MENTORS IN ORTHOPEDICS

ANDREW PRICE

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SUMMARY

Professor Andrew Price represents the academic surgeon who balances rigorous research with active clinical practice at the Nuffield Orthopaedic Centre. His trajectory, defined by the Oxford school of biomechanical thought, focuses on the refinement of unicompartmental knee arthroplasty. From early kinematic analysis to directing multicenter randomized trials, Price prioritizes empirical evidence in surgical decision-making. As President of the British Association for Surgery of the Knee, he currently oversees the transition toward robotic assistance and longitudinal registry data analysis.

Professor Andrew Price studied medicine at the University of Cambridge before completing his clinical studies at St.Thomas' Hospital in London. For his Orthopaedic training he joined the Oxford training programme in 1997, becoming a Clinical Lecturer in 2001. In 2011, through the University of Oxford Recognition of Distinction exercise, he was made a Professor of Orthopaedic Surgery. He is the President of the British Association for Surgery of the Knee.

Can you describe the British Orthopaedic Association?

> The BOA is one of the key organizations supporting Orthopaedic practice in the UK. It represents the interests of Orthopaedic patients and their surgeons in trying to achieve good outcomes. The BOA does not shy away from difficult issues, dealing with the increasing complex world of providing orthopaedic care. BOA is a fantastic example of a group of interested and dedicated individuals who step up and give their time, making it a fantastically effective organisation. It is very closely associated with the British Association for Surgery of the Knee or BASK and all of the other Specialist Societies : shoulder, elbow, hand, hip, spine, pediatric... All these specialties sit unde the umbrella of the BOA, bringing the groups together in a community that works well.

How many members?

> BASK has around 500 members and the BOA approximately 5000.

If we start from the beginning, where does your interest for orthopaedic surgery come from?

> I originally trained in medecine in Cambridge University. Fairly early on in my clinical training I knew I wanted to be a surgeon, because of the practical side of the specialty. I was attracted to Orthopaedics because of the exciting developments in technology that were emerging. That's what drew me in.

How did you get to Oxford?

> I did my initial surgical training in Bristol, Exeter and London. For my registrar training I was attracted to Oxford because of their history of research and the fact that they were pushing boundaries in Orthopaedic surgery. I applied and got the opportunity to work in Oxford. I

> developed my specialtty interest in knee surgery and took 3 years out for a PhD studying the Oxford knee. My supervisers were John O'Connor and David Murray, working closely with John Goodfellow so I was destined to work in the field of UKA. I didn't have a choice!

What was the topic of your PhD?

> My PhD was to try to look at the design philosophy of the Oxford Uni : reducing polyethylene wear, maintaining physiologocal kinematic function and producing good clinical outcomes. The two Johns had developed the mobile bearing design and I got to test it. I performed a novel in-vivo RSA study for wear, analysed kinematic function, with cadaveric studies and fluoroscopy techniques. It was a busy time !

You had some combined study with institutions outside of Oxford ?

> I was also lucky to work with Ulf Svard, a very nice guy in Sweden who did a lot of Oxford Unis. We studied his results and have been working together since 25 years. It opened my eyes on the importance of working with people across different countries who are all interested in developing care for patients. I have subsequently collaborated with surgeons and academics from over 20 countries.

Did you spend some time working abroad?

> I did my fellowship in Melbourne with John Bartlett in 2003. John was one of the great pioneers in knee surgery in Australia. He introduced me to a lot of organisations like ISAKOS. He also taught me a lot about care and how to look after people - everybody loved John because he was kind.

And then you came back to the UK to work in Oxford?

> Yes. I was at the Nuffield Orthopaedic Centre employed by the University of Oxford. I was very fortunate because I got an academic position and eventually became a Professor. With this academic position I am employed to do research but also spend a lot of time doing surgery. My time is 50% academic and 50% clinical.

What kind of surgery do you perform?

> The Nuffield Orthopaedic Centre has a busy Knee Unit. We do everything from pediatric to revision knee, sports surgery, early OA, late OA and revision – but no fracture fixation. I am very fortunate because the Nuffield Orthopaedic Centre has attracted some great people to work with : Will Jackson, Nick Bottomley, Abtin Alvand, Chris Dodd and David Murray. They are great colleagues and fun to work with.

How is your department organised ?

> In the NOC there are about 40 surgeons. On the knee side, 5 of us are full time knee surgeons making up the Knee Unit. We do the majority of the knee work, together with some dedicated arthroplasty surgeons who do primary and knee revision surgery. The NOC is a big elective tertiary referal center, taking cases from all across the UK. We do 2/3 of the major revisions in the UK for infection. It is a very busy unit. We have Fellows and registrars in training. The Fellows come from all around the world to learn about knee surgery, particularly the Oxford Knee but all other aspects of knee surgery. Working with the Fellows has been a great pleasure.

What are the links with the University?

> A great inspiration for me has been my academic colleagues at the University: Professor Andy Carr has instilled a desire to do really high quality work and to publish our work in high impact journals. My other close academic colleagues are Professor Jonathan Rees and Professor David Beard, both great friends for for over 20 years.

You know we have to ask you this question : can you tell us the Oxford story?

> It's a long story – over 45 years now. It has been a privilege to be involved. I guess my involvment started when I did my PhD, focusing on the link between engineering and clinical aspects of the Oxford Knee. Oxford has this long track record of evidence creation and before I started there were already countless papers published studying the implant, and I have just carried that on. Most people must be aware of the publication record around the Oxford. Sometimes slightly overbearing but always trying to understand and drive through improvements in clinical outcome.

How was the Oxford database started ?

> That's really down to John O'Connor and John Good fellow, who 45 years ago decided to collect data. If you go around the world, all the big Units - Lyon, Mayo, HSS, and all the great developers – Charnley, Insall, all of them focused on collecting data. Similarly in Oxford this was the key. So Goodfellow and O'Connor collected data to creat studies, to try to answer important questions, and David Murray took that on. And my role really working close with Will Jackson has been to take that forward. We are absolutely commited to continuing the work.

What are the changes that have occurred in the Oxford implant?

> Phase 1 was implanted with very simple instrumentation, typical from the 70's to the 80's. Phase 2 was introduction of the mill, for the fine balancing. Phase 3 was the introduction of the mini-invasive technique, around the late 90's. More recently was the introduction of microplasty, a new set of instruments to make insertion more accurate. In addtion development and testing of cementless implant has been a large step forward, helping to reduce the revision rate, as seen in recent registry data.

What is your feedback on cementless implants?

> Cementless started about 12 years ago, so there is more than 10-years of data. We were very cautious in term of our approach in developing this, but is has proven to be a highly effective innovation.

Can you mention us one particularly exciting study you have been involved in?

> One of the really great things to be involved in, is a RCT called TOPKAT : Total Or Partial Knee Arthroplasty Try. Leader and the brain behind the study is Professor David Beard. It has been 10-years of work and we are now presenting 5-yr data of this multicenter study, which had involved multiple surgeons and other workers – a truly huge effort. The message is clear : both operations are good operations, with big effect size. There are some advantages to Uni : faster recovery, better functional outcomes, a high percentrage of people achieving the best results and better cost-effectiveness. But most importantly for the Orthopaedic community, at 5-years there is no difference in revision rate, which is. a really interesting finding.

What do you think about registry data?

> I have to admit that I'm a member of the NJR Steering group for the National Joint Registry in the UK. Registry data, if you look to interprete them appropriately, is a critical resource. Regarding UKA if you take a very simplistic approach, looking at survival, you won't find a happy picture. But if you offset this against reductions in mortality rate, faster recovery, a higher percentage of patients doing better, the balance swings back in favour of Uni. You need to be cautious about not being too evangelical about these things, but I think the evidences for Uni is growing. Registries have a big role in trying to explain that.

What do you think about TKA ? What's your percentage of TKA/UKA ?

> TKA is still amazingly successful. Today I perform about 45% TKA and 55% UKA. We also perform HTO, to treat early structural OA. I firmly believe that you need to be able to perform all the treatment options around the OA knee. Experienced Knee surgeons who do both UKA and TKA will say that their best UKA if it goes well, will achieve a superior function outcome that you will if you use a TKA. The issue is to get the longevity equal to that of TKA - that is what everybody is looking for.

Do you use also mobile bearing for TKA?

> Not routinely but I have been involved in studies using Mobile Bearing TKA. I am a Cruciate Retaining Knee surgeon, who occaisionally uses a cruciate sacrificing design. I use Vanguard® and NexGen®. I am also involved in trials trying to explore different designs and the Kinematic alignment philosophy.

What are the scientific Societies you are involved in?

> One of the really inspiring thing about beeing involved in knee surgery is the opportunity you get to meet colleagues from the other part of the world and being involved in societies. I am currenlty president of the British Organisation of Knee Surgeons, working very closely with the BOA. I am a member of a number of European societies – EKS, EFORT and ESSKA. You learn a lot and you can contribute. Internationally I am involved in ISAKOS and I am a member of the AAOS. I also have a lot of very good friends in the American Knee Society.

What's the role of HTO for you?

> Traditionally in Oxford very few HTO have beeen done. But I wanted a treatment for people with non full thickness disease – the people where we don't want to do a partial knee replacement. We wanted a solution for these younger patients and HTO was something we could explore. We talked to the French surgeons, and to Philippe Lobenhoffer, who has published good results. We developed a program to perform HTO for people with non full thickness disease, which has been successfull. If anything, we've struggled to find people with the perfect indications: tibial metaphysal varus and early OA. If they have neutral alignment, it's a real challenge. We definitively think there is a role for osteotomy. We want to learn how to do this more but we still have a lot to learn from our European colleagues.

What's your opinion about new technologies?

> We have looked at and evaluated nearly all the new technologies in knee surgery that I have seen over the last 20 years. This includes the evolution of implants, means of fixation, ways to assess

> outcomes: RSA, fluoroscopy, PROMs, PSI, navigation and now robotic surgery. One of the biggest changes for me has been the way we look after people, with enhanced recovery. Today in Oxford, 60% of partial knee surgery are day cases. So this is a major change in our practice and a real team effort. But today no doubt the knee community is trying to understand the role of robotic technology and wondering if it is going to last. You can see the clinical advantages, but the question remains: will it be economically viable? That's the real question. But it is very exciting!

And the evolution in materials such as polyethylen?

> Zimmer Biomet always has been very good in terms of their poly technology, with very low wear rates with conventional PE with appropriate sterilization process. Now there is testing of 3rd and 4th generations of PE and I think this an inevitable development for the better. What's changed in our lifetime is the longevity of our implant. Joint remplacement now lasts 30-40 years and it is likely that you will see the reemergence of PE wear. So new PE technology is gonna be critically important : higly crosslinked modern polyethylenes.

You don't want to create a problem trying to solve a problem that you don't have?

> That is right. You change the biomechanical properties, so you win something but you lose something. That's one of the things I have learned, being involved for so long in the Oxford story, when you try to look after your patients and improve your implant. Changing things might seem to be a good idea, but there are countless episodes where that's gone wrong. You have to be vigilant.

Especially when you are talking about something like the Oxford Uni, with so many patients involved every year.

> A good exemple is the slow development and introduction of cementless implant. Lots of benefits, but then some downsides. The technique of implantation on the tibial side had to be re-thought. There was initially a slight increase in fracture rate , but we have now solved that. That's a typical example of the requirement to be diligent about collecting data.

How is the life in Oxford?

> Oxford is an amazing university town. It is full of very bright and intelligent people, from around the world like all University towns. People who are innovative and involved in fascinating projects - so you know that you're going to meet a lot of amazing people. The Nuffield Orthopaedic center is a great place to work, and we are all moving in the same direction. The University department is becoming more and more successfull under Andy Carr's guidance.

What do you like to do outside of surgery?

> I have a wonderful wife, who is an illustrator and has nothing to do with medicine, which is great ! I have 3 great boys and spending time with them as a family is very important. I play sports : tennis, cricket and ski. I also try to run but I don't do enough of that ! I like also to read, go to the theatre and enjoy live music as often as I can. I also like sitting around and talking, but if I sit around with knee surgeon I will talk about knee surgery!