



Historical vignette

Was the real Sherlock Holmes a pediatric surgeon?

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Abstract

Purpose: This article reviews the pioneering efforts of Joseph Bell, the model for Sherlock Holmes, in the surgical care of children during the antiseptic era.

Methods: I reviewed biographies of Sir Arthur Conan Doyle; the biography of Joseph Bell; his surgical textbook, *Edinburgh Medical Journals*; and the history of the Royal Edinburgh Hospital for Sick Children.

Results: Dr Bell was a colleague of Joseph Lister and one of the first surgeons to apply antiseptic methods to operations involving children. He was the surgeon appointed to the first surgical ward of the Royal Edinburgh Hospital for Sick Children; in that role, he cared for many children with surgical diseases.

Conclusions: Dr Joseph Bell, by his compassion for children and his surgical skill, was indeed a pioneer pediatric surgeon.

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When Arthur Conan Doyle embarked on his medical studies in October 1876, the University of Edinburgh Medical School had provided students from all over the world with a course of instruction in the classics, humanities, botany, chemistry, physiology, and human anatomy. The University professors, influenced by Herman Boerhaave, the professor of medicine at Leiden in Holland between 1709 and 1738, emphasized accurate observation of physical signs at the bedside of a sick patient. This emphasis on observation would influence Arthur Conan Doyle when he wrote his Sherlock Holmes stories. The Royal Edinburgh Infirmary, opened in 1729 to care for the poor, was one of the world's first hospitals to allow medical students to accompany professors and study patients at the bedside. The operating theater of the Royal Infirmary was where chloroform was first administered as an anesthetic and where Joseph Lister

performed operations with the antiseptic technique he had developed in Glasgow [1].

During his school years, Conan Doyle served as a ships surgeon and wrote short stories and novels to augment his meager income. After graduation, he established a successful general practice in a suburb of Portsmouth and became a Doctor of Medicine by completing a thesis on tabes dorsalis and circulation to the spine [2].

Arthur Conan Doyle abandoned medicine in 1890 to write full time [3]. His literary success was due in large part to the Sherlock Holmes stories, beginning with "A Study in Scarlet" published in 1887. The great detective became one of the world's best-known fictional characters. The inspiration for Holmes came from Edgar Allen Poe's detective, Dupin, who solved The Murders of the Rue Morgue, and Dr Joseph Bell, a talented and charismatic Edinburgh surgeon.

Joseph Bell, a master at observation and clinical diagnosis, held outpatient clinics for students in the old gas-lit surgical amphitheater of the Royal Infirmary. He

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theatrically seemed to taste a foul yellow liquid with his index finger and then passed the liquid around to the students to “taste.” No one noticed that he inserted his index finger into the liquid, but put his middle finger into his mouth. Bell used this “trick” to impress his students on the need to carefully observe minor details. He could determine the occupation, the nationality, and where a patient lived by observing the calluses on his hands, his accent, his clothing, and the mud on his boots. He then emphasized how a knowledge of the previous history, nationality, and occupation can help make a diagnosis. In 1878, Joseph Bell appointed Arthur Conan Doyle, then a second year student, to be his outpatient clerk, a position that allowed Doyle to become familiar with Bell’s great skill at observation [4]. At the time, Bell was 36 years old, sparse, lean, and tall, with an angular nose and unkempt black hair. He had long sensitive fingers, and his gray eyes “twinkled with shrewdness.” This is almost exactly the same description that Dr Watson made of Sherlock Holmes in their first meeting at 221B Baker St in the story “A Study in Scarlet” [5].

Later, when asked about his inspiration for Holmes, Doyle replied, “I thought of my old teacher, Joe Bell, of his eagle face, of his curious eyes, of his eerie trick of spotting details. If he were a detective, he would surely reduce this fascinating but unorganized business to something nearer to an exact science.” In another interview concerning his inspiration for Sherlock Holmes, Conan Doyle said, “But if you please, he is not evolved out of anyone’s inner consciousness. Sherlock Holmes is the literary embodiment, if I may so express it, of my memory of a professor of medicine at Edinburgh University.” In a letter to Bell, Conan Doyle made the point even more forcefully. “It is most certainly to you that I owe Sherlock Holmes and though in the stories I have the advantage of being able to place him in all sorts of dramatic positions, I do not think that his analytical work is in the least an exaggeration of some of the effects which I have seen you produce in the outpatient ward” [6].

At first, Dr Bell was annoyed by his new notoriety; but as the Holmes stories became popular, he became a great friend of Conan Doyle. In 1892, he wrote the following review. “Dr. Conan Doyle in his remarkable series of stories has proved himself a born story teller. He has had the wit to devise excellent plots, interesting complications; he tells them in honest Saxon English with directness and pith; and above all his other merits, his stories are absolutely free from padding. He knows how delicious brevity is and he has given us stories that we can read at a sitting between dinner and coffee, and we have not a chance to forget the beginning before the end.” In later years, when Dr Bell became synonymous with Holmes, he took an interest in forensic medicine and used his keen powers of observation to assist in criminal investigations [7].

Dr Joseph Bell’s great-grandfather, Benjamin (1749-1806), studied surgery in Paris and in London with William Hunter; he became the first physician in Scotland to specialize

in surgery. Joseph Bell’s grandfathers were surgeons, and his father was an ophthalmologist. All were closely associated with the Edinburgh Medical School [8].

Joseph Bell entered medical school in 1853 and graduated in 1859 when he was 21 years old. At that time, Joseph Lister, a house surgeon with James Syme, was doing his research that led, in 1866, to the use of phenol to prevent wound infections.

James Syme was the professor of surgery at Edinburgh from 1833 to 1869, a time that spanned the introduction of anesthesia and antisepsis. Syme attracted students and house officers from all over the world to see him perform new, daring, and successful operations. Joe Bell, an excellent student, distinguished himself in the classics and surgery. As a “dresser” for Professor Syme, he handled instruments, looked after surgical dressings, and had an opportunity to observe operations. His outstanding graduation thesis on epithelial cancer was an important factor in his becoming Syme’s assistant.

From the very beginning of his work as a house surgeon, Bell was especially gifted with a gentle touch for women and children. In 1864, during an epidemic of diphtheria, he worked around the clock taking care of children with tracheotomies. There were no suction machines to remove the thick gray membranes that occluded the tubes, so Dr Bell developed a pipette for sucking out “the diseased, poisonous mass.” As a result of close contact with infected patients, he contracted diphtheria and was left with partial paralysis of a vocal cord and a weak leg [9].

In 1865, the hospital board appointed Joseph Bell to be a clinical assistant surgeon to Syme. In 1869, when Syme retired, Bell applied for the professorship; but the position went to Joseph Lister, who was Syme’s son-in-law and the professor of surgery at Glasgow. Dr Bell stayed on at the Infirmary and in 1871 was appointed full surgeon and put in charge of the wards. In this position, he instituted the Nightingale system of nursing, took the nurses on Saturday rounds, and insisted upon perfect cleanliness in the hospital. Dr Bell, one of the first surgeons to embrace Lister’s antiseptic surgery, understood how hospital infections were transmitted through physicians and nurses. Although Lister wore the same fashionable swallow tail coat from one operation to the next; Bell rolled up the sleeves of his immaculate white shirt and scrubbed his hands. His career spanned the era of “antiseptic surgery” from 1866 until the introduction of steam sterilization in the 1890s.

Dr Bell taught a course in operative surgery to medical students and published *A Manual of the Operations in Surgery* for students, house surgeons, and junior practitioners [10]. The descriptions of operations are anatomically precise and could be used by students of surgery today. In the 1883 edition, his concern for the social aspects of disease is illustrated in his remarks on tuberculosis of the joints. “In our cold climate, so cursed by scrofula, and especially among the children of the laboring poor such joint diseases are very prevalent. Whether the disease commences in the synovial

membranes or the articular cartilages or the heads of bones, it so frequently disorganizes the joint as to make it a question of whether something must be done to preserve the life of the patient. The patient has youth on his side, could we give him fresh sea air, good diet, cod liver oil, etc. we might very likely obtain an ankylosis, but he may die while trying for his ankylosis and also, this ankylosis may so lame or deform him that resection may still be required." Bell also noted that removal of the epiphysis in a growing child shortened the limb. Amputation through healthy tissue was safer and easier but left the patient with a wooden leg. Joint excisions required the removal of the articular cartilage and all diseased tissue back to healthy, bleeding bone. The operation might leave a flail limb; but in the upper extremity, the child had a useful hand. Bell preferred excision for most joints but recommended bed rest and diet for disease of the hip because hip excision in children younger than 16 years of carried a mortality of 40%. For cleft lip, he delayed surgery until the infant was 2 months of age, then excised the mucosal edges of the cleft and united the edges with metallic sutures. He said, "tonsillectomy is sometimes rendered difficult by their struggles and movements of the tongue." The operation must have been done without anesthesia because he advised seizing the redundant portion of the tonsil with a clamp and, with one downward sweep of the bistoury, cutting it off. He applied cold water or styptics to stop the bleeding. Tracheotomy was performed for the removal of foreign bodies and for diphtheria. Dr Bell wisely advised providing warm moist air and the constant presence of a trained nurse or a student to clean the inner tube. His description of circumcision is still good today. "The elongated prepuce should be pulled forward with a catch forceps, and a circle of skin and mucous membrane removed by a single stroke of the bistoury or by sharp scissors. Care should be taken lest the glans be included in the incision, as has happened in at least one instance." He goes on to say, "This operation may be done as a method of cure for obstinate enuresis in cases in which the prepuce is very long or redundant, even when it is not too tight." Although he referred to the "radical" ligation of the neck of the sac for inguinal hernia, he was concerned about introducing infection into the peritoneal cavity. Some surgeons inverted the scrotum into the inguinal canal with sutures, but Bell preferred to close the internal ring with catgut sutures. He observed that most hernias recurred after an operation. Incarcerated hernias were reduced with manual reduction with the patient in the inverted position, aided when necessary by warm baths and chloroform anesthesia. If the hernia could not be reduced, Bell advised an early operation, which consisted of cutting through all layers to the sac under antiseptic precautions. If the intestine was still pink and glistening, the internal ring was opened; and the bowel was reduced into the peritoneal cavity. Gangrenous bowel was kept outside in the hopes that an intestinal fistula would form. He wrote that some surgeons had removed the gangrenous bowel, but with great mortality. In children with bladder stones, he preferred a perineal approach that cut through the

neck of the urethra and the prostate so that a finger could reach into the bladder and remove the stone.

His manual describes only 2 abdominal operations: gastrostomy for foreign bodies or esophageal obstruction and colostomy for imperforate anus. In children, the condition known as *imperforate anus* may sometimes be remedied by exploratory operations in the perineum, guided by the protrusion caused by the distended intestine. There are other cases, however, in which the rectum and the anus seem to be deficient; there is no warrant for attempting an operation. To form a colostomy in newborn infants, he made an oblique incision above the Poupart ligament, sutured the distended bowel to the abdominal wall, and opened it with a longitudinal incision. There were no comments as to the results of the operation.

Dr Bell's reports in the *Edinburgh Medical and Surgical Journal* provide insight to his surgical philosophy as well as his work at the Royal Infirmary. He observed that Lister's antiseptic technique prolonged operations and increased the risk of shock. He believed in operating rapidly to reduce blood loss and the effects of anesthesia. As an example, he reported the case of a man whose legs were crushed under loaded wagons. After applying tourniquets to the thighs and with the "strictest antiseptic precautions," Bell amputated both legs above the knees and had the patient back in bed within 24½ minutes from the time he entered the hospital gate. The stumps healed by first intention, and the patient was in the hospital garden on the seventh day after the operation [11].

In 1887, the Directors selected Dr Bell to be the surgeon in charge of the first surgical ward in the Royal Edinburgh Hospital for Sick Children. He was, at that time, President of the Royal College of Surgeons and had just retired from the Royal Infirmary [12].

The Children's Hospital was founded in 1860 to care for the many poor sick children with typhus, typhoid fever, scarlet fever, and other infectious diseases. The surgical ward opened in November 1887 under the direction of Dr Bell and was soon filled to overflowing, mainly with children with tuberculosis of joints or lymph nodes. Dr Bell noted that compound fractures and abdominal trauma resulting from street accidents and falls were taken to the Royal Infirmary, whereas children with burns, hernia, hare lip, spina bifida, cleft palate, phimosis, hydrocele, and club foot went to the Children's Hospital. He went on to say, "But the two great classes of disease which throng the waiting rooms and almost choke the beds are joint diseases and glandular swellings and suppuration. Had I four times the number of beds at my disposal, I could fill them all in a week with cases of spinal and hip joint disease. Only the very worst can be admitted where psoas abscesses have to be opened or hip abscesses to be drained or joints to be excised. Scraping and excision of the swollen and suppurating glands of scrofulous children are daily duties. A depressing lot of cases, some will say; but for the child's marvelous good nature and infinite fun once they recognize you mean friendship, their exuberant vitality

renders it almost impossible for a child to die if only you can avoid shock and hemorrhage.” He went on to say, “No case has yet died in my wards from an operation or within three months of one. Our ward deaths have been almost exclusively cases of hopeless burns. We have lost no burn cases that has survived the week.” Robarts [13], however, comments that cases of empyema, peritonitis, intussusception, and rectal atresia were considered terminal diagnoses; and the patients were not operated upon. There was also reluctance to operate on children with hernia, who were treated with trusses.

In 1895, Dr Bell’s house surgeon at the Royal Hospital for Sick Children reported on the results of treatment. One child with burns who died with pneumonia and intestinal bleeding had, at autopsy, a duodenal ulcer. There were many children with otitis media; one died with meningitis after drainage of his mastoid. Three patients were treated for empyema by thoracentesis; one 11-month-old baby died with empyema and multiple abscesses. Others were operated upon for lumbar abscess, tubercular tenosynovitis, syphilitic gumma of the tibia, curvature of the tibias owing to rickets, and tenotomy for talipes. Many children with hernias were treated with trusses; but one incarcerated hernia was reduced under chloroform anesthesia, and another was operated upon. There were 93 admissions to the ward. Eight children died; but all deaths were related to infections such as meningitis, tuberculous peritonitis, or pneumonia. There were no deaths directly related to an operation [14].

In his book, *Notes on Surgery for Nurses*, Dr Bell demonstrated his keen insight into children’s psychology [15]. He said, “Never deceive a child, tell it honestly that the dressing or movement you are going to make will hurt ... but also that you will hurt it as little as possible, and it will help you loyally. Don’t make favorites; children are much sharper than you think, and a quiet ... child may soon get a sore heart if you take less notice of it than of the more cheerful one in the next bed. You must always have the one great rule to guide you about sick children—that they don’t cry or moan for fun, but because they are ill and in pain, or from a nameless weariness if not in actual pain. Healthy children may yell and scream as an evidence and result of original iniquity, but sick children don’t... If once you get a child’s confidence and love it, it is marvelously loyal and utterly trustful... Adults can read and amuse themselves, but a child’s convalescence will often be much hastened by toys, cheering words, and fun of the mildest type. The stages in sick children are more rapid. Death is imminent before you are aware; yet if staved off, recovery is like a miracle. They stand loss of blood very badly, and yet they remake blood very quickly.” As an example of his keen skill at observation, he wrote, “Children suffering from diarrhea of a wasting type sometimes take a strong fancy for old green-moulded cheese and devour it with the best effect. Is it possible that the germs in the cheese are able to devour in their turn the Bacilli tuberculosis?” Was Dr Bell foreseeing antibiotics?

Joseph Bell resigned as the active surgeon to the children’s hospital in 1897, but continued as a consultant

until his death in 1911. He continued with charitable work at the Royal Hospital for Incurables and in his busy private practice cared for rich and poor alike. His colleague and rival, Dr John Chiene, said of him, “Every child in Edinburgh is indebted to this great man, rich, poor, church and unchurched.” [16]. At his funeral, an undertaker’s helper wept huge tears into the open grave. Dr Bell had treated his son, free of charge, for many years [17].

Was Dr Bell a pediatric surgeon? Long before specialty societies and board certification, a few surgeons took a special interest in children. Indeed, many of the advances in pediatric surgery were made by surgeons who we would not now consider to be purists. Yes; we can say that Joseph Bell, the real Sherlock Holmes, by way of his compassion for children and by his surgical skill, was indeed a pediatric surgeon.

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