

Percivall Pott (1714-1788)

Percivall Pott was a physician in England during the eighteenth century who identified soot as the cause of chimney sweeps' scrotal cancer, later called testicular cancer. In the 1770s, Pott observed that scrotal cancer commonly afflicted chimney sweeps, the young boys sent up into chimneys to clean away the soot left over from fires, and he hypothesized that the soot inside chimneys might cause that type of cancer. Pott was one of the first doctors to identify some environmental factor as causing cancer. Pott's research helped chimney sweeps to prevent scrotal cancer by using protective clothing, and it also allowed for future research on environmental causes of cancers.

Pott was born on 26 December 1713 to Elizabeth Pott and Percivall Pott in London, England. Pott's mother had a daughter, also named Elizabeth, from a previous marriage to an army officer who had left her a widow in 1708. Pott's father worked as a notary and died in 1717, leaving Pott's mother to raise two young children. Pott attended a private school in Darent, England, in 1721. In a biography of Pott, his son-in-law James Earle states that Pott developed an interest in classical cultures and he studied Latin and Greek in school, and his friends encouraged him to enter the clergy. Pott did not enter the clergy but in 1729 he apprenticed to Edward Nourse, a surgeon at St. Bartholomew's Hospital in London, England. The apprenticeship lasted for seven years and allowed Pott to earn enough money to provide for his family and to move himself, his mother, and his half-sister to a new home in London. As an apprentice to Nourse, Pott prepared dissections for Nourse's lectures on anatomy and surgery, he learned to sketch specimens, studied the treatment of diseases, and observed surgical techniques. Pott later used those skills in his work identifying cancer-causing soot that affected chimney sweeps.

In 1736, after six years as an apprentice, Pott joined the Company of Barbers and Surgeons, an organization composed of barbers and surgeons who taught anatomy and regulated the practice of surgery in London. At the time, barbers and surgeons were closely linked, as barbers were the most common medical practitioners in the Middle Ages, a tradition that extended into the eighteenth century. Barbers performed procedures like tooth-pulling and bloodletting, while surgeons focused on major surgical operations. In 1745, the Company of the Barber and Surgeons dissolved and became the Company of Surgeons, later renamed the Royal College of Surgeons. That same year, Pott accepted a position as assistant surgeon at St. Bartholomew's Hospital. Four years later he accepted a promotion to full surgeon. Pott's membership in the company enabled him to establish his own private practice while also working as a surgeon at St. Bartholomew's Hospital.

In 1746, Pott's mother died, a year before she could see her son wed to Sarah Cruttenden. Cruttenden was the daughter of the director of the East India Trading Company, a prosperous British company that traded goods with India and other British colonies in Southeast Asia. Pott and Cruttenden went on to have four daughters and five sons, though one died in infancy.

In 1753, the Company of Surgeons elected Pott as one of the company's first lecturers of anatomy. Pott began teaching anatomy to prospective surgeons, and three years later he began his writing career after he suffered an injury and spent months in bed recovering. In January 1756, Pott's horse threw him, which resulted in a compound fracture of Pott's leg, in which the broken bone poked through the skin. Because he recognized the severity of the fracture and knew that movement could further damage the limb, Pott did not let anyone move him off the ground. Rather, he waited for his assistant to purchase a door from a nearby construction site to craft an improvised stretcher, instead of putting him in a carriage for the ride home. Immobilized to protect his leg, Pott was carried home to avoid any jostling from a carriage ride. At Pott's house, the surgeons debated amputating his leg but Pott's former apprentice-master Nourse arrived and urged the surgeons to

set the bone instead. Pott later reported in his written surgical works that he did not agree with the drastic surgical procedures that many surgeons advocated at the time. According to Pott, he stated that surgery was too rough and medical care at the time prioritized surgical operations over patient care.

While he recovered from the compound fracture, Pott wrote papers, beginning with his treatise on the ruptures he had treated as a surgeon. Ruptures occur when an organ pokes through its surrounding tissues, a condition later called a hernia. In 1756, Pott wrote a treatise on particular ruptures found in newborns. After recovering from his fracture at the end of 1756, Pott continued to publish papers on a variety of medical subjects, including ruptures, head injuries, spine curvatures, lower limb paralysis, and the causes of testicular cancer in young chimney sweeps. In a 1760 article on head trauma, Pott described a swollen area on the front of the skull that he called a tumor, although it was not cancerous. That swollen area stemmed from the influx of fluid gathering in a divot in the bone and he hypothesized the cause being a bone-eating bacterial infection, later called osteomyelitis. The swollen area on the skull that related to the infection was later named Pott's puffy tumor.

In 1763, the Company of Surgeons appointed Pott to the court of examiners, a position in which he tested upcoming surgeons for competency, and then to master of the Company in 1765, which allowed him to oversee the organization. That same year, Pott published a surgical paper on fractures and dislocations, and he advocated techniques similar to those used in his own compound fracture, such as not jostling the broken bone before a physician sees to it. As of 2015, a particular fracture of the ankle later named Pott's fracture is still the term used to refer to a category of ankle fractures that often occur from running and jumping.

In addition to describing medical conditions and how to treat them, Pott's surgical works included critiques of the practice of surgery at the time. Pott used a gentler approach in his own practice, and for this reason historian of medicine Sherwin Nuland called him the most distinguished surgeon in London of his generation. Generally, Pott preferred to prevent operations when possible, as with his own leg fracture in 1756, meaning that he often considered other forms of treatment for his patients before surgical procedures.

Pott spent much of his time writing and seeing patients. In the 1770s, he encountered many young chimney sweeps with sores on their scrotum. In 1775, Pott published on those sores, which he determined to be cancer of the scrotum caused by prolonged exposure to the soot in chimneys. In his 1775 paper, Pott refers to scrotal cancer as the chimney sweeps' cancer because it occurred almost exclusively in chimney sweeps. Chimney sweeps wore no clothes, so they were as small as possible to fit into the narrow, twisting chimneys. The cancer appeared on the bottom of the scrotum, the sack that contains the testicles that produce sperm in men. The cancer manifested as a superficial, painful, ragged sore with hard, raised edges that the chimney-sweep trade called a soot-wart. Because the sore never appeared in males before puberty, most surgeons, according to Pott, considered it a symptom of a sexually transmitted or venereal disease. As such, surgeons often treated the sore with ineffective treatments like salves, which did not stop the cancer from spreading to the testicles and then up into the abdomen.

However, Pott hypothesized the sores originated from an environmental factor, the soot in chimneys, and he advocated for a different and more effective treatment. To prevent the sores from spreading to the testicles and abdomen, Pott advised immediate removal of the part of the scrotum affected by the sore. Pott suggested removing the scrotal tissue at the first indication of a sore because if the cancer spread to the testes not even castration halted the spread of the cancer. Pott noted that the cause of scrotal cancer was the way soot lodged in scrotum's folds of skin. As of 2015, researchers have determined that the soot lodged in the skin of the scrotum and exfoliated away cells at a rapid rate, which then caused cells to replicate more quickly, enabling cancer-causing mutations to occur with greater frequency. By linking soot exposure to chimney sweeps' scrotal cancer, Pott established one of the first environmental causes of cancer.

When Pott realized that surgery to remove the scrotal sores did not prevent the spread of the cancer, he searched for other treatment options. Though he did not find an effective treatment for scrotal cancer once it had developed, Pott worked to implement policies to protect the chimney sweeps from

developing scrotal cancer in the first place. According to Nuland, as a result of Pott's advocacy, the British Parliament passed the Chimney Sweeper's Act of 1788, which prevented boys under the age of eight from becoming chimney sweeps and mandated the boys be given clothing that protected their bare skin from soot exposure. Pott's observation that soot caused cancer allowed chimney sweeps to limit their risk in the workplace, and led to one of the first historical instances of a government mitigating cancer-causing environmental conditions through legislation.

In 1777, at the age of sixty-three, Pott moved to Hanover Square in London, England. There, Pott wrote further surgical treatises, including one cautioning against amputation, and later Pott encouraged surgeons to abandon amputation procedures altogether. In 1779, Pott wrote on tuberculosis, an infectious bacterial disease that causes the growth of nodules in lung tissue. He specifically focused on how tuberculosis affected the spine, a condition that later became known as Pott's disease. Also in that year, Pott published his work on the paralysis or palsy of the lower limbs resulting from curvature of the spine, and wrote another paper on that disease in 1783. The 1783 article was his final written and published work. Four years later, in 1787, Pott resigned from his position as surgeon at St. Bartholomew's Hospital.

On 11 December 1788, Pott traveled through severe weather to see a patient twenty miles from London and caught a cold that developed into shivering, fever, and delirium. Pott had trouble with language and focusing his thoughts. On 22 December 1788, he died in London, England, and was buried near his mother.

Sources

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