

SURGERY OF THE SOUL

JOSEPH E. MURRAY

I thank the Pontifical Academy of Sciences for allowing me to speak at this plenary session on *The Cultural Values of Science*. As a medical student sixty years ago, I thought of surgery merely as a series of operations developed over the years to: (1) save life; (2) restore function; or (3) relieve pain. Following graduation from medical school in 1943 and a nine-month surgical internship I was drafted into the United States Army Medical Corps and served on active duty for three years until my discharge in late 1947. My army experience consisted of surgery on battle casualties from the European, African, and Pacific theatres. This influenced my entire professional life. It was here that I recognised an additional indication for surgery, i.e. to improve quality of life.

VALUE OF LIFE INDICATIONS FOR SURGERY

1. *Save life*
2. *Restore function*
3. *Relieve pain*
4. *Improve 'quality of life'*

The title of today's talk was suggested by a book editor who happened to hear me speak about my surgical career at Harvard Medical School. My life in surgery has been a fortuitous blend of science and humanity. I chose to attend a small liberal arts college, College of the Holy Cross, and concentrated on Latin, Greek, Philosophy, and English. Assuming I'd receive ample science in medical school, I took the minimum of chemistry, physics

and biology. I entered Harvard Medical School expecting to return to my hometown near Boston as a general surgeon. However, as Louis Pasteur wrote, I was to find myself pulled into pure research through my application of medical school knowledge:

No category of science exists to which one could give the name of applied science. There are science and the application of science, linked together as a fruit is to the tree that has borne it.

Louis Pasteur

Science and plastic surgery entered my life when I helped care for Charles Woods. Charles is a United States aviator who was 70% burned in a crash flying over the Himalayan Mountains between Burma and China. China was then our ally against Japan. Charles was flown halfway around the world to our army hospital in Valley Forge, Pennsylvania. Here is a slide showing Charles today. He is 83 years old, the same age as I. (Slide 4, see page 382).

The next two slides show Charles as he was when he arrived at Valley Forge Hospital. (Slide 5 and 6, see page 383).

You can see in this slide that we covered his open burns with skin taken from other parts of his body. Charles went on to become a successful businessman. His family and mine have stayed quite close over the years, and I still hear from them regularly.

While working at Valley Forge Hospital on patients including Charles Woods, we often encountered the challenge of covering the burns with skin to permit healing to take place. We sometimes used skin from cadavers, but it was always eventually rejected. I became fascinated with this problem. Thus began my two major surgical interests: plastic surgery, and transplantation biology.

Along the way I have operated on many continents. In India I operated on leprosy patients at the Christian Medical College in Vellore, correcting hand and facial deformities. As with the battle casualties, it was the spirit and the soul of these patients that carried them through their trials. The patients were reconstructed and then taught to use their improved hands in making saleable items. With their reconstructed hands they create hand-

made toys and other items including a wooden plaque bearing the motto 'Difficulties Are Opportunities'. These patients' functional hands give them the chance for employment so that they did not have to go on begging for a living. The sign sits on my desk as an inspiration, an example of the many times that patients have enlarged me with their courage and faith.

As decades passed and surgery became more skilful and safer, we surgeons expanded the numbers of treatable conditions. Birth defects are a good example. Here is a child born in the seventies with severe facial and cranial distortion. (Slide 9, see page 384).

The parents were strongly advised to place him in an institution for handicapped children in order to protect their five other 'normal' children. After two years of weekly visits to the institution with no sign of improvement, the parents took him home. This picture shows him as I first saw him with his twin brother at age seven, after surgery performed elsewhere. (Slide 10, see page 384).

We performed six craniofacial operations over five years to restore some degree of facial, cranial, and orbital symmetry. He then entered the public school system that his brother attended. Unbelievably, he graduated with higher grades than his brother. (Slide 11, see page 385).

It is appropriate to mention during this occasion in Rome that Italy herself has made historical contributions to the field of plastic surgery. Gaspare Tagliacozzi, 1545-1599, was practicing a form of plastic surgery rebuilding the noses of those whose nose had been removed as punishment for crime. Tagliacozzi also recognized quality of life as a reason for surgery:

We restore, repair and make whole those parts of the body which nature has given but which fortune has taken away, not so much that they may delight the eye but that they may buoy up the spirit and help the mind of the afflicted.

Tagliacozzi, 1597

All surgeons around the world owe immense gratitude to the pioneer surgeon, Paul Tessier, of Nantes and Paris, France, for showing us the way to operate safely on the orbits and skulls to correct craniofacial deformities in infants. This speciality of craniofacial surgery emerged after World War

II. The next three slides show a good example of the application of Dr. Tessier's innovative surgery in infants. (Slide 13, see page 386).

In slide 13 you can see the asymmetrical face and cranium, which we studied carefully before performing surgery. I would take a picture of a patient and cut it up into puzzle pieces, sliding them around to visualise how the operation would proceed. Nowadays of course these preparations are made with the aid of computers. (Slide 14, see page 386).

Slide 14 shows segments of the child's skull which have been detached from the head. These segments were reshaped on a side table before being replaced. This reshaping of the cranium allows the skull to grow symmetrically larger under the influence of the growing brain. At the top of this picture, you can see the bone grafts taken from the child's hip which were inserted into the gaps left by this procedure. (Slide 15, see page 387).

Slide 15 shows the same child post-operatively, with his appearance and skull size near-normal. In addition to observing improved post-operative appearance, parents of our post-surgical craniofacial patients often commented on improved behavior as well.

To proceed to another topic: Organ transplantation is one of the most dramatic biological advances of the 20th century. 'Spare parts surgery' had been dreamed of for centuries. Throughout our travels I sought out depictions of the twin Saints Cosmos and Damian. (Slide 16, see page 388).

According to legend, Cosmos and Damian were physicians who successfully transplanted the limb of a dead Moor onto a patient whose leg required amputation. It was almost as if fate had decreed that identical twins would play a role in successful organ transplantation. You can see in this slide the twin saints attaching the black leg to their lighter-skinned patient.

In the early 50's, organ transplantation was considered an impossible dream by practically everyone – except surgeons and physicians caring for patients with severe burns or severe kidney disease. Drs. Barrett Brown and Brad Cannon, Chiefs of Plastic Surgery at Valley Forge General Hospital, had used skin from dead persons to temporarily replace skin in burn patients. Nephrologists had experimented with hemodialysis as a temporary substitute for diseased kidneys. Brown had shown that skin exchanged between identical twins could survive permanently. (Slide 17, see page 335).

In this slide you can see identical twins displaying the successful skin grafts where a small patch of skin from the forearm has been transferred to the other's arm.

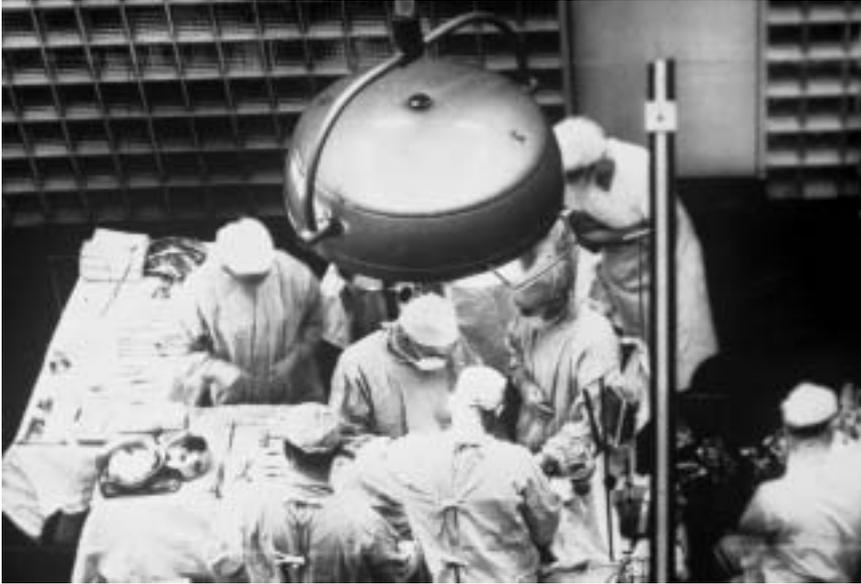
With the case of Charles Woods in mind, after the war I eagerly joined the transplant team at Brigham Hospital and Harvard Medical School in Boston.



Slide 17. Brown's twins.

Soon I had developed a predictable operation for kidney transplants in dogs. At the same time, hemodialysis was first used at the Brigham. A patient was referred for terminal renal failure who had an identical twin brother anxious to donate one of his kidneys. We did go ahead with the transplant operation, but only after serious consideration of the many ethical problems involved. We met first with a number of doctors and clerics as well as with the family members to discuss the concept. (Slide 18, see page 336).

This slide of this historical operation shows the transplantation team preparing the sick twin to receive a kidney from the healthy twin, who is being operated on in an adjoining operating room. Following five weeks of excellent function of the transplanted kidney, we had a decision to make about removal of the diseased kidneys. I favored removing the diseased kidneys immediately, while my colleague wanted to leave them in place as a backup in case the transplant did not 'take', and with the hope that they might recover. After discussing the situation with my superior, I bowed to my colleague's wishes, as he was the medical doctor in charge of managing the renal disease. Later we learned that diseased kidneys should be



Slide 18. Intra-op photo of kidney transplant operation.

removed so they do not infect the transplanted one, but at the time we were all doing what we thought was best. (Slide 19, see page 337).

Here are the young men leaving the hospital after the successful operation. The sick twin is in the wheelchair, which is being pushed by the donor twin. The recipient lived for another seven years before dying of renal failure after he developed the original renal disease in the transplanted kidney.

Chief of surgery Dr. Francis Moore commented years later that as a result of this accomplishment, the ethical assumption of physicians 'to do no harm' would be forever challenged.

None of these advances could have occurred without the benefits of animal research. Our research lab, where we developed our transplantation techniques, depended on the most careful care of our animals. They were treated like royalty in every way. But even though we protected them to the best of our ability, two of them managed to get together when Mona was in heat, and she presented us with a healthy litter of pups as you can see in the next slide. (Slide 21, see page 339).

This unexpected event proved fortunate, as we did not know whether the immunosuppressive drugs would interfere with pregnancy, or whether



Slide 19. Twins leaving hospital.

they would lead to birth defects. Since then we have learned that neither is the case, and there have been many successful pregnancies within the population of transplanted patients living on immunosuppressive drugs.

The success of this first twin transplant in 1954, followed by a successful sibling transplant in 1959 and a similar successful transplant from a cadaver in 1962, opened the door for worldwide transplantation.

INTERNATIONAL TRANSPLANT SURVIVAL RECORD

Longest surviving recipient with continuous function:

Kidney	31 years	Heart	23 years
Kidney-Pancreas	13 years	Heart-Lung	11 years
Pancreas	16 years	Single Lung	8 years
Liver	24 years	Double Lung	7 years
Bone Marrow	20 years		

This table shows the longest survival times for kidney, heart, liver, kidney-pancreas, bone marrow, heart-lung, single lung, and double lung transplants. At the time that we were developing the kidney transplant operation to benefit our patients with severe kidney disease, none of us had any idea that these other transplantation surgeries would soon become possible.

The transplant story comes full circle in the next slide. (Slide 22, see page 389).

Here we see a young man who has undergone a successful double hand transplant holding in his transplanted hands a copy of my book, *Surgery of the Soul*. Dr. Max Dubernard of Lyon, France sent me this slide recently, and it certainly illustrates the far-reaching impact that our original research in the dog lab and with identical twins has had in our culture. During my career, research pursued in the care of patients has shaped the direction of medicine and indeed has affected our society's culture.

In closing, I would like to read excerpts from a patient highlighted in my book.

The full benefits from plastic surgery are epitomized and encapsulated in the care of one extraordinary human being, Raymond McMillan. Ray was born with severe facial deformity. With no control of his facial muscles, he drooled constantly. His lips were blue and cyanotic. His tongue hung out and his ears were only little blobs of tissue. He was diagnosed as Moebius Syndrome (a not uncommon congenital facial problem) and he also had a heart defect.

Ray had an exceptional spirit despite the physical and emotional hardships he had endured since childhood. After spending the first five years of his life with his mother, he was sent to live at the Wrentham State School (Chapter 17), the same mental institution where Jimmy Hickey had been.



Slide 21. Mona and pups.

Ray survived the next 16 years there, and was released at the age of 21. One year later, he was referred to us at the Brigham by either a local newspaper editor or a parish priest.

Ray's problems were so extensive that it was difficult for us to know where to begin. After study, we decided to tackle his facial deformities first, because it was his most visible and compelling problem, and also the most easily repaired. At that time, in the late 1950s, cardiac surgery was non-existent; heart-lung pumps were still undergoing research development.

We started our reconstruction by dividing his lower jawbone into two sections and repositioning each section so that he could close his mouth and control his saliva. A few months later, we detached portions of whatever functional facial muscles he had, and reattached them to the corners of his mouth. This gave Ray the ability to smile, albeit in a limited way, for the first time.

Subsequently, we operated on his palate to help improve his speech and made revisions to the shape of his nose. These moderate improve-

ments increased his self-esteem, another example of a slight physical improvement being more beneficial than an onlooker – or even the surgeon – might expect.

By the next decade, cardiac surgery had progressed remarkably and. Drs. John Collins and Larry Cohn were able to repair Ray's heart, giving him considerably more strength and stamina.

Ray lived alone and was self-sufficient. I helped him get a job in one of the labs at the Dana-Farber and Children's Hospitals and, on his way to or from work, he frequently dropped by my office. I enjoyed these casual visits and, during one of them, suggested he study for his high school equivalency diploma. A few years later, he bounded into my office, waving his diploma. I was deeply touched when he asked if I would keep it! I suppose in some way I had become a father figure to him.

Later, I suggested he do some writing. Apparently he acted on my suggestion. These excerpts from his unfinished memoir, uncovered after his death in 1997, were written as Ray sat on a park bench in the Boston Common. This is where George Washington took command of the American troops and began training them for the American Revolution.

'It is a beautiful day', begins Ray's memoir. 'I have a wonderful free, serene feeling just watching the people go by. I am writing this in the hope that it might help someone today.

This story begins with despair and ends with hope. My name is Raymond Francis McMillan and I was born in Malden, Massachusetts on January 15, 1943. I spent my first five years with my mother, whom I never really got to know.

Because of my deafness, malformed heart and facial deformity, my mother and two social agents admitted me to the Wrentham State School. The School is situated in the New England countryside thirty miles from Boston. The oppressive Victorian buildings of a state hospital still stand, symbol of a time when people abandoned those with whom they could or would not deal. Historically, the hospital was the home of the unloved, the indigent, the handicapped and the insane. It was the total world and experience to thousands of emotionally bereft people. The corridors echo with neglect suffered and cruelties done. And the institution was more like a prison, instead of a mental hospital. It was the antithesis of a nurturing environment; it was an unlikely place for me with my handicaps and I did indeed survive! I survived because I was blessed with a beautiful intelligence, humor and courage. Today I enjoy a normal life and a bright future.

While I was a resident at Wrentham State School, it took some time to get used to because I was very young and I was scared, lost, lonely and confused. My 16 years were a total nightmare and I wonder how I ever survived under those conditions and still was able to keep my head on straight. I was no longer wanted and I found it very difficult to live with the idea of being rejected by my own mother and family because of heart, hearing, and facial malformation. My family only visited me twice during my ordeal. My father came to visit me when I was 12; my stepfather came to visit me five years later and I saw my mother for the first time then. But that was the last time I saw either of them!

I got about four years of good education between 1959 and 1963. Of course living at the School was an education in itself. Under the circumstances I did my very best but I did not graduate nor did anyone else. There was no such thing as a high school diploma at a mental institution.

The people who were in charge at Wrentham State School did not think or feel that I could make it on my own in the outside world because of my handicaps and poor health. The longer I stayed at the institution the more angry I got and I can't count how many times I ran away from the place. When I got caught I knew I was in trouble and after so many beatings it became an everyday thing.

I was paroled (that's the word they used in those days) in April, 1964 at the age of 21. Boy was I glad to see that day come! I knew I had a long hill to climb and it wasn't easy at first but I was so happy to get out of the place they call Wrentham State School that I never looked back! I was not in the best of health but I was so excited to get out on my own for the first time. It felt so good to be free!

"... to preserve freedom, we must begin with peace within ourselves and then spread it to others. Freedom is not a store-bought commodity. There are many ways freedom can be preserved, but with every freedom there is a responsibility and with every right there is an obligation ...". Vida Ivanouskas

On my first day on my own in the outside world, the weather was beautiful. It was a Friday. My first stop was at the White Swan Motel where I was to share a room with three other former residents of the Wrentham State School. The next day I went out looking for an apartment because I wanted total independence and wanted to be alone to prove to myself that I could make it on my own and in the community. I became a dishwasher and salad bar helper at the Lafayette House Restaurant.

My first year, 1964, was a very difficult year. I had trouble making the transition and I didn't know to whom, where or how to go for help. I didn't speak English very well since I had very defective speech. It made it very difficult to

talk. Abraham Lincoln once said: "Most folks are about as happy as they make up their minds to be". You know, he was right! The following year, 1965, I promised myself to be so strong that nothing could disturb my peace of mind. To talk health and make all my friends feel that there is something in them. To look on the sunny side of everything and make my optimism come true. To forget the mistakes of the past and press on to the greater achievements of the future. To wear a cheerful countenance at all times and to have a smile ready for every living creature I meet. To give so much time to the improvement of myself that I have no time to criticize others. To be too large for worry, too noble for anger, too strong for fear and too happy to permit the presence of trouble. To think well of myself and to proclaim this fact to the world – not in loud words but in great deeds. To live in the faith that the world is on my side so long as I am true to the best that is in me.

That same year I had an appointment with Dr. Joseph E. Murray, a plastic surgeon at the Peter Bent Brigham Hospital. He told me that he could help me and make my life a lot easier to handle. As the years went by I continued to see Dr. Murray even until this day. Throughout 1965 I spent a great deal of time as an outpatient. Four to six months was spent getting my jaw ready and strengthened for my first operation in 1966. I didn't know what to expect of the outcome but I knew there was a lot of work to be done and that I would have to be strong and have a lot of heart and to be brave and courageous and to do what is right and to take responsibility for my own actions. I expect nothing from the world but I realize that as I give to the world, the world will give to me.

I had my first operation in 1966, and addition operations in 1967, 1968 and 1969. They could only do a little at a time because I had a weak heart. Then in 1970 I went and had the open heart surgery and I was in the hospital for about seven weeks. I can honestly say they did a wonderful job. The surgery was performed by Dr. John Collins and Dr. Lawrence Cohn. I had my last operation in 1977. In the meantime, I did a lot of reading as part of my self education. I couldn't read well or understand all that I was reading. I kept on reading anyway!

Many people have severe facial deformities, either congenitally or as a result of injury or disease. They do not look like other people and because they are different, they are treated differently. They may even come to think of themselves as less than human. But beauty is not determined by a perfect figure and features. It is determined by the way you respect and honor yourself.

I had a very difficult time with my handicap and sometimes I had to fight with my fists. I had to fight to survive. Handicapped people are a part of our

society that are beaten down time and time again. But we are a strong-willed and extremely proud people who desire no handouts, no charity and want nothing more than the simple chance to support ourselves through our own abilities. There are ups and downs and you can never be a quitter. There is a reason for living! There is a reason for being here. And there is always a way. No matter what you are going through, there is always a way'.
Raymond Francis McMillan

Ray died suddenly in 1997, seated in a car beside his best friend, on the way to lunch at a favored restaurant. At his funeral, a circle of people far beyond his hometown of Wrentham came to mourn his passing. Many described Ray as a beloved friend. Jack Collins, Larry Cohn and I agree that Ray was one of the most remarkable patients we have ever had the privilege to care for. We feel fortunate to have known him.

The impact the hospital staff and I had on Ray's life only partially involved scalpels and sutures. Simply because we cared for him and showed him compassion and basic human kindness, we gave him a feeling of worth and helped heal his spirit. The greatest benefit we gave Ray was not so much the freedom of facial muscles, but rather the freedom for his inner self to glow and grow. The cosmetic improvements we made to his exterior simply removed what had been a constant impediment to his daily living. Surely this was a case of "surgery of the soul".



Slide 4. Charles as he looks today.



Slide 5. Charles on arrival at VFGH.



Slide 6. Charles with skin allografts.



Slide 9. Patient at birth.



Slide 10. With twin brother as I first saw him.



Slide 11. The two brothers later in an office visit.



Slide 13. Asymmetrical infant face and cranium.



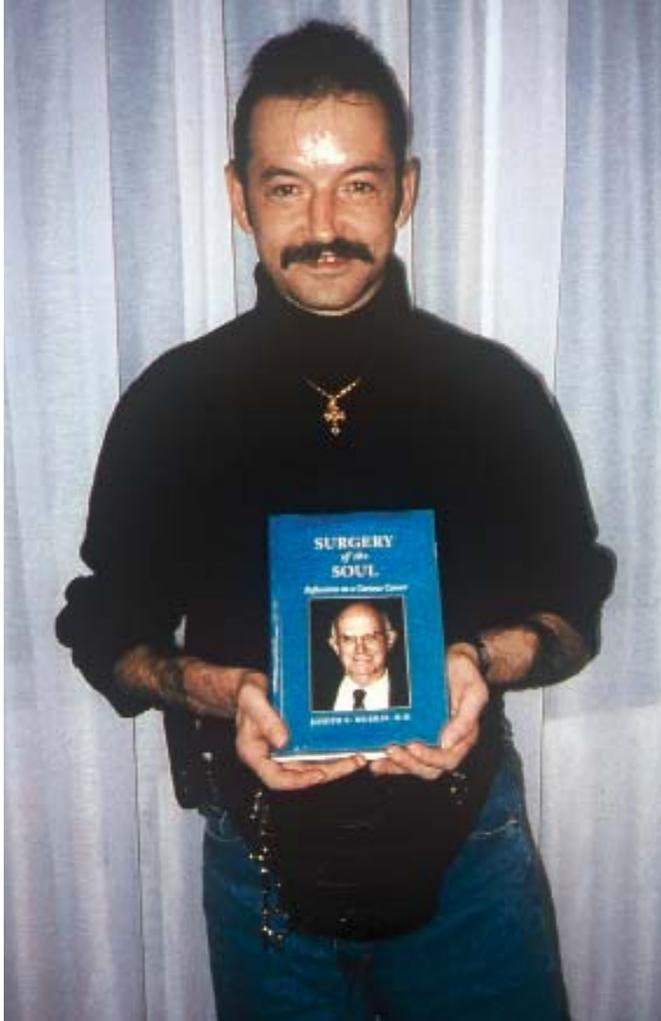
Slide 14. Skull and hip bone segments.



Slide 15. Post-op photo of infant.



Slide 16. Cosmos and Damian.



Slide 22. Double hand transplant, courtesy of Dr. Max Dubernard of Lyon, France.