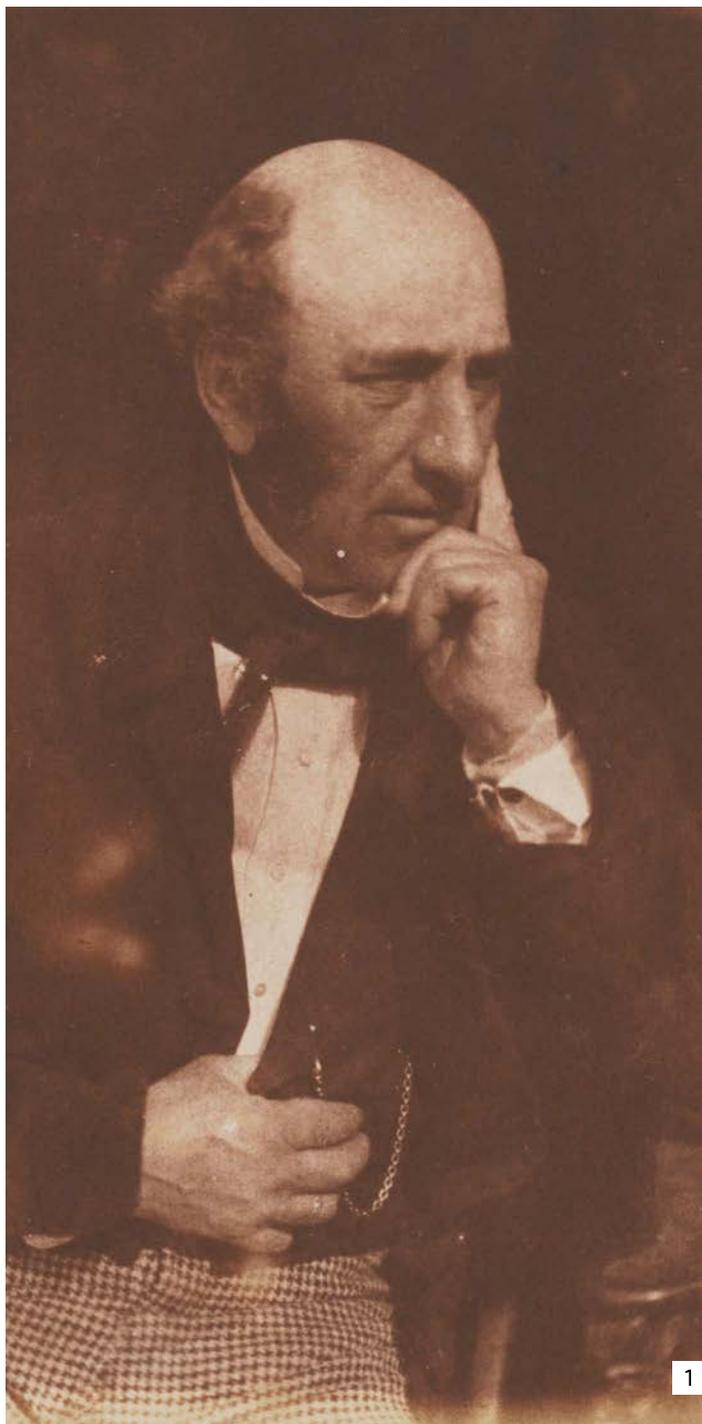
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Standing six feet two inches and powerfully built, Robert Liston (Figure 1) embodied the bold surgeon of Victorian England. Famous for his ability to complete an amputation in less than a minute and his intimidating and argumentative nature, he was a scholarly and principled practitioner deserving of his reputation as the leading surgeon of his age.



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Education and early career

Robert Liston was born on October 28, 1794 in a small village in West Lothian, Scotland, the firstborn of Reverend Henry Liston, the village minister and a pipe organ inventor. His mother died when he was six, so he was raised and taught by his father. He entered the University of Edinburgh at 14.¹ Only two years later, in 1810, Liston began his medical training under the famed anatomist John Barclay (1758-1826). He was appointed house surgeon at the Royal Infirmary in Edinburgh in 1814, and was admitted to the Royal College of Surgeons in London two years later at age 22.^{2,3}

Even then, Liston had a reputation as an argumentative and intimidating man, especially when he stood to his full height of 6 feet 2 inches. A disagreement with Barclay led him in 1818 to open his own anatomy class, which attracted 60 students that winter.³ Liston was known as a fearless surgeon who would operate on patients sent away from the Edinburgh Infirmary by other surgeons who thought that their conditions were too severe.^{3,4} Without apology he expressed his disapproval of surgeons he did not respect and whose practices he found inferior.¹ Some patients had been rejected by surgeons at the Infirmary, leading to a charge that he was inducing patients away from the facility to his own practice. The accusation led to a brief banishment from the Infirmary, but he was soon reinstated.^{1,4} The stormy episode probably contributed to his decision to accept an appointment as professor of surgery at the newly-opened University College Hospital in London. He was only 34. He would remain there for the rest of his life.^{1,2}

Master surgeon

In an era where surgical skill meant boldness, precision, and especially speed, Liston became known widely for his surgical excellence. His nickname, "The Fastest Knife in the West End,"⁴ endures today. His above-the-knee amputations from incision to final suture were completed in less than thirty seconds.⁵ Visiting surgeons packed Liston's surgical theatre to witness his unparalleled technique. With a showman's presence, he would nod to the medical students, pocket watches in hand, and say, "Time me, gentlemen, time me!"^{1,5} Patient survival in Liston's era, before anesthesia, asepsis, and blood transfusion, often depended on how quickly the surgeon could complete the operation and control bleeding.^{4,5}

However, Liston was much more than a lightning-quick hatchet-man. Believing that surgery was often a patient's last resort, he firmly believed that a surgeon must know when not to operate.^{1,5} In the preface to his text, *Elements of Surgery*, he noted that the study of anatomy and pathology had led to a better understanding which conditions were best addressed by surgery. He wrote:

*The functions and structure of parts are more frequently preserved uninjured—mutilation is more rarely required—and operations are dispensed with. The wider the extension of Pathology, the fewer the operations will be—thus affording the best criterion of professional attainment. Who will question, that there is more merit in saving one limb by superior skill, than lopping off a thousand with the utmost dexterity?*⁶

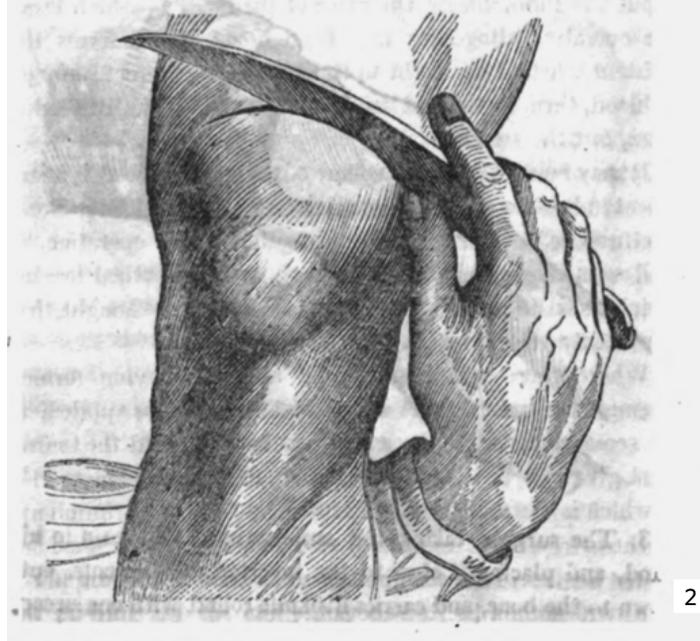
Liston made several contributions to the progression of aseptic practice, even though he practiced a half-century before Pasteur and was known to clench his knife in his teeth when his hands were otherwise occupied. Before the discovery of microorganisms and formulation of the germ theory, his routines in surgical hygiene probably came from an inherent sense of cleanliness and order. He was one of the few surgeons known to wash his hands prior to an operation, long before Simmelweis introduced hand washing at the Allgemeines Krankenhaus in 1847. He always wore a clean apron for each operation, counter to the common practice of wearing the same apron caked with blood, pus, and filth as evidence of ability and experience.⁵ He shaved surgical sites prior to incision, a practice recognized only within the past decades to increase the risk of surgical site infections. Surgical sponges had to be clean. His dressings were soaked with cold water only, not the salves and other nostrums that often harbored infection.¹

Innovator and educator

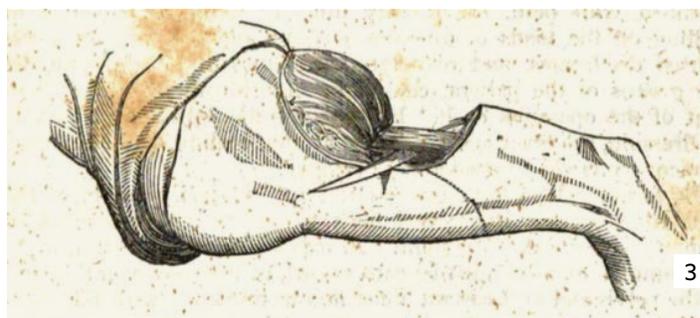
Liston performed Europe's first operation under anesthesia on December 21, 1846.³ At the conclusion of the operation, he said, "This Yankee dodge beats mesmerism hollow,"⁵ referring first to the first use of ether in the United States, and to "mesmerism," the discredited attempt at using hypnotism for pain control during surgery.¹ Liston was one of among the few to reject the notion that the excruciating pain of a surgical procedure without anesthesia enhanced the healing process.^{4,5}

He revolutionized the way amputations were performed, the operation for which he was most noted. A standard method was a circular incision, starting with the surgeon's arm wrapped behind the extremity, poised to sweep around its circumference as the surgeon pulled his scalpel around the limb (Figure 2).⁷ This however left a cylinder of skin, subcutaneous tissue and muscle that was difficult to pull over the cut end of the bone. Liston's solution was to leave a U-shaped flap that could be turned over as a pad over the cut end of the bone. His technique was to insert a long knife into the midsection of the limb, parallel to the bone, then sweep it outward to slice the soft tissues outward (Figures 3 and 4).⁸ It required a long straight knife that had both edges sharpened at Liston's request. The famous Liston knife became a standard amputation knife ever since. He also invented forceps with a built-in snap that kept the tips pressed together to control arterial bleeding.⁸

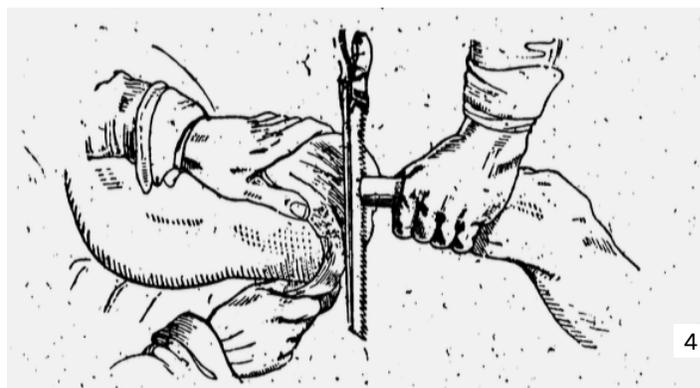
To make the first circular incision, the knife is thus held—



2



3



4

To guide the expert surgeon Liston had three principles, outlined in the introductions to his two multi-volume surgical texts, *Elements of Surgery* and *Practical Surgery*. First, and to Liston the most important, was a mastery of anatomy. He wrote:

*The foundation of the art of operating must be laid in the dissecting room, and it is only when we have acquired dexterity on the dead subject, that we can be justified in the operating room.*⁸

Liston believed that the emotions of the patient were next in importance.² He knew that his patients felt that surgery was something to be feared.

*It is of utmost importance to attend to the state of the patient's mind and feelings. He ought not to be kept in suspense, but encouraged and assured; and his apprehensions must be allayed.*⁶

If the patient expressed dread, the operation was postponed or cancelled. Once the operation was completed, Liston considered the task only to have started.

*Attention to after treatment is of much greater importance [than the operation itself]. The Practitioner is not to rely on success however well the manual part has proceeded. He must consider his labour only begun, when the operation is finished; the patient is yet to be conducted, by kindness and judgment, through the process of cure.*⁶

Third, Liston felt that a surgeon must be willing to take courageous action, confidence that came from study and experience. He spoke of timid surgeons who left patients to die on the operating table for fear of making the wrong decision.² This was unacceptable. Age did not guarantee experience and ability. Being a surgeon who started his career at a young age, Liston argued that volume of cases dictated experience. He said:

*The greatest number of well-assorted facts on a particular subject constitutes experience, whether these facts have been culled in five years or fifty...It is only from experience, directed and aided by previous study, that accuracy and celerity of decision can be acquired. Besides knowing in what manner to proceed, the Surgeon must know well wherefore he acts, and also the precise time at which he should interfere. With knowledge and confidence derived from experience, he will perform such operations as are indispensable for the removal of pain and deformity, or the preservation of life, with calmness and facility – with safety to his patient, and satisfaction to those who assist in, or witness, his proceedings.*⁶

Ethics

Liston was tough and demanding. He was especially harsh to trainees, who served as his dressers.¹ They received severe admonitions in the operating suite when their performance did not meet the professor's standards. He was generous outside the hospital, however, and appeared to compensate for rough treatment during surgery with an invitation to his home for a plentiful dinner.¹

Liston would not stand for practices that he considered unethical.⁹ One of his most famous confrontations was with Robert Knox (1793–1862), surgeon and unindicted collaborator in the notorious Burke-Hare serial murders of 1827-1828. William Burke and William Hare were grave robbers who supplied anatomists and students in the lucrative trade

in bodies for dissection. Liston grew suspicious of Knox, suspecting that the corpses the latter used for his anatomy demonstrations were victims of the infamous duo. Bursting into Knox's laboratory with his students, Liston found one of the corpses, a young woman named Mary Paterson, in a lascivious pose. Outraged, the powerfully built Liston threw Knox to the floor and retrieved the body for a proper burial.⁹

Liston denounced practices that he considered objectionable and unscientific. He publicly disparaged James Yearsley (1805-1869) for removing the tonsils and uvula for stammering.¹⁰ Often correct in his assertions, he was not infallible. His hubris had fatal consequences in a child that had a neck mass. Convinced unequivocally that it was an abscess, Liston took a knife from his apron and plunged it into the mass. Unfortunately, the mass was indeed an aneurysm and the boy exsanguinated.¹¹

Impact

Liston died in 1847 at age 53 of a ruptured aortic aneurysm.¹² His funeral was attended by 500 students, friends, and pupils.¹ For nearly 100 years following his death, the Liston Medal for Surgery was awarded for surgical excellence at University College Hospital.

Popularly known today for his bravura 30-second amputations and operations and its apocryphal 300 percent mortality (the patient, the assistant who lost a finger, and a bystander who died from shock from nearly being sliced by his errant scalpel), Liston had a substantive impact on surgical technique in his use of flaps in amputations and in such commonplace instruments as his amputation knife and locking vascular forceps. His practices had features that anticipated aseptic surgery.

His stature and imperious behavior influenced surgical education. His operating theatre and wards were austere locations for learning. His trainees were challenged by his high standards, but he had still treated them fairly. This fostered an environment for the continual pursuit of excellence. He was unabashed and candid when it came to criticism of his peers.

Less known today is his devotion to his patients. His era was one where patients entered hospitals fearing certain death, with a justified terror of surgery. Liston understood that he had a responsibility to his patients' feelings. His duty as a surgeon was to have a thorough knowledge of anatomy and pathology and be experienced and accurate in diagnosis. Surgery inflicted horrible pain and agony, so the surgeon needed the resolve to proceed without hesitation with confidence and deftness, important features of Liston's surgical technique. While the embodiment of the domineering surgeon, a complete picture of Liston includes a compassionate doctor, devoted to his patients, convinced that they are best served by his command of the field and technical skill.

Acknowledgements

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Legend

- 1 Liston circa 1843-1847. On calotype by Hill & Adamson, © National Portrait Gallery, London, England.
- 2 Technique of thigh amputation, making the incision from the skin to the femur. From Bell (ref. 7).
- 3 Thigh amputation using Liston's amputation knife to create a flap from the femur outward. From Liston (ref. 8).
- 4 Transecting the femur. From Liston (ref. 8).