

Eminent Indians in Medicine

P. K. Sethi

MB BS, FRCS (E), DSc (Honoris Causa)

Dr P. K. Sethi was born on 28 November 1927 in Banaras. He graduated from the Sarojini Naidu Medical College in Agra in 1949 and went on to do the MS from the same institution in 1952. He became Fellow of the Royal College of Surgeons (Edinburgh) in 1954.

On his return to India, Dr Sethi joined the Sawai Man Singh (SMS) Hospital and Medical College in Jaipur in December 1954 as a lecturer in surgery and retired as Professor of Orthopaedics and Director, Rehabilitation Research Centre from the same hospital in December 1982. He is at present Emeritus Professor there.

Dr Sethi is internationally known as the innovator of Jaipur Foot, a prosthetic footpiece which overcomes the difficulties faced by Indian amputees who hitherto had been using artificial limbs which were conceived and designed in the West and inappropriate for use here. This footpiece is being increasingly used in Sri Lanka, Afghanistan, Vietnam, Cambodia, Nicaragua and Kenya—war-torn countries with heavy concentrations of physically disabled people.

Dr Sethi has received many honours for his scientific and professional work. He was awarded the Dr B.C. Roy Award in 1979 as an eminent medical teacher; and the Padma Shri honour in 1981 from the Government of India. He was given the Ramon Magsaysay Award (1981) for Community Leadership in recognition of his surgical innovation and for joining together doctors, craftsmen and the community in a programme which enabled the crippled and limbless to lead a normal life. In 1982 the Guinness Award for Scientific Achievement recognized him as one of the most inspiring examples of healthcare delivery in the world. He was given the R.D. Birla Award for Outstanding Medical Research in 1984.

He has been invited to lecture at various international conferences which include the First World Congress on Prosthetics and Orthotics in Montreux, Switzerland (1974) and he delivered the Knud Jansen Lecture at the World Congress on Prosthetics and Orthotics, Kobe, Japan (1989).



NMJI: Dr Sethi, could you tell us something about your childhood and your parents?

P. K. Sethi: I was born in Banaras in 1927. My father was a physicist and had joined the Physics department of the Banaras Hindu University (BHU) a year previously as a lecturer. He had been exposed to the Independence movement and was greatly influenced by nationalist leaders like Mahatma Gandhi and Madan Mohan Malaviya. He started to work at BHU on a very low salary. I had six sisters and Gandhiji was anxious that my father should be earning a little more money. At that time Agra College in Uttar Pradesh had a separate postgraduate department and the salary was much higher. So in 1930 we moved to Agra; I was 3 years old at that time and all my education up to postgraduation was at Agra.

This background explains some of the early influences on me and the dominating influence of the value system which my father had. He was fiercely nationalistic and would not compromise on principles. For instance, he completely refused to accept the traditional dowry system. He said he would educate his daughters and that would be their dowry. In none of the marriages of my sisters was dowry given and if anybody raised this issue the marriage was immediately called off.

One of the things which my father felt strongly was that science

must percolate down to the level of the common man otherwise it remains elitist. He recognized the importance of science education in local languages. In 1920, he was the first to produce a dictionary of scientific terms in Hindi (published by the Kashi Nagari Pracharini Sabha). He wrote the first textbook in Hindi for high school physics, which remained, till very recently, the standard textbook of physics. He wrote a number of books on physics and later translated all of them into Hindi.

NMJI: You went to Medical College in Agra. How do you remember your student days? Why did you do medicine?

P. K. Sethi: Entry into a medical college was fairly simple in those days. If you performed well in science subjects in school, in college you took science. If you were good in mathematics, physics and chemistry you went in for engineering and if you were not good in mathematics you went in for biology. I, amongst all my brothers and sisters, was weakest in mathematics. As I was good in science and not in mathematics, I opted for medicine.

NMJI: Did you enjoy your medical college?

P. K. Sethi: Yes. I think most teachers were quite bad—as bad as

the present ones—but there were certainly some who were outstanding. Dr G. N. Vyas, Professor of Medicine, I would rate as one of the finest teachers. He became my role model. I always dreamt that some day I should be like him. I would be a physician. In fact, even after I passed my MB,BS where I got honours in surgery and did not get honours in medicine it was clear in my mind that I was going to be a physician.

NMJI: In what way was Dr Vyas a good teacher?

P. K. Sethi: When he taught he really lived his subject. When he taught neurology his gait would sometimes become Parkinsonian. He would stand at one end of the ward and say that when I start moving to the other end please stop me as I will not be able to stop myself. He would mimic heart sounds, there were no gadgets for the students to listen to but he could reproduce them unerringly. It was not just his performance but the way he was totally immersed in his subject.

NMJI: Were you an outstanding student? You got honours in surgery?

P. K. Sethi: I got honours in several subjects in medical school though as a school student I was very average. My father never asked me how I studied, whether I was doing my home work. It was not that he was indifferent; whenever I went to him with any difficulty, he would leave everything and sit down and explain things to me. When I was appearing for my high school examination he called me and just said: 'Look, if you get a good division you will get admitted to a college but if you do not get a good grade do not expect me to help you.' I got a second class in high school but in college, because it was mainly science, my scholastic results were better.

NMJI: What did you do after you finished MB,BS?

P. K. Sethi: I told you that I wanted to become a physician but then I learnt that Professor Vyas was retiring and I was unwilling to work with the person who was going to succeed him. So circumstances took me to surgery although I was not a very good craftsman. I followed the usual pattern, I did my MS in General Surgery and as there was no specialization in those days in our country I decided to go abroad for the FRCS (Fellowship of the Royal College of Surgeons). The Agra Medical College was not recognized by the General Medical Council, and our students were not permitted to take the examination. I wrote a letter to the President of the Royal College of Surgeons saying that I wanted to take the examination and I sent a copy of my scholastic record. The President, apparently, had the authority to use his discretion and sometimes waive certain clauses. He said: 'You can come and take the primary fellowship. But for taking the final fellowship you will have to work in a British hospital because otherwise we won't recognize your training.' I also sent a similar letter to Edinburgh and they allowed me to appear in both examinations. So I went to Edinburgh although mostly I did my courses in London at the Institute of Basic Medical Sciences Laboratory. It had a very good reputation and the course was outstanding.

After appearing for the examination in Edinburgh I came back and did my final course at the Postgraduate Medical School under Professor Ian Aird in the Department of Surgery. He was not interested in preparing a candidate for the fellowship like Guy's or St Thomas' Hospitals which had courses totally geared towards the examination. At Hammersmith I got a broad surgical education. Aird was, of course, a legendary figure for us because we

were all brought up on his textbook of surgery and to see him in person and listen to him was very exciting. I stayed back to be able to attend the operations and then appeared for the FRCS in Edinburgh and passed. That year my father was retiring and as I was the eldest son, I had to come back and start earning so I did not hang around trying for the London fellowship. I returned in December 1954 and just then there was an advertisement for a lecturer in Surgery in Jaipur. I applied, the interviews were held and I was selected. I joined the medical college in Jaipur and I have remained there since.

NMJI: How did you get into orthopaedics?

P. K. Sethi: I never imagined I would go into orthopaedics because I was trained as a general surgeon. What happened was that the Indian Medical Council after inspecting the medical college in Jaipur had reported that within five years the institution should have independent departments of orthopaedic surgery and paediatrics—these were the two specialties which first branched out of the major disciplines of surgery and medicine. My Principal called me and said: 'I want you to start a separate Department of Orthopaedics.' I said: 'Why should I? For one thing I do not want to leave the broad field of surgery and I was never groomed as an orthopaedic surgeon. I have never worked under some recognized orthopaedic surgeon or developed an aptitude for it.' I, however, saw that I had no future in general surgery because the person under whom I was attached as a lecturer was quite passive and I was stuck with him. I thought if I had continued with him for another 2 or 3 years then my entire future as a surgeon would be ruined. This Principal was a former teacher of mine in Agra and in those days we used to respect teachers; he bullied me and I conceded.

I joined orthopaedic surgery and had to learn everything the hard way. It was a blessing in disguise because my thinking was not fixed by any conventional approach. If I had worked under a great master I would have just followed his footsteps. I had nothing to go by because general surgeons were managing fractures, osteomyelitis and other procedures but now when I claimed to be an orthopaedic surgeon I had to do something better. So I started moving into the fields of poliomyelitis and open operations for fractures which meant learning everything from the books and learning by making mistakes. I took leave for six weeks to travel round the country to see some of the well known orthopaedic surgeons. I first came to Delhi. At that time the All India Institute of Medical Sciences had been set up and Dr Doraiswamy was a well known figure. Robert Roaf from Liverpool had set up an orthopaedic surgery department at Lady Irwin with R. P. Chakraborty. Lucknow was another major centre for orthopaedics with Dr B. N. Sinha and Kanpur had Dr A. K. Gupta. Dr Gupta was an extraordinarily good man. He developed my interest in the subject. He was in love with orthopaedics and his feeling was so infectious that I used to go to Kanpur again and again to see him. I then went to Patna and spent time with Dr Mukhopadhyay. All these visits generated a lot of confidence. The things that I had been doing, these people were doing in the same way.

For the Annual Surgeons' Conference at Jaipur in 1959 Mukhopadhyay wrote to me and said: 'We have a separate section on orthopaedics and because you are a local orthopaedic surgeon, you should act as the local secretary.' In those days the orthopaedic section partly met with general surgery and had some sessions of their own. One of the traditions laid down was that you had to have a clinical session in which a local man had to spend one morning

and show what kind of work he was doing. I put up this show—the clinical case demonstration. At that time, Mr P. G. Muir had come from London as a representative of the Royal College of Surgeons of London. When I was setting up my clinical demonstration I was surprised to find Muir sitting in the front row. However, it turned out to be a success and later Muir wrote up a report on his visit to this Annual Conference and made a special mention of the case demonstration in orthopaedics.

NMJI: When did you get interested in the rehabilitation of the disabled and amputees?

P. K. Sethi: Formerly we had one person whom we could call a physiotherapist. He had a certificate from the Indian Army as a masseuse and was already on the hospital payroll before the orthopaedic department came into existence. This person had a small side room in the ward and his monthly indent used to be one bottle of 'Himalayan bouquet' talcum powder which he would sprinkle and massage. He had a walker and no other equipment. He came as a legacy to me but he was a hard working person, and eager to learn. We decided to first set up a physiotherapy department. I wrote out the list of equipment that I needed but in all our annual budget meetings my request was shot down. There were many more important things in the hospital. We were getting very frustrated. But we had patients and Jaipur being a small town everything was possible.

In Jaipur, every one knew every one else and ours being a government hospital, we treated the patients free of charge. If I treated somebody and went and told him that I needed something for our work, he readily came forward and lent support. I found that it was absolutely futile to ask for money because the moment you got a donation in cash you had to deposit in the hospital and then it went to the government treasury and never came back. So we started asking for raw materials. I would ask them to donate some wood for parallel bars and ask somebody else if I could engage a carpenter as I had been given some wood.

Within two years, we equipped the whole physiotherapy department using local community support and local materials, transport, mechanics, carpenters and cobblers. This allowed me to get to know this class of people. They helped me initially to get equipment for physiotherapy like a Thomas' splint. We were not able to buy them. So I got a book on *Orthopaedic appliances* which showed how to prepare a Thomas' splint. I took it to a blacksmith, sat down with him and we fashioned a lovely Thomas' splint. Then there were saddlers. Jaipur was previously the home of many cavalry regiments, there were always people who worked with leather and making leather appliances for them was child's play. I also became familiar with a lot of these skills which are not normally a part of surgical training. However, there was no space available. If I was allotted space there would be ten other departments who would stand up and say they also needed space. I never asked for it. When a pair of parallel bars was made I put it in the corridor, followed by another apparatus and another. The passage got blocked so the superintendent allocated an open courtyard with a part corrugated asbestos roof. In the morning we would bring out all the equipment and put it back in the shade. If it rained, it was a holiday. It became an area of brisk activity because many patients came with polio, some for post-fracture exercises, which they had never been asked to do earlier. The authorities then put a complete roof over the courtyard and created posts for more physiotherapists. This was the nucleus of the physiotherapy department.

Children with polio who had been neglected had developed

such severe deformities that it was not possible to fit them with appliances to stand up in. So first I had to learn corrective surgery for polio. These were often staged procedures. As an undergraduate, I was taught that poliomyelitis was rare in India. This was because these children never came to hospitals, nobody did anything, so why should the parents bring them? When the word went round that something was being done we were flooded with polio patients.

I corrected the deformities so that the limbs were straight, often after several operations. I then advised them to go to Bombay and get the calipers from the All India Institute of Physical Medicine and Rehabilitation because there were no workshops in north India. I never even realized that it was stupid advice because most of the patients came from villages, and could not afford to travel to Bombay. They would listen to me, go back to the villages and reappear with the same problem. I soon realized that this was an exercise in futility and there was no real mystery about calipers.

We had already made Thomas' splints and the workshop needed just a little upgradation. At that time, I found a qualified male nurse trying rather ingeniously to mend our fracture table. When I asked him where he learned these skills, he said: 'I come from a family of craftsmen, my father was a mechanic, my uncle has a lathe shop and after the hospital I go and work in the workshop.' He was a trained nurse, familiar with clinical terms and also knew how to make plaster of Paris casts and had other mechanical skills. I wrote to the Director of the All India Institute of Physical Medicine and Rehabilitation in Bombay to help train this person. He was sent there for two years but in six months the director sent him back saying: 'We cannot teach him anything more, he knows everything.'

We started a small workshop, mainly with the idea of producing simple appliances for polio patients. The idea of making an artificial limb never even crossed my mind. However, we found we were doing the same thing for our amputees, sending them to the Pune Amputees Centre where again the amputees were unable to go. So, for the first time, we made a limb for an amputee. This was of course a replica of the Pune prostheses which in turn was a replica of the western model. I presented the case in a clinical meeting and everyone came and patted me on the back and said: 'Good work done.' I was very proud. However, Jaipur is a small town. When you go out into the street your own patient will greet you. I would spot amputees with crutches. I would think here is a potential candidate for our workshop. Unfortunately, I generally found that the person had already been treated by me. Why was he not using an artificial limb! I would ask him. My initial apprehension was that it had broken down or did not fit him well but then I learned something very different. He said: 'You have given a limb which I cannot use. I cannot use it at home, I cannot sit on the floor, I have to wear shoes all the time.' To go inside the house we have to take our shoes off, and in western countries taking your shoes off meant taking your limb off. You cannot go to a mosque or a temple with shoes on and, an Indian farmer won't farm with his shoes on. So I started realizing that the shoe was the villain of the piece. Could we do something so that we did not need a shoe by altering the appearance of the footpiece and making it from material which was waterproof, sturdy and wear-resistant.

I realized how formal education prevents you from thinking outside certain narrow boundaries. There was a man who heard about the need to make a foot. One day he followed me and said: 'Sir, you want a foot to look like a foot? It can be done.' Initially my reaction was rather sharp. 'You are talking about shapes. Can we make a cast of my foot and make an aluminium mould in which

the cavity will look like a foot. I know how to do sand castings.' Then I got interested.

In the premises of the hospital we set up a small furnace and got some bricks, sand and molasses, then made a mixture for sand-casting and got our mould. But once we got the mould I found that this chap did not know anything about rubber. I did not know either. I went to all the big rubber companies—Firestone, Dunlop. They all talked politely, but they were all looking at the thing from a commercial angle. Nothing came of it till one day somebody said: 'Why are you running around? There is a nice retreading shop just near the hospital. They should know about rubber.'

The strategy we used was to take an amputee, take the mould and go to him and say we need your help. We can pack in rubber which is used for car tyres into the mould, vulcanize it and might get something which is like a foot. It will be black but we will paint it. But we did not know how to vulcanize it. He laughed and said: 'You leave the mould and come back in the evening'. In the evening there was the black footpiece sitting there. I was excited. I took it in my hand not realizing that solid rubber could be so heavy; it was absolutely stiff, no mobility at all and I was so disheartened that I did not see it for almost a year. But the need was there and the problem kept cropping up. Then one day I realized that we had been making western footwear which was lighter. Suppose we used the western footpiece inside the mould as a filler, we would pack the little space all around, with bad rubber then vulcanize and externally it would look like a foot. So we did that and suddenly the whole thing became much lighter but then the patients said that they could not squat, or sit cross-legged. Whenever they went home they had to take the limb off. We must have transverse rotation, we must have flexibility. So the design kept changing. We started fiddling with the standard western footpiece, modifying it and ultimately just discarded the whole concept of the shoe so central to the western footpiece. So the concept of the Jaipur foot emerged.

It was then a question of refining it, strengthening it, making it light, and it became a very exciting experiment. A large number of my postgraduate students wrote dissertations on its various aspects. They started collaborating with the engineering college to study the whole thing in an objective manner. These are ongoing studies.

NMJI: How many people now have been fitted with the Jaipur foot in India?

P. K. Sethi: I would not know. Initially there was no production centre or manufacturing unit which was producing the footpiece on a large scale.

NMJI: Your whole philosophy was to use global technology and decentralize?

P. K. Sethi: Once you have got a design then somebody should take it up from there—the manufacturer.

NMJI: Why did you not patent it?

P. K. Sethi: Well, this is something so foreign to my way of thinking. How can you make money on something and prevent others from using it? That idea never even crossed my mind. When I went abroad everyone asked me: 'Have you got it patented?' And some of those people who were my well-wishers said: 'Look, take my advice, the first thing to do is to patent it. Someone will borrow the design and will prevent you from making it.'

NMJI: I have read somewhere that there are 40 thousand people who have the Jaipur foot, including a well-known dancer and a person who climbs and jumps off trees.

P. K. Sethi: There are two aspects to the whole thing. You must have read in the newspapers about a lot of controversy surrounding the Jaipur foot. It is a sad reflection on the current state of affairs. My major interest was on the technical questions—to look at a design which would be appropriate for our country and in the development of that design a lot of local craftsmen and persons who knew about retreading and moulds were involved. Once our ideas changed, we changed the material for the limb as well and a whole series of different ideas emerged. Footpieces are standardized items. All you need is a right or left piece and somebody has to produce limbs in adequate numbers. Any limb-fitting unit does not require to be capital-intensive just to make footpieces. All it needs to do is to buy footpieces from the manufacturers. Had that been done today all centres in the country would be using our footwear.

NMJI: Why was it not done?

P. K. Sethi: Because manufacturers never came forward. They did not feel it was worthwhile. The other thing was a little unpleasant. Because of the public visibility many people thought that here is a gold-mine for 'philanthropy' but ultimately everyone who contributed monetarily wanted to own the system. They started doing things contrary to my ideology like using amputees as objects of pity and charity.

NMJI: What was your philosophy?

P. K. Sethi: I feel that pity is something which actually demeans the receiver. Something which destroys. We did not do our work out of pity. I feel when a person remains disabled, he is a burden on society. We should help him become economically viable, not only to restore his own self-image, pride and confidence but also to become a useful earning member of society.

NMJI: There are lot of countries in the Third World such as Cambodia, Vietnam where there are P. K. Sethi Centres of Rehabilitation.

P. K. Sethi: These are recent developments. In 1975 a voluntary organization in Rajasthan came to me for advice. That was the year of the 25 hundred years of the *nirvana* of Mahavira. So, all over the country, the Jains, a business class were celebrating and a lot of money was being raised for the construction of temples, etc. There was a senior Indian Administrative Officer from the Rajasthan cadre with a very bad compound fracture in the knee joint which was infected and I treated him. He spent a month in hospital and ultimately recovered. He also became an ardent admirer of our work during his stay. It struck him that the Jain community could set up a rehabilitation centre. They raised a sum of Rs 2 lakhs. They said: 'Look, we have this money and we want to build an independent rehabilitation centre. We want your advice.' I argued with them: 'If you have just 2 lakhs, you need a piece of land, you need a building, you need to employ manpower, equipment. We have to spend on establishment. So why don't you think of an alternative? As a government hospital we have limitations, we are bound by rules and regulations but you have no restriction. Suppose we work together; we do the technical work, you do the social side, use our premises as your office, so

you do what you can and we do what we can and very clearly demarcate the areas so that there is no clash.' I made out working papers, presented them at a World Health Organization meeting on how a non-governmental organization (NGO) can work in a government hospital. This worked marvellously.

To anybody who came to offer donations, I said: 'Give it to them.' I knew that it would be available when needed. The idea was to bypass the whole accounting system. This went on well for five years. Our turnover increased partly because of this help and partly because of the changed technology that came in 1975. Then we were making a limb a week and by 1980 started making about 10 limbs a day. But after some time the quality went down; that intimacy which was there between the patients and us started disappearing. Ill-fitting limbs were being provided, corruption set in because there was a long waiting list and some were willing to pay money to the technician.

I decided that we should not become large. It would be better to share our experience with other centres; to try and set up identical centres in different states of the country. I was angry at a certain point of time when my patients had to travel to Pune for a limb and today how could I take pride in the fact that people were coming to me from Tamil Nadu and Kashmir.

NMJI: How many centres are there in the country making the Jaipur foot?

P. K. Sethi: Later, the thing got out of my control. I could sense now that that bureaucrat who was the secretary of the voluntary organization was getting very uneasy, he did not like the idea of others getting involved. Ultimately he said the local Marwari community in different states should be in charge of the programme. Why should we give exclusive rights to one community? Then they really tried to destroy the work.

NMJI: What's the situation now?

P. K. Sethi: I retired in 1982, till the time I was there I did not allow them to handle affairs but the day I retired they saw to it that I was not able to re-enter the premises. Because he was a senior bureaucrat, I found my colleagues, my own students trying to avoid me. A couple of years later the Department of Science and Technology (DST) gave me a grant for the development of the appliances for polio. Materials were provided. With the help of the DST we set up a small workshop to develop polio appliances. The Indian Institute of Technology then gave me another project, and then another; and the whole thing became very large. From 1984 onwards there was an ongoing programme of development but we work in a very low-key manner.

NMJI: You have received a lot of national and international recognition. What are you most proud of?

P. K. Sethi: Frankly, as a professional I am most proud of the fact that on the first day of the International Association of Prosthetics and Orthotics (IAPO) I was invited to deliver the Knud Jansen lecture. It is named after the first president of the IAPO.

NMJI: What are your major regrets in life?

P. K. Sethi: One was the major break up with the NGO group that I was trying to foster and I had a dream to have identical set-ups all over the country. I have been able now to get the TVS group in South India to set up a production unit at Madurai, they have a

rubber factory there, and have been supplying components to the defence department, they have a strong research and development department, and through the DST I am linking up with them. The other regret is that I have not been able to produce a good second line to carry on the work.

NMJI: Why did you not do that?

P. K. Sethi: I have been able to do that for orthopaedic surgery. I can say that I have trained half-a-dozen orthopaedic surgeons whom people respect and who hold certain values but in the rehabilitation area nobody was willing to come.

NMJI: You think value-based medicine was central to your life and work?

P. K. Sethi: Absolutely. There is no question.

NMJI: What do you think of the Consumer Protection Act?

P. K. Sethi: I see very much eye-to-eye with what Sunil Pandya has been saying. I think when a patient comes to me he puts his trust in me and I am responsible, I have to look after his interests.

NMJI: Why is there distrust between doctors and patients?

P. K. Sethi: I think it is the lack of communication which is something that two people can sense. Is this man genuinely interested in me or is he interested in my money? I think a good level of communication can generate a feeling that you are genuinely interested in the patient. The patient will not go against you.

NMJI: What is your present opinion about Indian medicine? Do you think it has improved in the last thirty years or deteriorated? Are we dependent too much on the West?

P. K. Sethi: There are a number of people who are outstanding. You see sparks scattered all over the country. For instance, at one time I had a very dim view of the medical students, till I started attending the P.N. Berry Scholarship Selection Committee meetings. I suddenly found that a large number of very bright people came and I was not aware of it.

NMJI: So do you think there is hope?

P. K. Sethi: I think there is. As teachers, as relatively older members of the profession it is our duty to push in this value system.

NMJI: What are the values that you hold dear? What advice would you give to people who are embarking on a medical career?

P. K. Sethi: Giving advice to some one who is embarking on a career sounds very hollow. They all say, 'Look, the older generation always says this to the younger generation.' They are very sceptical about it. I think it is wiser to set an example.

NMJI: What and who would you say have guided your life and work?

P. K. Sethi: I can't say anything clear-cut but I always had to be honest with myself. I could not lower myself in my own esteem. At the back of my mind, I always thought: 'What would my father have said if I had done this?'