

# The study of art and its influence on the education of surgeons

A look back at some key figures in the crossover between the two disciplines.

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## INTRODUCTION

The study of art has the potential to refine and improve observational skills, communication ability and global perspectives, giving surgeons a spontaneous balance in a challenging style of work and life. In this study, we attempted to analyse observational and communication skills among residents in general surgery who had a special interest in art.

## MATERIAL AND METHODS

Medical students in their final year ( $n=50$ ) and residents in general surgery ( $n=30$ ) at our medical centre were randomly selected; 15 residents and 25 medical students had a special interest in the arts (10 music, 15 classic literature, 15 history of art). The remaining 15 residents and 25 medical students had no special interest in the arts. Two independent staff surgeons reported a subjective judgement of their observational and communication skills. A subjective score was

used, from 0 to 10, with 10 as the best score (Table 1). All subjects gave informed consent and the study was approved by the Institution Board.

## RESULTS

The 2 groups of residents shared similar characteristics: mean age (28 years), sex and family background. Residents who showed a special interest in the arts performed better in observational and communicative skills. The 2 groups of medical students were also similar in mean age (25 years), sex and family background. Medical students who had a special interest in the arts had better observational and communicative skills (Table 1).

## DISCUSSION

An increasing number of neologisms are used to define the technological changes we see in everyday life and how they influence and affect culture and society.<sup>1,2</sup> The simultaneous

fear of and fascination with the developments in technology, and their effects on society, have constituted the background for new philosophical and creative thinking. In the 1970s, almost all universities introduced programmes in 'science, technology and society' with the aim of analysing how technological innovations influence society from a broad perspective, including anthropology, history, political science and sociology.<sup>3,4</sup>

The basis of judging any technological innovation and any attitude (including education), today is pragmatism – a philosophical tradition defined and standardised at the end of the 19th century, but present in the human mind since antiquity.<sup>5</sup> Inevitably, in the pragmatic analysis of education, the study of art is going to be confined to the corner of 'something useless'. In this paper we have tried to demonstrate how the study of art can be important in the education of surgeons, from a pragmatic and humanitarian point of view.

#### The study of art to improve observational skills

In all forms of art, from sculpture and literature to painting, details are essential. In analysing art, the student has to improve his or her capacity for looking at details, and using their imagination. This is a form of training for surgeons, and it can be highly useful in clinical practice. Observational skills can improve through the study of art, where interpretation is personal and subjective but still remains in the field of rationality.<sup>6,7</sup>

#### The study of art helps communication

Easy and valid communication is a cornerstone in medicine. Good communication skills are essential to facilitate collaboration among doctors and paramedics. Interpreta-

**Figure 1** Theodor Billroth (seated, centre) teaching his assistants



tion of art requires a fine, specific communication of your feelings and sensations. It is an exercise that helps refine language, which should be clear, precise, and at the same time rich in detail.<sup>8,9</sup> The study of art encourages imagination and innovation, whereas the study of medicine requires a logical, rational approach to problems and to their solution. Medical education is structured and analysed in examining tests, which determine the capability of the student to memorise accepted knowledge. There is no place for imagination or fantasy. The potential to improve upon accepted theories and create new ones requires many characteristics, including the ability to see alternatives and the courage to believe in your new ideas.

Art, in general, has always been the expression of people who were able to realise in painting, sculpture or music the contemporaneous general feeling, adding new ideas to the accepted status quo. The study and

interpretation of these expressions emphasise the importance of your personal view, as a possible maker of new positive changes.<sup>6,7</sup>

#### The study of art gives importance to feelings and emotions

The study of art revolves around emotions and feelings. It teaches the importance of those feelings in the history of human beings. Great ideas, strong feelings, and the courage to listen to our personal sensations have always survived the more transient factors such as economy, egotism and aggression. The pride in being what we want to be and listening to our sensations will make us better doctors who are better able to interact with our patients. The study of art can help us to find this courage. It is possible that we will be better prepared to control the many situations we have to face. We will be more likely to have the right answer and perspective in the inevitable situations when our professional and personal lives are affected by the economy.<sup>10,11</sup>

#### How to prove this pedagogical hypothesis?

Analysing how the study of art can positively influence medicine is very difficult. Too many variables are involved and it is difficult to define any eventual beneficial effect or

**Table 1** Mean score for medical students and residents in general surgery with a special interest in the arts

Skills	Medical students		Residents	
	Interest	No interest	Interest	No interest
Observational	6	5	9	7
Diagnostic	6	5	9	7
Communication	6	5.5	9	7
Research attitude	4	4.5	7	7

end results. Our study seems to confirm the above mentioned hypotheses. Here, we outline the history of some of the giants of modern surgery and their interest in the arts in general. The different surgeons were chosen because they were innovators in their specific field and in their own country. Owing to space limitations, we were unable to include many other giants of surgery who also had a special interest in the arts.

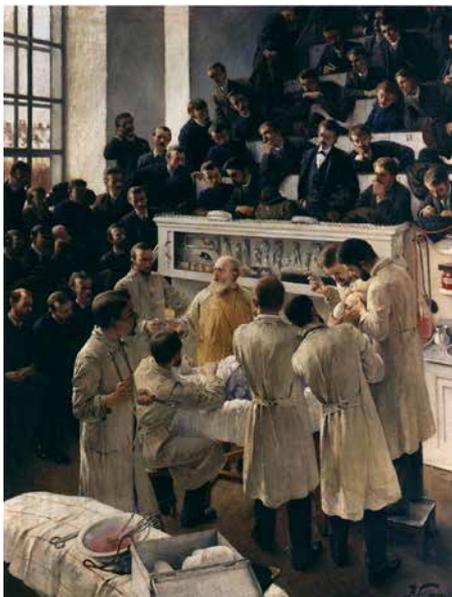
#### John Hunter (1728-1793)

John Hunter is generally considered to be one of the innovators and fathers of modern surgery. One of his assistants described him as 'warm and impatient, readily provoked, and, when irritated, not easily soothed'. Despite this, he married a poet, Anne Home, who asked him to judge all her work each day. In March 1790, he was made Surgeon General of the British Army. While in this position, he reformed the promotion of army surgeons so that it was based on merit and experience, rather than on the patronage-based system that had been in place.<sup>13</sup>

#### Edward Jenner (1749-1823)

Edward Jenner was very interested in classic literature, and he was fluent in Latin. He was

**Figure 2** Theodor Billroth teaching his students during surgery



a student of John Hunter and qualified in surgery in St George's Hospital in London. He was offered a position as a surgeon in London, but preferred to return to his home town in Gloucestershire, where he was appreciated as a family doctor and surgeon. He wrote books on many subjects, from romance to zoology. He was the pioneer of the smallpox vaccine, which was the world's first vaccine. Noting the common observation that milkmaids were generally immune to smallpox, Jenner thought that milkmaids could have been infected by cowpox, a mild disease, and for this reason they were

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immune to smallpox. He is considered the 'father of clinical immunology' and his work is said to have saved more lives than that of any other human being.<sup>14</sup>

#### Joseph Lister (1827-1902)

Joseph Lister had a special passion for literature, including German and French literature – to the extent that he could read and speak German and French fluently. In hospitals, surgery was practised in insanitary conditions. There were no facilities for handwashing, either for the surgeons or the patients. A surgeon was not required to wash his hands because it was considered not necessary to prevent infection. Surgeons, often

washed their hands in the same dish without changing the water from one operation to another and at the end of day they took pride in the dark colour of the water as sign of their hard work.

In 1867 Lister championed the use of carbolic acid (phenol) as an antiseptic, which became the first widely used antiseptic in surgery. He made antisepsis a must in all procedures before, during, and after the operation. He is considered to be one of the fathers of modern surgery.<sup>15</sup>

#### Theodor Billroth (1829-1894)

Theodor Billroth is thought of as the father of modern abdominal and oncological surgery. He was an indifferent student and spent much of his time playing the piano and the violin. Once he had obtained his medical degree, he worked in Berlin as assistant to Karl Langenbuch from 1860 to 1867. First he was director of the surgical hospital in Zurich, and later director of the Vienna General Hospital. He stressed the importance of applying science and rationale to surgery. He strongly supported the publication of the results of surgery – whether they were good or bad – and introduced the need for audits. He also introduced the use of white coats for doctors. Billroth underlined the importance of the gradual training of surgeons through a 'residency programme', as introduced by his teacher Karl Langenbuch (Figure 1). Many surgeons from all over the world, including William Halsted and Theodor Kocher (a future Nobel Prize winner), visited and worked with Billroth, and all introduced the German surgical residency programme (Figure 2). He performed the first oesophagectomy, the first laryngectomy and the first gastrectomy. He was also a talented pianist and violinist. He became close friend of Brahms, one of the greatest composers of the time. Brahms sent all his original musical scores to ask Billroth's opinion. In a letter, Billroth wrote: 'It is one of the superficialities of our time to see in science and art two opposite. Imagination is the mother of both.'<sup>16</sup>

**Figure 3** Durante's Department of Surgery at the University Hospital Policlinico Umberto I; the bas relief shows Lister, with whom Durante trained, teaching his students (Source: Author)



#### Howard Atwood Kelly (1858-1943)

Howard Atwood Kelly is considered to be the founder of modern gynaecology. He was very much interested in literature and theology. Kelly was educated at the University of Pennsylvania and then became a member of the faculty of medicine at McGill University in Canada. He travelled to Europe to visit the most important surgeons interested in gynaecology. During his subsequent long career at Johns Hopkins Hospital in Baltimore, he developed many new operations and instruments, such as the cystoscope. He was one of the first to treat cancer with radium and founded the Kelly Clinic, which was a leading centre for radiation therapy. He was a close friend of Henry Luis Mencken, considered one of the most influential American writers and prose stylists of the first half of the 20th century. Kelly wrote numerous medical textbooks and several theological and philosophical books.<sup>17</sup>

#### Francesco Durante (1844-1934)

Francesco Durante is considered the founder of modern surgery in Italy. After his graduation, he worked in Europe with Billroth and Lister. He founded the Italian Society of Surgery and he wrote a three-volume surgical textbook, which was at the basis of all surgical procedures in Italy for almost 50 years. He was the first to report a successful removal of a brain meningioma. Together with Guido Baccelli, he helped to plan and found the University Hospital Policlinico Umberto I, which became one of the most

important surgical centres in Italy. In designing the hospital, Durante took into consideration all the notions about aseptic surgery that he had learned while he was working with Lister and many details used in the building of the Johns Hopkins Hospital, which he saw in construction when he was invited to give a talk in the US about his successful operation of brain meningioma removal. He introduced the English nursing system developed by Florence Nightingale and hired Dorothy Snell, an English nurse he met while he was in England, to teach and lead the nurses in his hospital. Durante was supposed to become an artist. He was a talented sculptor and painter, and he originally went to Messina to study art. He was urged by the professor of medicine to study his subject instead. With the help of other artists, he created the bas relief that decorates his department, which shows Lister teaching his students (Figure 3).<sup>18,19</sup>

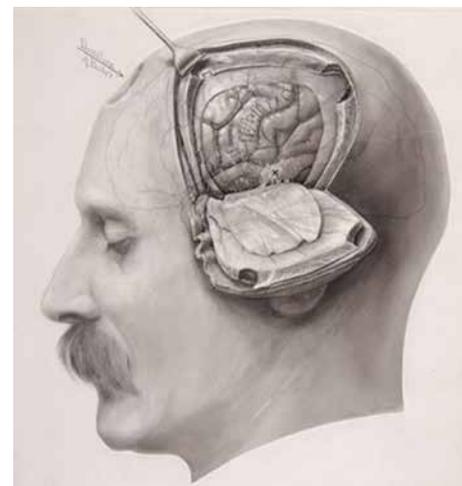
#### Harvey Cushing (1869-1939)

Harvey Cushing is considered to be the father of modern neurosurgery. His contributions to surgery and neurosurgery are impressive. Cushing was interested in painting and literature. He was awarded the 1926 Pulitzer Prize for biography or autobiography for his book recounting the life of Sir William Osler, one of the fathers of modern medicine. The book received the prize because it was a deep study of the relationships between medicine and society, disease and modernity, with a strong thread of anthropology and philosophy. Cushing was also an excellent painter. He drew the majority of the anatomical drawings for his textbooks and papers (Figures 4a and b) and also painted numerous paintings on various subjects (Figure 5).<sup>20</sup>

#### Rudolph Matas (1860-1957)

Born to a family who had emigrated from Spain, Rudolph Matas became a Professor and Chairman of the Department of Surgery at Tulane University. He is considered the father of modern vascular surgery. As a

**Figure 4a** Cushing's drawing of the brain (1906; Cushing Center, Yale)



medical student, he was sent to Cuba as a laboratory assistant and interpreter with the US Yellow Fever Commission, in times when yellow fever was a serious problem. Matas spoke fluent Spanish and was immune to yellow fever because he had already contracted the disease. Matas openly supported the theory proposed by Carlos Finlay that the mosquito was the vector of the disease, which was subsequently proved to be correct.

Matas used spinal anaesthesia for the first time in the US. He also developed the

**Figure 4b** Cushing's drawing of the brain (1906; Cushing Center, Yale)



intravenous drip and introduced endotracheal intubation with positive-pressure ventilation. He loved literature and the new art of 'cinema'. His library was immense, so that he had to give many of his books to the Library of Tulane University, which he established and funded. He was a poet, and many of his poems were also published in medical journals. His dearest friend was Lafcadio Hearn, a writer. He was a close friend of William Halsted, who defined Matas as 'a great innovator' and of Will Mayo, who said that he was 'the world's best-educated physician'.<sup>21</sup>

#### Henry Mondor (1885-1962)

Henry Mondor was an innovator in surgery. He practised as a professor of surgery in Paris and published many textbooks of medicine and surgery and represented the teaching centre in the dynamic and innovative French school of surgery. He was an excellent artist and drew all the illustrations for his medical textbooks. He received several prizes for his drawings. He was the mentor of future

**Figure 5** A painting by Cushing, completed during his visit to the town of Coudes in France (circa 1900; Cushing Center, Yale)



famous surgeons and artists, such as Charles Dubost (a pioneer of cardiac surgery) and Jean Labellie (a famous abstract painter). He wrote also many books on poetry, literature and philosophy and was also editor of cultural and surgical journals.<sup>22</sup>

#### Michael DeBakey (1908-2008)

Michael DeBakey spoke fluent German, French and Arabic. He was a military surgeon from 1942 to 1946 during World War II and helped to develop the mobile army surgical hospital, for which he received the Legion of Merit. After the war, he joined the Baylor College of Medicine. Under his leadership, Baylor College of Medicine became the leading centre for the development of cardiovascular surgery and medicine in the world. His innovations are astonishing. He created the roller pump, which provided continuous blood flow during surgery. He was the first to use polyester as a patch and was one of the first to perform coronary artery bypass grafting. He was probably the first to perform a 'standard' carotid endarterectomy, and first to report the successful resection of a thoracoabdominal aneurysm. He did extensive research on the implantation of the artificial heart, together with Denton Cooley. He established the DeBakey Medical Foundation to support the Texas Children's Cancer Center.

DeBakey was interested in literature and music and was an excellent saxophonist. His mother was an accomplished seamstress, who also taught sewing classes. His mother taught him to knit and sew. At the age of ten, DeBakey could cut his own shirts and pants from patterns and assemble them, and repair any subsequent tears.

#### Thomas Earl Starzl (b. 1926)

Thomas Starzl is a pioneer of modern transplantation. He performed the first successful liver transplantation in humans; he standardised the technique for successful kidney transplant and he understood and made rational the exact role of immunotherapy in transplantation. He completely changed ideas

about immunotherapy, defining the concept of 'chimerism'. He performed the first simultaneous heart and liver transplantation. His studies in xenografting are revolutionary.

Starzl has a great interest in humanist studies and literature. As an adolescent, he worked in the local newspaper edited by his father, doing almost any kind of job. Later, to support his medical studies, he worked in his free time in another journal, mainly as a proofreader. He wanted to become a priest, but after his mother died at age 47, he decided to dedicate his life to help sick people. He has been always interested in literature, anthropology and sociology, and is fascinated by other cultures. His book, *The Puzzle People*, was named by the *Wall Street Journal* as one of the best books on doctors' lives. In this book, Starzl underlines the many challenges for surgery in the future, analysing not only the scientific aspects of the work but also the moral and sociological view in a developing society.<sup>24</sup>

#### CONCLUSIONS

The study of art can undoubtedly help surgeons in several ways, including the possibility of finding the right personal balance in the continuous challenges we are forced to face when our personal feelings are in contrast with the emerging – and sometimes oppressing – forces of economy, efficiency and pragmatism. The study of art should be encouraged in high school and college, especially in students eager to get into medical school.

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