MENTORS IN ORTHOPEDICS

ARUN MULLAJI

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SUMMARY

Arun Mullaji is a famous knee surgeons in India and very active in Europe. He is one of the founding members of the Indian Hip and Knee Surgery Society and the past president of the Asia Pacific Arthroplasty Society.

Where are you practising?

> I practice in the city of Mumbai, formally called Bombay, which is one of the largest cities of India. I was born and brought up in this city. I have a private practice where I see patients in four clinics. Mumbai is a huge city and it deals with almost 12 million people but it's a very narrow, long strip of land made up of seven islands which have been joined together. So, our patients come from different parts of the city and travelling and commuting in the city is difficult. I run four clinics and I have my junior associates who I want to encourage and develop their own practice as well. I give them one clinic to run in the sense they see new patients, they see follow-ups of patients in those clinics and we operate together. We operate in two private hospitals where they would assist part of the surgery and also continue to look after the patients when they go back to the area that they stay in. So, these are four clinics in four widespread areas and each clinic caters to people in that area so it's convenient for them to go there especially with their disability. They don't walk a lot, they don't want to travel a lot. A lot of them have urinary problems or other things so they need to reach about pretty soon and don't need to get stuck in traffic. That's how I practice in Mumbai.

Since when?

> I have been in practice since December 1994 when I came back from overseas after training. I started off as a general orthopaedic surgeon with the special interest in arthroplasty. But initially till you get some sort of recognition people don't come to you only for arthroplasty. They will come to you for all sorts of problems and gradually I narrowed down and started doing only arthroplasty and now it's mainly knees. Especially total knee replacement, unicompartmental, patello-femoral. A few bicompartmental surgeries and revision knee surgeries. But I do also hip replacements as well. When I started off I used to do upper limb joint replacements because I had a large number of rheumatoid patients and I was trained with shoulder surgery, elbow surgery as well and therefore I was happy to do all forms of arthroplasty.

How many knee surgery you do a month?

> I'd say about 80. Put it maybe annually, I'd say we do about 900 to about 1,000 operations in a year.

What's the difference between public and private practice?

> In India we are trained in teaching hospitals which are public hospitals. The quality of care in these hospitals is not as good as in a private hospital. So, there's a big difference in the standards

of care. That is in terms of the hygiene and in terms of the environment in which the patients are being treated. The quality in terms of the people treating them is very high. So, from that point of view, they are highly qualified, well-trained students as well as staff, medical staff looking after them. But the facilities given to these patients is nowhere near a private hospital and therefore the people visiting these hospitals are generally from the lower socioeconomic strata of society. They're not really the well-off people and that brings in another problem because they come from different parts of the city or the state and they also come from other parts of India. The number of beds is limited but our population is huge and we cannot turn away any patients. So, if the ward has let's say 20 beds officially there would be in fact 60 patients. One below the bed, one next to the bed on either side, so you always have more patients than the capacity. And therefore that would also bring the problem of infrastructure. You build it for 20 but you filled it with 60 people so obviously, there's going to be crowding problems of hygiene etc. So, although they give us the best training, they're not the best for a person who has either insurance or reasonable funds to take care of this own medical care. When you can afford it, you go to a private hospital.

How does it work with the insurances?

About 25% of the people who come to a private hospital or seek private care are covered by insurance. Not necessarily fully covered in the sense of it depends on what premium they have been paying. So, that would allow them to avail of a certain amount of money for a problem. It may or may not cover the entire expenses for that hip replacement. You may need a revision hip replacement. You have insurance for x amount of money but the cost is x+y so you have to then pay the additional amount yourself. Roughly 1/4 of the patients have insurance. The other pay themselves. Many of them who are working in companies have also their own company insurance.

Do you think that overall you can reach now the same quality for TKA surgery than in western countries?

I would say yes. I have travelled to many countries and I have seen the quality of care and specially in England where I worked for nearly 4 years. Even in the same hospital if you work in different units with different consultants, you can see a difference in the level of care and the level of expertise given to those patients and the same is true in our country. You have surgeons with different expertise levels. Some are better than others but overall I think Indian surgeons are very skilled. Once they pick up a certain technique most of them will be able to accomplish the surgery very well. What is lacking really is the infrastructure. The ability to have good saws, drills, power equipment. Also theatres which are as sterile as you can make them with laminary airflow. All these things are not available across all hospitals in all settings. So, there is quite a variation of the quality of care unfortunately and that mirrors what is seen in other countries as well.

Do you face more post-operative infections ?

I would say that is partly true that you do see a higher rate of infection where the set up is not as good. Where the asepsis overall quality of hygiene both in the operation theatre and in the ward is poor. And when the patient goes home, the environment in which he is living may not be optimum. Therefore we do see a high rate of infection in orthopaedic surgery in general not only with arthroplasty but we see with simple hip fractures and normal platings. In all these internal fixations we see also fairly high rate of infection particular in hospitals which are not as well equipped from the infrastructure point of view. That unfortunately is the case.

Outside of infection, do you have high rate of TKA revisions ?

> There is a significant problem of revisions and this is seen across the board in different countries. I read a very important paper from the US published in the JBJS where they said that in the next 2-3 decades they are expecting a 600% increase in revisions. That is absolutely incredibly to expect this sort of an increase. They may not be right, it may not be 600% but even if it is a fraction of it, that's a huge number to deal with. In India now we're doing roughly 150,000 arthroplasties a year. Some years ago it was barely 5 or 10,000 so the growth rate is 11-12% in India for primary arthroplasty; and that's going to keep increasing. Now if you look at the population base which is 1.25 billion people, even if a small percentage of that undergoes arthroplasty and then the revision rates keep increasing, I don't think we'll have the people and the money to look after the problem. So, revision is definitely an issue. We have a lot of extraarticular deformity and a lot of our patients have coxa vara, severe bowing of the femur and the tibia. So, if you are not aware of the extraarticular deformity and you don't factor it into your planning, you're likely to have misalignment before you finish the operation. For example about the cut of the distal femur, most people would just take their jig, set it at 5 degrees or 7 degrees of valgus and do it for every case. We looked at 500 consecutive Indian patients and we measured the angle between the mechanical axis and the anatomical axis of the femur. Only in 44% was it between 5 and 7 degrees so more than half the patients it was less than 5° or more than 7° which means that if you put 5-7 degrees as soon as you finish the operation you already have a malalignment. And given the fact that a lot of our patients have osteomalacia, vitamin D deficiency although there so much sunlight, plus osteoporosis in elderly women, if you leave them malaligned, that is a recipe for revision.

Is alignement such a problem?

> I think failure it's multifactorial. There are many factors that contribute to revision but one of them is alignment. I would not say alignment is the only thing but I think alignment along with the soft tissue balance, plus the bone quality are three things that matter. If you have a little bit of malalignment, a little bit of instability and a poor bone quality I think will eventually fail.

The failure site being more at the interface of the bone than between the artificial components?

> That's right. Thanks to our engineering colleagues who have been improving the quality of the polyethylene. I don't think polyethylene is really the issue now even in he hip. So, even if you have asymmetrical loading on the polyethene, the poly may not wear. What might happen is that the bone gets asymetrically loaded and that is more likely to create a problem if the bone quality itself is comprised. If you have solid, hard bone like in some western countries and you leave it misaligned, maybe you'll get away with it. But with softer bones and obese patients there is high chance of failure.

Do you cement your knee prosthesis?

> Oh, yes I cement. I think in hips there's a completely different ball game. The hip is not the knee joint and hips do very well cementless although I have a very high experience with cement too. So, for THA in an elderly person I might use cemented total hip but for a younger, middle-aged person I would do a cementless in most cases. In total knees, we don't have cementless components yet in India. Our Prime Minister has recently announced a ceiling cap on implant prices. Beyond the fixed price they are not going to pay the hospital or the doctor. Whoever is doing the operation cannot charge and the companies cannot charge beyond that amount. So,

there is no incentive for companies to bring in expensive implants because they will have to sell them at the same price as a standard cemented implant. We don't have cementless total knees yet but even if we did have it and if they were priced the same I would be hesitant to use it in elderly people with suspect one quality and especially in the sort of deformities we get. A lot of our elderly patients have waited so long that they come with huge deformities and then there is secondary bowing in the femur, in the tibia. I'm not sure I would do a cementless in these type of cases.

People like to seat cross-legged in India, is this a problem for you?

It's a very important requirement. A lot of patients when asked why they waited so long, say we were told we will not be able to bend our knees, we will not be able to sit cross-legged, we will not be able to sit on the floor, so why should I do the operation? But on the other hand, we have now been doing arthroplasty for over 20 years and a lot of our patients are sitting cross-legged, they get good movement. They are able to sit on the floor, get up from the floor. They seem to be doing quite well. It is a requirement for our patients to have good range of motion. Surprisingly, a lot of patients even with severe arthritis, with huge osteophytes, deformity, bone loss, one would expect them to become stiff and painful but they are very flexible. They tend to have a very good range of motion. Almost as if they have developed a neuropathic joint because they have worn out everything including all the receptors for pain I guess. They are able to flex completely. They have stretched everything out and with their willpower and ability to sit, they still retain a very good range of motion.

You don't have to use special operative techniques?

One of the most important factors that determine the postoperative range of motion is the preoperative range of motion. So, unless you have done something incorrect like let's say upsize the femur or had a reverse slope of the tibia or your flexion gap is so tight, you should have a very good range of motion in most of these patients. So, you don't really need to do too much. You have got to follow the standard principles, excise the osteophytes, make sure there is no obstruction and that you're not overstuffing the patella or oversizing the other components. If you follow the standard principle, you should get a reasonably good range of motion for most of your patients. But some osteoarthritic patients are very stiff and I warn them that they are not going to get as much movement as the other person in the next room who had the same operation. So, we have to look at the preoperative range of motion and the aetiology and tell them whether they can expect to get full movement or not. Many times it's the quadriceps which have come contractured and we have to do quadriceps plasty at the same time as total knee replacement. In these patients who come with ankylose in extension I do a release of the vastus intermidius. You actually exise a segment of the intemidius and then do multiple stabknife and then manipulate the knee. So, that gives them a much better range of motion.

Do you always resurface the patella?

I personally resurface the patella in almost every case. I known that some European surgeons don't do it and they seem to have no problem. I came back form a conference where people claimed it doesn't matter and I start not resurfacing for a few cases. Then I realised that those patients they keep complaining about pain in the front of the knee. When they come for follow-up I can identify some of these patients: "Ah, this is the one I didn't do a resurfacing and he doesn't look happy". That's why now, I resurface every patella. But it also depends on the design of the trochlea and the patella, and there are some designs which do very well like the LCS which had a

very friendly trochlea. Anyway our Indian patients sit cross-legged so there is a lot of strain on the patella which is not so in western countries and therefore western patients might get away with it. Sitting at 90° or sitting at 135° makes a big constrain difference for the patella.

Do you use navigation?

I started using navigation in 2005 and I have been using it ever since almost for every case. Now, the reason I started using navigation was because I wanted to prove I didn't need it. So, I set up a randomised double-blind study where we used conventional surgery for one group of patients and navigation for the other group of patients. But for the non-navigation group, we didn't do pure conventional surgery; we made it as good as we could make it. So, we identified the hip centre and the centre of the ankle with C-arm while the anaesthetist was giving anaesthesia. My objective was to make conventional surgery better than navigation. I was hoping that with these little things, like measuring the valgus correction angle individually for every patient, we would be able to beat the computer. So we did nearly 500 cases and once my colleagues who didn't know what we had done measured the x-ray and told us that we had 21% outliers with our conventional method versus 9% with navigation, I said oh my God, I'm not as good a surgeon as I thought I was.

So, there was quite a spread !

Sure and this was published in Journal of Arthroplasty in 2007. Then after we did thousands of navigated surgeries and we started to analyse the outliers. What are the causes for having outliers with navigated surgery? One of the reasons was patients with severe extraarticular deformity especially in the femur. For instance, patients with more than 20° of varus deformity. Patients with a huge divergence angle, that is the angle between the tentative cut on the femur and the tibia. The greater that divergence angle, the more likely you are not to be able to balance the knee. So, it is not so much an issue of malignment but also an issue of not being able to get balance. And that's what leads to some of the techniques I described like the sliding medial condyle osteotomy. A lot of French surgeons use the epicondyle sliding osteotomies for a valgus knee but not for a varus knee. We went to the cadaveric laboratory with navigation and we did cadaveric studies to figure out how should we do properly this medial osteotomy and finally we started doing it in some our patients with big deformities and we would slide the medial epicondyle distally to properly balance the knee.

Navigation is useful for severe deformity but what's the point spending 20 minutes to align an usual arthritic knee?

That's a very valid question. I agree that you don't need it for every routine case but on the other hand, if you don't do it with your simpler cases you can't suddenly one day without experience, decide to use it for a very complex case. It doesn't make sense. The other thing is that you can use navigation to the extent that you need it. If you feel that in a particular person you need to refine the femoral cut, do your femoral cut with navigation and then do your conventional surgery. You don't have to go through the entire navigated surgery from beginning to end. In fact, now, we spend less time doing navigated surgery than conventional surgery. So, if I were to do conventional surgery sometime because the computer is not available for some reason, that would take me 10 minutes more than with navigation.

Is there a recent improvement in navigation stations!

> Yes. So, I think the software has improved. It's much quicker. You just need to pin four areas. You put the pins and you register the landmarks and that takes no more than 3 minutes. So, it's very fast and it's now giving us a lot of information about the soft tissues. So we are able to do a much better act of balancing our ligaments and we can see exactly in what part of the range which tissues are contracted. I think navigation is very useful. And there is data form the Australian registry showing that the use of navigation particularly in patients younger than 65 years of age has been able to reduce the risk of revisions.

What is your opinion about patient specific instrumentation?

> I thought it might be a good idea but then I was watching the literature very carefully and talking to the people who are studying these devices. There were three things against it. One was the fact there was 4 to 6 weeks time lag for getting these devices back from the company. In our practice when a patient comes to you they're all set for surgery and then you tell them "I can do it after 6 weeks", forget it. They'll go away. That's one. Secondly, they were costing I think $200 so that's a huge amount of money for a patient. It was almost the amount of the prosthesis. The cost of the throwaway device was almost the same as the cost of the prosthesis so it was hard to justify it. Thirdly, the results that initially came out were good but then as the non-designer and the average surgeon started using it, the accuracy especially on the tibia, was not that great. If you're using a tool, you might as well use something which is accurate or forget it. I was very comfortable with navigation so I didn't see the need to switch to PSI with these three problems that I spoke about.

The 18th "Journées Lyonnaises du Genou" are dedicated to revisions...

> Yes. It's great to have a conference dedicated to revisions. It's a very bold a courageous move and I think it's very timely as well because everywhere now revisions are increasing, that's for sure. Besides, there's a lot of confusion in the field of revision. Very often I meet doctors in a conference for example and they'll show me an x-ray of a patient and say "This patient needs a revision for instability". Then they start talking about stems in the femur and the tibia which is irrelevant. So you know they seem to not understand that fixation is a separate issue. Restoring stability is a separate issue. I try to tell them that they don't necessarily need a high level of constraint when they're doing a revision surgery. Even in a primary surgery, people are putting in constraint implant for a valgus knee as a routine. I have not used a constrained implant for a various knee except on two occasions. And we have done over 12 000 knee replacements and we have used it twice or thrice because the lateral collateral is so stretched out we have had to put in a real thick insert which is only available in the constrained design where you get a 20mm thick insert. So, that's why I put in a more constrained implant. But in a revision situation you don't need to necessarily put in a constrained implant for every case. So, I think it's very good to have a conference where you can address these issues of how much constraint you really need in a revision when you need that constraint.

And bone loss?

> Bone deficiency is one issue. How do you tackle that? Should you use augments and stems? Should you use a sleeve? Should you use cones? Should you just fill it with a whole load of cement? Or just do a tumour prosthesis and resect everything out and just put in a hinge? So, I think that's important to figure out how you should deal with bone defects. Second issue is how do you restore

stability and the kinematics of the knee. How do you get your joint line? People don't think of the joint line in revisions. It's not so important in primaries because it's not really disruptive. But in a revision scenario very often in the primary they have resected too much of the distal femur so unless you restore the joint line you're still going to be chasing your own tail trying to establish stability. If you don't bring the femur down and visualise it and restore the joint line, you're going to have a problem. So, I think these are issues which really need to be dealt with in a revision symposium. How do you balance the knee? How do you take care of that huge flexion gap in revisions?

Let's talk about your surgical training - how was it?

I did my three years residency in the orthopaedic department in Mumbai hospital. At the end of those three years you get the degree of Master of Surgery. Then you either continue in a teaching hospital or you can go for further training overseas or you can start your private practice. I chose to remain in a teaching hospital. So, I worked in the same hospital as a lecturer, which is just below professor level. The job was to teach students, do surgeries and train the younger people. During this time, the Royal College of Surgeons of England came up with a scheme for training overseas doctors. That scheme was based on your own professors recommending you to the Royal College with an assurance that you will return to your home country after your training. So I applied to the Royal College and they had a vacancy in a lovely hospital in England. So, I went there and gave my interviews. I liked the people there, they liked me.

Where was the position?

In a hospital called Black Notley in Essex. It was an historic hospital which did only cold surgery. But unfortunately with the NHS reforms it has been demolished and sold to a real estate developer. Anyway, I was very happy to be trained over there and that's where I learned arthroplasty. Although the scheme was for 2 years I was in the UK for four years, but rotating to different places. After Black Notley, I did a one year course which was run by the University of Liverpool. I worked for a year in Liverpool after the scheme and then they appointment me as a consultant in one of the hospitals near Liverpool. So, I worked there for a while and then I wanted go back to my country.

Was it difficult to be far from home?

Not for few years. I was married when I was a lecturer so I took my wife with me. My wife is qualified occupational therapist. She also applied for a position in the UK so both of us had jobs to go to. Most initially it was separate in two different towns but later on she was able to get a position in the same hospital. So, we were working in the same hospital and the salary for two of us was pretty good because we didn't have any major expenses. We had the accommodation provided by the hospital and within a month or two we were able to save enough money to go and buy a second-hand car which was important to go from place to place. So, for four years we had a very good time. We wanted to do as much travelling as we could during that period. So during that time I also did a AO fellowship in Germany. I wanted to do upper limb surgery so I went to Mass General in the US and did a fellowship 3 months with Jessie Jupiter. Then I wanted to do spine as well. So, after UK we went to Hong Kong and I worked there as a lecturer in the University of Hong Kong.

You didn't know exactly what your future practice would be ?

> I couldn't find anyone with an accurate crystal ball who would predict "this is what you're gonna do". So, I said let me cover all bases and be as well trained as I can be.

How was your professional situation when you came back to India?

> It's very difficult to start practice in India. In Mumbai, it's extremely competitive and there were a lot of senior doctors around of great repute. There was no way I could go to a teaching hospital because I had resigned from there and I didn't want to go back to teaching hospital. There are a number of private hospitals and I approached all of them with my CV and one of them, the Bhatia hospital, took me on. So, I started there and I'd also applied to the biggest hospital in Mumbai where there was a very reputed surgeon by the name of Doctor KT Dholakia. He was a towering personality not only in height but also in his stature. He passed away some years ago but he was outstanding. Everyone in India knew him. He was the person in Mumbai Hospital who was a chief. I sent in my application but I never expected that they would accept me because for many years they had not appointed any surgeon. By good fortune he said yes on my CV and that's how they invited me, interviewed me and I joined Mumbai Hospital in 1994. Doctor Dholakia initially offers me to be part of his team but then he turned around later because his 5 assistant surgeons were not very keen for me to join the unit. So, he said look, I'm very sorry but if you ask my advice you start independently because and I remember his words "A small plant will never grow under the shadow of a big tree". So, with a very heavy heart, I started practice and during my first year I did 12 arthroplasties.

Which is not so bad for a first year?

> But I used to do 12 in the week when I was in the UK! So my wife and I were wondering why did we came back? We were doing so well in the UK and look at this! Luckily for me when I started to do some cases people realize that the patient were really doing quite well. I would mobilize the patients early. I would do as many meetings as I could, I would attend meetings, speak to people, interact with general practitioners, with other doctors, other orthopaedic surgeons. And over a period of 3 years I built up my practice.

At the beginning, did you choose medical studies because every school boy wants to be a doctor in India?

> When I was in school my grandmother, as well as my mother's sister had cancer. So I took a greater interest in biology, I would read up a little bit more about what's happening to them and we had to keep going to the hospital. I would be seeing this particular cancer surgeon who would strike the corridor like god. He was amazing, immaculate, he seemed to me like a divinity. So when you are exposed to hospitals and doctors and so on at that time it starts playing on your mind and I thought maybe I should be a doctor. So that's how I got into medicine. Then I thought cancer is a bit too depressing. Once I studied in medical college and saw all these young residents playing around with plasterboards and fixing bones, it seemed like great fun so I thought maybe if I get an opporunity I might take up orthopaedics.