

ALESSANDRO BISTOLFI

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SUMMARY

Deeply rooted in Turin yet shaped by international mentorship, Alessandro Bistolfi bridges the gap between clinical practice and material science. His career is defined by rigorous investigation into polyethylene oxidation and the integration of vitamin E in arthroplasty, reflecting a commitment to long-term implant stability. Beyond his focus on complex knee and hip reconstructions, Bistolfi advocates for the evolution of biotechnology and surgical education. This interview explores his transition to new leadership and his perspective on orthopedic innovation.



We met with Alessandro Bistolfi, an Italian surgeon from Turin and a leading specialist in polyethylene, who tells us about his attachment to his region and describes his vision of the place of new materials and innovation in prosthetic surgery.

Alessandro Bistolfi, where are you from?

I am a pure product of Turin! I was born in Turin, grew up there, went to school and boarding school there, got married there and work there. I feel a strong attachment to this city and to my country: it is a beautiful place to live and work. Nevertheless, thanks to my professional life I have travelled a lot, which has allowed me to bring back knowledge and experience from many different places.

Did your parents have an influence on your career choice? Were they in the medical profession?

My parents have also had roots in Turin for a very long time. I was the first in my family to choose a medical career. My father was an architect, and my mother was a teacher, before becoming the principal of her school. In a way, my father passed on to me his taste for manual work, and I may have found this desire to repair things... and people.

According to what criteria did you choose the places of learning throughout your medical education?

I started my internship in Padua. I did my first year there; it was a very good school, and I was delighted to settle there. Only I had to go back to Turin to do my military service - compulsory at the time - and I stayed there to finish my internship.

Anyway, Turin is known for having a very high level of training in orthopaedics, so I took advantage of this great opportunity to live in my hometown while enjoying a high quality education.

Who were the big names in orthopaedics at that time?

My first mentor was Prof. Crova, who was very well known for the knee. He practised in the hospital where I am now based, and retired many years ago. He practised traditional surgery, in the tradition of Insall. He explored different options, including the Endo-Model with its very invasive technique. Then he tried PFC, then cruciate preserved knees, and cementless knees. He was a great believer in the hinge prosthesis for revisions. He never stopped innovating and exploring throughout the years.

During your training, did you stay in one hospital or did you rotate?

I have been to many hospitals in and around Turin, where I have worked in specialised units for paediatrics, spine, oncology, etc. Even though I have little interest in spinal surgery, I could see that the practitioners of the CTO Trauma Center in Turin are a solid group of technically very advanced people who do fantastic things. This is also true for hand and micro surgery.

You mentioned Prof. Crova as your first mentor: were there others?

Three great figures have been very influential in my career. As mentioned earlier, Prof. Crova was the first: I had never been exposed to arthroplasty before, and he was able to pass on his love for knee surgery to me. Later in my career, Prof. Massè played an important role, as he gave me the great responsibility of developing knee surgery in the hospital where I am currently practising. I have grown a lot professionally with him over the last eight years. Finally, the last important figure in my career path is Dr. Thornhill in Boston: he is my American mentor!

Early in your career, did you get a fellowship there?

A.B.: Yes, I spent part of my internship in Boston. At first I went there to do research, then I went back to study polyethylene with Prof. Anuj Bellare who is a biological engineer, a professor at Harvard Medical School and particularly competent in nanomaterials, nanoparticles and of course polymers. Finally, for my third stay, I went to the Brigham Medical Hospital where I met Dr. Thornhill, who treated me with the utmost consideration. During the last two stays, I was able to work on surgical practice even though, of course, I could not operate there: I was able to observe his way of working carefully. In all, I spent a year in Boston.

What are the connections between Turin and Boston? How did you get this opportunity?

Turin and Boston had been cooperating for a long time, as Dr. Thornhill knew Prof. Crova, and they were both prominent members of the Knee Society. In addition, a group from Turin was studying highly cross-linked polyethylene; I went to Boston to conduct research on this very specific subject.

Was it a personal wish, or was it your mentor who urged you to take this direction? Research is not for everyone...

Even though I didn't really have an academic profile, I was always interested in clinical and basic research, and this is what justified my choices to explore new avenues, including for my activity as a surgeon. As the hospital where I worked was an academic hospital, research was an important aspect and I started with the study of explants. Then, over the years, I wanted to extend the horizon of my research to other subjects such as biology and histology.

Coming back to polyethylene: at the time, it was a hotly debated topic, especially highly cross-linked polyethylene and its potential for both the hip and the knee. You did a lot of research on the subject, how did you go about it?

My mentor once had the idea of asking a chemist why, in the late 1990s, we regularly found almost destroyed inserts during revision surgeries. Of course, nowadays this doesn't happen anymore, but 20 years ago it was not uncommon to find an insert completely oxidised and cracked. "Why don't we ask a polymer expert for advice? The idea was born! In Turin, Giulio Natta was one of the first to work on polymers; in our chemistry department, we could consult Prof. Costa -now retired- and Prof. Pierangiola Bracco, a friend, who both came to the same conclusion: the failure of the inserts was a direct consequence of their oxidation. This was a very important discovery at the time, which led to several studies and publications that had a great impact on orthopaedics and led to a change in sterilisation methods worldwide. Moreover, it meant for me the beginning of my research activity, with the initial help and motivation of Professor Brach del Prever. To date, I think that cross-linked polyethylene is an excellent solution, but in my opinion the addition of vitamin E is necessary. We published a research paper about infections in which we found that vitamin E played a preventive role for infections by reducing the adhesion of bacteria to polyethylene.

Do you currently have other research topics besides polyethylene?

Yes, there are two other areas of research that I am very interested in. The first, in collaboration with the Turin School of Engineering and Prof. Enrica Verné and Prof. Silvia Spriano, concerns the surface treatments of implants; with this work we are looking to improve osseointegration and also to diffuse antibiotics or other molecules via the contact surface. We are also studying innovative materials such as bioverses or composite bone cements.

The second field of research is that of mesenchymal cells, on which I collaborate with Professor Riccardo Ferracini, who is also a good friend. This is a very promising field that will develop exponentially in the near future. Of course, it is not a question of creating cartilage ex nihilo, but rather of reducing inflammation and pain in early knee arthrosis. This would make it possible to delay the fitting of a knee prosthesis in a young and active patient, which would be extremely beneficial. Conversely, the same principle could be used in very old patients for whom surgery would represent too high a risk.

Where do you currently work?

I am at the City Hospital of Health and Science in Turin, which is a trauma centre. It is so called because it brings together the four main hospitals of the city: the general hospital, the paediatric hospital, the gynaecology centre and finally the trauma centre. It is one of the largest hospitals in Italy, with a strong academic focus, and I work in the trauma building.

You don't just do traumatology, there's also surgery?

In the 1960s, when it was built, it was only for trauma, hence the name. Since then, we still treat trauma, but it has become an orthopaedic centre with many units. Even though a large part of the building is dedicated to trauma, the distribution of activities has evolved over the years to take care of all the cases that smaller hospitals cannot handle, such as microsurgery, spinal surgery, tumour surgery, etc. I deal with lower limb trauma, but my main focus is on hip and knee replacements.

Moreover, as we are a university institution, we welcome fellows from all over Italy, as the orthopaedic school in Turin is very well known.

Your activity mainly revolves around the knee and the hip. For the knee, what are your preferences? Total, partial, posterior-stabilised, cemented prosthesis...? Do you do sports surgery?

I practice more total prosthesis than partial prosthesis. I think partial dentures are a great solution, but the indications are very specific and you have to choose your patients very carefully, otherwise you'll end up with huge failures. With the right patients I love to use unis. Otherwise, I tend to use cemented total prostheses, with preservation of the PCL and a mobile plate. If the tibial insert is ultra-congruent, that's even better.

Lately, I have been interested in exploring the use of uncemented implants, firstly to save time and secondly to avoid a potential source of third body such as the cement microfragments. I am also involved in arthroscopy and ligament reconstruction surgery as well as cartilage preservation and repair; in this area I believe there will be increasing opportunities to use mesenchymal stem cells to facilitate graft integration and speed recovery.

What is your philosophy on alignment?

I stay in the tradition: I keep the mechanical alignment. I know this could be a long discussion with my "kinematic" friends, but, while I agree that a few degrees of the patient's natural varus or valgus can be maintained, I still don't understand why reproduce the deformity that probably led to the failure of the native knee. I do equal parts ligament balancing and measured resection. As for the patella, I make my decision based on its size and shape. If it is not aligned or damaged, I resurface it.

This keen interest in the knee led to your being selected for the Insall travelling Fellowship. How did that work out?

I got this opportunity thanks to Dr. Thornhill, who was my mentor. It was a great experience, much more than you can imagine. I was able to visit 12 centres in the US and meet great surgeons who became friends. In addition, I did this fellowship with Gwo Chin Lee and Sebastien Lustig, who have become more than friends: we are still in touch and we spend time together or visit each other, we have seen our families grow and our wives become friends as well, and on top of that, we collaborate on scientific work and publish together. This has added considerable value to the enjoyment of the experience. It was an absolutely remarkable fellowship! I wish I could go back in time...

Let's go back to the hip: what is your practice? What type of implant, what approach, cemented, uncemented, short stem, dual mobility?

For the most part, I use a posterolateral approach. I have also improved my anterior approach over the years, which is perfect for some young and active patients. In 90% of the cases, my stems -always standard- and cups are not cemented; we only cement the stems in elderly patients who are having partial arthroplasty with femoral neck fracture; in Italy, cemented implants are reserved for very elderly patients with osteoporotic bone. I feel comfortable using cross-linked polyethylene with added vitamin E combined with a ceramic head, but for younger patients I use a ceramic/ceramic pair.

The double mobility is a solution that I use very often in case of risk of instability, which is perfect for example for patients with neurological or psychiatric pathologies. But I use the single mobility cup more often, as it is more suitable for young and active patients.

Do you ever use a short stem?

I don't see the point. I know that short stems give good results, and we often hear that the short stem preserves the bone stock for a future revision, but as far as I am concerned, I prefer to place a stem for my young patients which has the best chances of osseointegration and which will allow them to continue their sports practice, because they do not always follow the recommendations...

We are in an area quite close to the Alpine ski resorts and skiing is a very popular activity here. I have patients who ski with a TKA, which I think is quite daring... I think a good skier with one TKA can compensate by using his healthy knee a bit more, and a skier with two TKA's has to lower his ambitions and doesn't go down the black slopes anymore...

What is the situation of orthopaedics in Italy? Is it difficult to become an orthopaedic surgeon and to settle down?

Like everywhere else, Italy is confronted with the choices of politics: when I was a resident in Turin, there were eight of us, while this number increased over the years and now, in the first year, there are about 25 residents! Therefore, at that time and for many years, it was difficult to get a job as a resident, but it was easy to find a job after becoming an orthopaedic surgeon. Today, in general, there is still a high demand for doctors and specialists all over the country and therefore a medical career in Italy offers great opportunities, especially in the emergency field. Whether you are a general surgeon, an orthopaedic surgeon, an anaesthetist or a radiologist, there are many possibilities.

How do you see your future?

This is a very important question, and it comes at the right time. After spending so much time in one place, I think it is time for a change and a new experience. I will soon be moving to the Cardinal Massaia Hospital in the town of Asti. Asti is a wonderful town of medieval origin in a region known for its beauty and excellent wines. However, it is not for the wine that I am moving, but because the director of the orthopaedic unit, Dr Eugenio Graziano, who is a great surgeon and friend and with whom I have already worked for years when he was also at the CTO, has called me to take charge of the lower limb prosthetic surgery department. I am very excited about this new experience.

Will you be able to work in both the public and private sectors?

This is a simple question for which the answer is yes with nuances. I think that the Italian public health system is excellent, and gives free access to care to everyone: you can get high quality treatments, be it a mallet finger or a lung transplant, without paying a cent! Generally speaking, all patients can get essential care (tumours, fractures, serious illnesses) within acceptable timescales, whereas the wait can be longer for non-essential treatments (e.g. knee arthroscopy to stay in orthopaedics!). That said, over the past decade our politicians have not always made the right choices and have not sufficiently supported the health sector, which is currently experiencing a crisis in terms of staff, resources and equipment. This was highlighted at the beginning of the Covid health crisis. In addition, there are huge disparities between regions, which should be addressed. Despite the many difficulties, I have always preferred to work in the public sector, out of conviction: I think it is in the interest of the patient, for whom access to quality and free care is a fundamental right. Moreover, Italian law allows doctors to have a private activity in addition to the service provided to hospitals, for example for patients with insurance.

You mentioned the Covid health crisis: what about regulated surgery, both public and private? Is it all cancelled, or just part of it?

It is quite complex. In public institutions, all regulated surgery has been cancelled. Having said that, there are big differences between all the regions of Italy, because each one has its own system, but in general terms regulated surgery was stopped during the first wave and considerably reduced during the second wave. All resources were allocated to the fight against Covid, and many services were transformed into "Covid units". This is the case, for example, in the Turin area, where the orthopaedic units in the majority of the city's hospitals were closed to make way for Covid units. On the contrary, the hospital where I work being the largest trauma centre in the region, it has continued to take on all trauma cases, which - as a consequence - have increased.

In general, in my personal opinion, it should be taken into consideration that it is risky to ask an 80 year old patient to stay in hospital in the middle of a pandemic for a postponable surgery and that it is therefore better to tell him to wait for another 6 months.

How long do patients stay in hospital after a PTG? In Italy, how does it work, do you do little or no outpatient care?

In Italy, it is difficult to treat a patient in a few days and almost impossible to do it on an outpatient basis; the best that can be done is to plan to go home after one week. In addition, patients are very keen on rehabilitation, and they usually get it for two to three weeks in specialised centres. This is very often the case after a knee or a hip. While the choice I suggest would be to go home quickly to work with a physiotherapist, our older patients very rarely accept this. Fortunately, this is beginning to change and our younger or motivated patients are more willing to do this: this is something we can improve.

You talk about improvement: how do you see the technical developments in orthopaedics?

I think that any new technology that can assist the surgeon is more than welcome and should be embraced and improved rather than resisted. Sometimes there is a tendency to reject the new, but on the contrary, we should embrace it: in a few years, all these innovations will be very important, even if not everything is perfect at the moment. I use, for example, 3D pre-surgical modelling in

complex revision cases, which allows me to have a precise idea of my strategy even before entering the operating theatre. I know the size of the stem, the insert, how to adjust my alignment, etc. It also allows me to reduce the amount of material I have to use. It also allows me to reduce the amount of material brought into the OR. Last but not least, this kind of modelling on complex cases can be used as a support for the training of interns. As for robotics, the major problem is its cost: for the moment, in Italy, this is often prohibitive. Moreover, the use of a robot today lengthens the duration of the operation, which may lead to a reduction in the number of patients treated. It's only a matter of time, though: I'm sure that in a few years' time these obstacles will be removed.

In addition to your daily practice, you are involved in several national and international societies. Is there one that you are most interested in?

The most important one for me is the European Knee Society (EKS), which is one of the two international societies I am involved in, the other being ESSKA. I am also a member of the Italian Orthopaedic Society and the Regional Orthopaedic Society of North West Italy. Finally, my aspiration is to become a member of the American Knee Society, which currently corresponds to the dream of playing in the French Open as a child.

Why is EKS so important?

I strongly believe that the EKS is a very active society, whose members are bound by sincere friendship and with the common intention to improve and develop knee surgery. Participating in the EKS gives me the opportunity to meet renowned and highly qualified surgeons in my field and to discuss new technologies, techniques and strategies with them. It is always very rewarding to discuss with people who are more experienced or smarter than you in certain fields and there is always something to learn!

Participation in congresses also allows one to meet surgeons from all over Europe with whom one can set up research programmes; the mix of multiple nationalities and schools contributes to the enrichment of each one through exposure to different ways of thinking.

The pandemic has changed our habits: normally I travel a lot for a meeting or a congress, but for more than a year now this has of course not been possible.

How does attending the EKS differ from your national orthopaedic society meetings?

In the national society we cover all fields of orthopaedics, and this more generic approach than the EKS means that we are less active in terms of pure research and innovation; in a congress of our national society, only one or two sessions will be of scientific interest to us, which naturally leaves us more time to network and meet up with friends, colleagues and former fellows. These are two very different atmospheres.

Outside of your professional activity, what are your passions?

My first passion is my family, my wife who supports me in all my activities and my two wonderful children. We like to share and practice together our favourite sports which are skiing and tennis and ... Juventus. We also like to travel and go to the theatre. Another of my passions is sailing, which I have always done since I was a child on the family ketch that we no longer have and in fact I dream of buying a new yacht soon.

What would you say to a young medical student who wants to have a successful career and a happy life?

I'll be the first to tell him that medicine is an excellent career choice! I don't know if it's the same in France, but here in Italy, doctors sometimes say "don't choose this profession, you'll have to deal with patients, their complaints, nights and weekends on call...". I don't agree at all! It's a wonderful job, and you shouldn't hesitate. One should choose one's speciality according to one's natural inclination, and not based on the fame or prosperity of a big name. Only this initial and sincere enthusiasm will enable you to progress more easily. On the other hand, sometimes you have to compromise when you first take up a position: for example, in a public hospital you may have to do general orthopaedics or traumatology, even if we specialise in knee surgery. But with passion and application, the future can only bring great satisfaction.