MENTORS IN ORTHOPEDICS

BERTRAND SONNERY-COTTET

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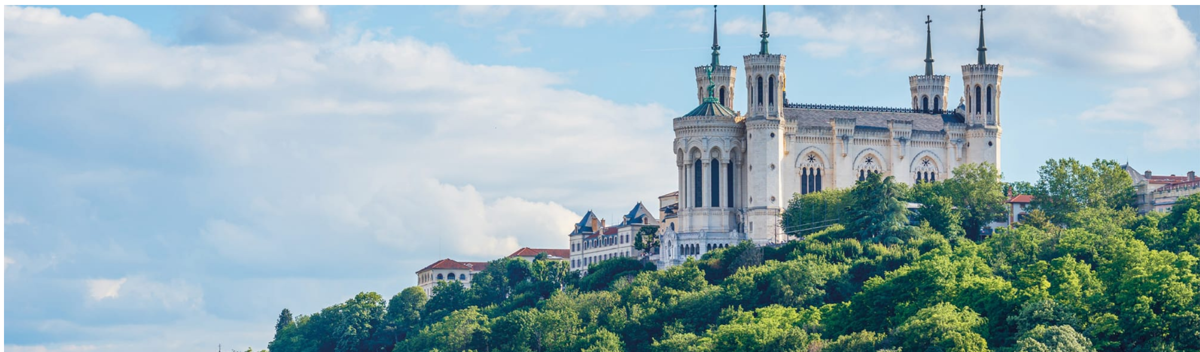
SUMMARY

Dr. Bertrand Sonnery-Cottet's trajectory from a childhood in a foster home to the presidency of the French Arthroscopy Society reflects a career defined by clinical rigor. Specializing in knee ligament reconstruction, he pioneered the modern application of anterolateral ligament procedures. His commitment to data-driven research and the integration of mixed reality into the operating room underscores a focus on reducing surgical failure. This interview explores his transition from traditional mentorship to digital innovation in sports surgery.



A passionate orthopedic surgeon, Dr. Bertrand Sonnery-Cottet combines surgical expertise with technological innovation. His journey, marked by significant encounters, has led him from an unconventional childhood to the presidency of the French Arthroscopy Society (SFA). A pioneer of anterolateral ligament reconstruction and staunch advocate for clinical research, he embodies French excellence in sports surgery. His commitment to continuous improvement and his forward-thinking vision make him a leading figure in modern orthopedics.

Bertrand, let's start by talking about your origins. Are you a native of Lyon through and through?

> I am indeed from the Lyon area, but not really from the city itself. I was born in Tarare, a small town about 50 kilometers from Lyon. To be more precise, I grew up with my parents in a tiny village called Valsonne, near Tarare, in the southern Beaujolais region. It's quite a remote place, but that's where my roots lie.

> I don't come from a medical background at all. However, my family environment was extraordinarily rich from a social perspective. My parents, who were rather utopian and remarkable people, were foster parents. But they did much more than that: they decided to have all the children they fostered live under our roof, children who had experienced serious family breakdowns.

> We are four biological siblings, but throughout our lives, we shared our home with ten to fifteen other children. This started very early for me; the first child arrived when I was six months old. I think I only spent a few weekends alone with my biological parents and my actual brothers and

sisters. We were always surrounded by these children, some staying their entire lives, others just passing through during crisis situations.

It was an incredible experience. We took in children with very diverse backgrounds, but all of them were experiencing great hardship. So I had an extremely rich childhood from a social perspective and a very unusual one. It's only now, with my own family life and children, that I realize just how extraordinary our situation was compared to a conventional family life.

What led you to pursue medicine? Did your family environment play a role?

Initially, I was destined to follow a traditional scientific path. I was a year ahead and was programmed to enter preparatory classes for engineering schools. I took a ‚bac E', which was essentially a ‚bac C' with a technical component, paving the way for engineering schools.

But in my final year of high school, I had something of an epiphany. I realized that working as an engineer, with fixed hours from morning to evening, wasn't for me. I wanted to do something different. That's when the idea of medicine came to me, though I can't really explain why. I had no one in my family who practiced medicine.

Once I started my medical studies, my attraction to technical professions naturally led me toward surgery. It became obvious to me. But this choice of medicine wasn't entirely random. In my family, we are four children, and I'm the youngest. We all chose careers in the social sector: my eldest sister is a nurse, my second sister is a social worker, and my brother is a physiotherapist-podiatrist.Certainly, surgery is a very technical profession, but as my father says, by practicing medicine, we remain at the heart of humanity. We are in a privileged position to care for people, even if it's in a more modest way than what my parents did, who dedicated their entire lives to it. You can still see this commitment to others, which is deeply rooted in our family values.

We understand about medicine, but what led you to choose surgery during your studies? Was it a choice you had in mind before your residency? And why orthopedics in particular?

In my second year of medical school, I suffered a severe ankle sprain that required surgical intervention. At the time, there were major strikes in the hospitals, which led me to the Parc Clinic. My future wife, whom I had met in medical school, was working there as a surgical assistant.

The surgeon who examined me found that I had ruptured all three ligament bundles. We then discussed the options: surgery or conservative treatment. I was already quite decisive, preferring surgery to resolve the issue definitively. So Dr. Laurent Barba performed the operation.

This experience was a true revelation for surgery. After the procedure, the surgeon invited me to observe an operation. My future wife had also suggested that it would be an interesting opportunity in my second year to earn some money. From my very first day in the operating room, I knew this was the profession I wanted to pursue.

It's quite ironic that I entered this field through a sports injury. At the time, I played football and rugby, which partly explains my interest in orthopedics. My best friend and confidant is Jean-Philippe Hager, with whom I studied medicine. A former professional rugby player, he is now a sports medicine physician and works in the office next to mine at Santy. This specialty allowed me to combine my passion for sports with my attraction to this particular branch of medicine that is surgery.

After your studies in Lyon, you followed the traditional residency path. Is that when you went to Paris?

> Actually, I completed all my studies in Lyon. What's quite amusing is that football ultimately played a crucial role in my professional journey. I was part of a medical team called the "Hearts of Lyon." With this team, we became champions at the World Medical Games in 1992 in Bari. The captain of this team was Éric Noël, who had a considerable influence on my career.

> When I took the residency exam, it was the first or second year where the competition was divided between North and South. I was very well ranked in the North, slightly less so in the South. In essence, I had access to all cities in France, except Lyon. Not really knowing the environment, I only knew that I wanted to specialize in orthopedics. I had noticed that at the Parc Clinic, several surgeons came from Paris and advised me to do my training there. For everyone, it was an excellent opportunity to have this possibility. So I chose Paris for my residency, without any particular ulterior motive. This decision offered me the opportunity to develop in a very large city with many different departments. I was quite satisfied with this choice. This decision wasn't motivated by a particular desire to leave Lyon, but rather by the opportunities that Paris seemed to offer for my orthopedic training.

How was your experience in Paris?

> My arrival in Paris was quite difficult. Although I was well received as a surgical resident coming from Lyon, living conditions were complicated, far from the comfort I was used to in Lyon.After two years, in 1995, I had to complete my military service, which I spent in Tahiti until 1997 - paradise on Earth! Returning to Paris was challenging; my wife was pregnant, and we only had a resident's salary, making it a difficult period.

> At that point, I decided to leave Paris with my family and move to England to improve my English and live in better conditions. I applied and we landed in Edinburgh, Scotland, where I was accepted for a semester.

> By a fortunate coincidence, the Scottish academic calendar left me with a free period from May to August 1998. This period coincided with the Football World Cup in France. I had the opportunity to be hired by Adidas as the physician in charge of their "Fan Zone" commercial site located at the Trocadéro. This experience allowed me to live extraordinary moments, such as holding the World Cup trophy and watching France's victory from the rooftop of the Drugstore on the Champs-Élysées.

> Our six-month stay in Scotland was absolutely wonderful. The living conditions were so pleasant that the idea of returning to Paris didn't excite us much. On the advice of Eric Noël, my "medical big brother" and captain of the Cœurs de Lyon, I contacted Philippe Neyret in Lyon to do a visiting fellowship during the three months I had left before returning to Paris in 1999. He couldn't accommodate me but recommended I go to Pierre Chambat and Gilles Walch. Eric Noël then advised me to seize this opportunity, describing these surgeons as extraordinary individuals.

> During this three-month fellowship at the Émilie de Vialar clinic, I followed Eric's advice: I spent most of my time with Pierre Chambat to train in knee surgery, but I also asked Gilles Walch to entrust me with articles to write. This is how I wrote my first two articles published in the American Journal of Sports Medicine in 2004. The first was about rotator cuff surgery in veteran tennis players, and the second about posterior superior shoulder impingement. This experience allowed me to stand out, as Gilles was particularly receptive to this type of initiative. This 3-month

period was a decisive turning point in my career, opening new perspectives and allowing me to build important connections in the Lyon orthopedic community. There, I met my first two mentors who had a crucial influence on my life as an orthopedic surgeon, and beyond.

Did you have more training periods to complete in Paris?

Yes, I returned to Paris to complete my residency and continue with my fellowship under Prof. Gérard Saillant from 2000 to 2002. Gérard Saillant was also a true mentor, although it's difficult to place him in chronological order. I had already met Pierre Chambat and Gilles Walch, with whom I had spent only three months. Gilles Walch greatly impressed me; whenever I crossed paths with him, I was struck by his aura and the large entourage that surrounded him. Pierre Chambat impressed me with his skills and surgical precision.

With Gérard Saillant, I discovered three essential aspects. First, his exceptional availability: at a time when mobile phones were just beginning to become widespread, he always found a way to be reachable and available, despite an extremely busy schedule. Second, he possessed very refined clinical diagnostic skills and excellent patient relationships, particularly a unique way of communicating with athletes. You don't talk to an athlete the same way you talk to a regular patient, for a simple reason: athletes care little about medical details. What they want is discourse directly related to their sporting practice. I remember, for example, a famous motorcyclist who had a wrist fracture; Prof. Saillant focused mainly on range of motion while other doctors spent their time analyzing the X-ray. Athletes greatly appreciated this approach, and I could see it created an immediate connection. The third characteristic, which I somewhat identify with now through my various activities, was his open-mindedness. He was head of a huge department, a leader in sports surgery, dean of the faculty, and later created the Brain and Spine Institute, an absolutely remarkable project both financially and in terms of research. This open-mindedness always struck me, showing that even while pursuing a brilliant career in orthopedics, one can branch out into other areas and accomplish major projects.

So you worked as a senior registrar (chef de clinique) for two years. Did you already know at that time that you would return to Lyon? How did that come about?

When I resumed my residency in Paris in 1999, I was already convinced that I wanted to establish my practice in Lyon with Pierre and Gilles. It's one of my characteristics: I don't give up easily. I couldn't envision any other possibility. The situation was somewhat complex with Pierre Chambat, who was a demanding man. He would tell me: "We've never taken on a Parisian." The irony was that when I arrived in Paris, I was known as the guy from Lyon, and when I returned to Lyon, I had become the Parisian. I understood Pierre Chambat's message, but I had no intention of giving up. During all my holidays, I would systematically come back to spend a week with him. My wife would say: "Can't you see he doesn't want you?" I would reply: "Don't worry, it will happen with time, I'm certain of it." Eventually, they realized they needed someone for the sports and lower limb specialty. They recognized that the workload was too heavy for Pierre Chambat alone. This was during the period when they were forming the future Santy group with Pierre Chambat, Gilles Walch, Michel Bonin, Laurent Nové-Josserand, and Vincent Fière. Pierre Chambat contacted me, I believe it was at the end of my first year as senior registrar, saying: "As it turns out, there are opportunities with the opening of Mermoz. Would you be interested in coming back to Lyon?" For me, it was absolute happiness, a dream coming true.

You arrived in Lyon in 2003. Did Santy already exist then, or was it still at Sainte-Anne?

> I established my practice in Lyon in January 2003. At that time, we were still at Sainte-Anne. We opened Santy in January 2006. As for Mermoz, it was initially supposed to open in 2003, but due to construction issues, its opening was delayed until August 2008 - a five-year delay during which we worked in temporary buildings and with an MRI installed in a truck. However, I was so happy to join this group and to work alongside Éric Noël, who left public hospital practice in 2004, that it didn't matter.

You arrived from Paris in January. I imagine the environment in Lyon was already competitive. How did that go for you?

> My reception in Lyon was rather difficult for two main reasons. First, I was Parisian, so people didn't know me - I wasn't from the Lyon school of thought. Second, I probably didn't handle my integration properly. My personality obviously played a role in this difficulty to adapt. Quite quickly, some irritation emerged, particularly regarding athlete patients. In reality, it was a continuation of what I had been doing in Paris. Professor Saillant had given us significant responsibilities, particularly in arthroscopy. As a result, a number of networks and athletes followed me to Lyon, which probably complicated my smooth and peaceful integration into the city.

> The situation became very difficult at one point. In the SOCOLY/SANTY group, we are collectively and definitively validated after one year. Pierre Chambat had even questioned whether to keep me or not, and he told me this frankly. One Sunday, in desperation, I went to see him and said: "What you're telling me is very harsh, but what are the valid reasons for which you might not accept me? This will have a major impact on my career." He replied that he had nothing personal against me, but that people around him in Lyon were not satisfied with my arrival. I was able to respond: "If you sacrifice my career for the people around you in Lyon without having any specific personal reproaches to make against me, that goes against your deeply humane nature and will be very difficult to accept." This allowed us to clear the air, and finally, he accepted me and I was able to stay. But it was a particularly difficult weekend to get through.

So you were with this group that was already well-established in terms of activity. At that time, was the organizational and clinical research dimension already present?

> All of this was created by Gilles Walch. Gilles is incredible and manages to combine all qualities, whether surgical, human, interpersonal, or scientific. I simply followed his example. I didn't do much; I followed absolutely incredible mentors.

> Gilles had his own organization, with unimaginable personal standards. He collected all his data on cardboard cards. When I wrote those two famous articles with him, I noticed that he compiled all his patient information on these simple cards. I suggested computerizing his system to save time. He replied that 'people spend more time developing or using software,' and all that lost time, they don't spend it publishing, which was actually quite true.

> The environment of the future Santy group was very favorable scientifically. Michel Bonnin was already becoming an international reference; he was later joined by Tarik Ait Si Selmi. The shoulder specialists naturally followed Gilles' example, whether it was Laurent Nové-Josserand, Arnaud Godenèche, and later Lionel Neyton. The explosion of our scientific activity finally occurred with the opening of the Centre Orthopédique Santy, another idea from Gilles who

wouldn't accept the slowness and uncertainties of Générale de Santé's real estate project. After Santy opened in 2006, everything progressively fell into place. In the original contracts signed by Pierre Chambat and Gilles Walch with Générale de Santé (now Ramsay) in January 1999, there was already a clause providing for a certain number of scientific secretaries proportional to the number of surgeons. I believe it was one secretary for 3 surgeons, 2 for 5, 3 for 7, and so on. Gilles and Pierre had thus planned the expansion of research based on the volume of incoming surgeons.

Subsequently, things became more academically organized thanks to the possibility of benefiting from SIGAPS/MERRI points through Ramsay's COS from 2014-15. We've been benefiting from this for about ten years now, which has been an extraordinary asset. We have, in addition to the historical scientific secretaries, a CRA (Clinical Research Associate), a Scientific Director since 2019, and numerous fellows. We have access to the best methodologists and statisticians. This has given us a much more significant dimension than what we could achieve individually. In 2023, the Centre Orthopédique Santy published more than 90 PubMed-indexed articles and over 700 articles since its creation.

Did Pierre Chambat easily support you in this approach, or was he already of this mindset?

Pierre always advised me to publish. It's quite amusing - when I first started my practice, I went to see him and asked: "Mr. Chambat, do you think I should do what you do, that is, ligament and prosthetic knee surgery?" He replied: "Listen, if you focus solely on sports medicine, you'll become a reference. So I advise you to do just that." I then asked him if I could make a living from it, to which he replied: "That's your problem."

Then I went to see Gilles, who told me something I've always remembered: 'If you do knee surgery, and only knee surgery, whether prosthetic or ligament, you'll become an expert. The peculiarity of an expert is that they never change their technique because they're an expert! But if you want to go beyond that, you only have one thing to do: publish. This will allow you to objectively analyze your results.' I asked him the same question about making a living, and he responded: 'I've just given you solutions, the rest is your problem.' It was quite didactic.

So in 2004, I decided to focus exclusively on sports surgery and, simultaneously, follow Gilles' advice by pursuing scientific work. What's quite interesting, and I discussed this somewhat in my science thesis, is that I realized I had initially published in 2002 because Éric Noël had advised me to do so to distinguish myself from Gilles Walch. Then, I didn't publish again until 2009-2010. This means I had a 5-year gap where I didn't publish, but this actually corresponds to the first years of establishing my practice when you have only one obsession: trying not to be too poor surgically, especially when working alongside someone like Pierre Chambat, who was a virtuoso. During those years, I was solely obsessed with the surgical aspect, trying to be somewhat consistent, not too bad, to do what he did technically. You don't think about anything else. It was only once I freed myself from this technical aspect, once I mastered it, that I opened myself to other things, particularly science. But there's a surgical pressure that's oppressive at the beginning. Pierre Chambat never forced me to go towards science, but we all knew it was part of Santy's DNA.

What led you to pursue a PhD in science?

The PhD came about through a very long intellectual journey and my fascination with motor inhibition following knee sprains or surgery. This subject was initially taught to me by the

clinicians at the Hauteville rehabilitation center - amazing practitioners like Olivier Rachet, a physiotherapist, and Bénédicte Quelard, a rehabilitation physician, who didn't talk about the brain or AMI (Arthrogenic Muscle Inhibition) but rather about reflex protection mechanisms. Shortly after I established my practice, they showed me that many cases of flexum were antalgic due to reflex contracture of the hamstrings. They also demonstrated that this flexum could be reduced in the prone position by fatiguing these muscles. Later, I noticed that we often saw patients who presented with flexum, for example due to a bucket handle meniscal tear, but it would disappear under general anesthesia. I realized there was something I didn't understand. For several years, I encouraged my fellows, especially the native English speakers, to find an explanation in the literature because I was convinced there must be scientific publications explaining this incredible reflex mechanism. It took an enormous amount of time. The first article we found that finally discussed this mechanism we knew nothing about - 'Arthrogenic muscle inhibition' - was from 2017. We had finally found the keyword, and everything fell into place.

I then thought that to go further, we would need to conduct a study using functional brain MRI, as this hadn't been done and could prove that it was indeed a central reflex mechanism. I tried to arrange this in Lyon, but there was a rather sad pushback due to private-public sector conflicts. I was told they weren't going to host a 'private sector' surgeon for a PhD in Lyon...

At that point, I was fortunate to meet Étienne Cavaignac, who decided to spend a week at Santy. He found our work interesting and wasn't familiar with these issues of flexum that could be reduced by simple maneuvers. He said it was quite impressive and that he would be happy to help, for example by publishing on the subject. I told him I was considering making it into a PhD thesis. He said I was completely crazy, that it would be a nightmare lasting 3-4 years, with absolutely terrible constraints. But I insisted, thinking it would be an opportunity to do truly disruptive research, beyond clinical research. I couldn't do it in a private setting, so I might as well make it a PhD thesis with financial support from Ramsay through MERRI points. It would be validation through a prestigious degree, especially at my age, of rather atypical research. In the end, it was more challenging than I expected, but I was able to defend it and obtain my PhD in December 2022 in Toulouse with a thesis director much younger than myself, Professor Cavaignac. I love this detail. Moreover, this young Professor is destined for a brilliant future.

Could you tell us about your career path in sports surgery? Have you maintained a multi-joint focus, or have you become more specialized?

Early in my career, I was interested in sports surgery as a whole. However, as my practice evolved and new associates joined, my area of expertise naturally became more focused.

Today, I primarily dedicate myself to knee ligament surgery. Nevertheless, I maintain a particular interest in muscle surgery, which remains a relatively unexplored field requiring specialized training acquired over time. Regarding other joints, such as the ankle and foot, I have gradually handed over these cases to my associates. Mathieu Thaunat was the first to join the team, followed by Benjamin Freychet, and more recently Ronny Lopes, who has made it his exclusive specialty. This distribution of expertise within our group allows us to provide optimal and highly specialized care to our patients.

To stay at the forefront of my field, I continue to pursue additional training, travel extensively, and exchange knowledge with other specialists. This approach enables me to offer innovative solutions particularly suited to the specific needs of high-level athletes.

You mentioned traveling abroad. Could you tell us about some visits, people, or trips that particularly interested or impressed you, that were important moments for you?

> I still continue, approximately every two years, to spend a week observing an expert in their practice. I usually identify presentations at conferences that interest me and offer novel approaches that I believe I can learn from. Among the most memorable visits, I would say there were two:

- The first was in Korea, where I later brought other colleagues: Etienne Cavaignac, François-Xavier Gunepin, and even some Brazilian colleagues. I return regularly because they are very advanced in meniscal repair. It's absolutely extraordinary: there, they repair everything with hooks and PDS. It's truly a lesson in surgery, very impressive.
- The second memorable visit was in Chicago with Brian Cole, the American sports surgery star. There, I discovered the business aspect, which was absolutely incredible. It's a mind-blowing experience: when I arrived, the first patient had come from across the United States for ACL surgery. At the end of the consultation, Brian casually offered to inject two types of products: either PRP or stem cells. The patient asked about the difference, and Brian replied that PRP costs $3,000, stem cells $7,000. When the patient asked about the difference in effectiveness, Brian admitted that we still don't know. And the patient simply said, "Give me the best." Incredible! At that moment, I thought to myself, "We're in a different world!" It was interesting because it's a completely different vision of medicine. It's far removed from social medicine, but it's quite stunning. It must be said that Brian Cole is at the top of the pyramid. In fact, the first question Brian Cole asked me when I arrived, after greeting me and saying he was honored to have me spend a week with him - he was very nice and even invited me to his home - was: "But how much do you earn per year?" Americans are very straightforward about this subject.

For professionals, would you say there's no room for uncertainty? How do technology and innovation integrate into your practice?

> Let's start with technology and surgical technique. What I learned from Gilles Walch was data collection. Gilles used to fill out his card files, and I barely improved upon this quest for "data." In 2003, I created an Excel spreadsheet with names and first names, which I gradually enriched with meniscal lesions and other information. I now have a database containing over 10,000 patients who underwent anterior cruciate ligament surgery, with numerous data points. It's an inexhaustible source for publications that allows me, if I wish, to conduct a different study each day thanks to this incredible data, simply stored in an Excel spreadsheet. In fact, it's a mandatory task for fellows: every day, they update my ACL database.

> When I started publishing my first series, I realized we had globally at least 10% failure rate in anterior cruciate ligament reconstructions, meaning graft ruptures, but more concerning, around 30% of reoperations, revisions, cyclops lesions, meniscectomies, and stiffness... This deeply shocked me but was ultimately beneficial. The truth is that we only progress through our failures or poor results, but we must first recognize them, which means following up with patients and honestly publishing our results. With my ACL surgery volume and 10% of patients experiencing re-ruptures, I see two graft ruptures from my previous patients every week. I knew we had to improve this.

I remember going to see Pierre Chambat early on to share my concerns. I felt our results weren't as satisfactory as we thought. These are young patients, and their future is therefore more than concerning. Surgeons performing arthroplasties wouldn't accept having 30% of patients requiring reoperation. Pierre Chambat was incredible in this regard. Contrary to what one might think, while he was very cautious about evolving surgical techniques, he was open to pursuing progress. He told me: "When you change techniques, we discuss it together. It must be logical, you can't change every 6 months, and most importantly, you must conduct 2-year follow-up series and analyze your results." He thus gave me the green light provided things were logical and validated by scientific study.

After the "Lyonnaise-style" bone-patellar tendon-bone graft with femoral press-fit technique by Pierre Chambat, we quickly turned to double-bundle reconstruction in 2005-2006, as it was the trend. The idea was to achieve better rotatory control. Nicolas Graveleau and I went to Japan in 2007 to deepen our knowledge of this surgical technique. It was my first significant trip. We spent three wonderful weeks with Japanese experts: Professor Yasuda in Sapporo, Professor Ochi in Hiroshima, then Professor Kurosaka in Kobe. It remains an unforgettable memory and encouraged me to travel regularly. We ultimately developed two approaches to this double-bundle reconstruction: either with hamstrings or by taking a quadriceps tendon that we split in thickness. We published this technique in 2006 with Pierre Chambat, but the results weren't satisfactory: still about 10% re-ruptures and 30% reoperations.

However, double-bundle reconstructions made us aware of the importance of the "remnant" and preserving the native ACL. We questioned why we were removing everything when performing a graft. Like someone performing a liver transplant, what's ultimately important is the graft's vascularization and its environment, rather than "newton force and resistance" as we had been taught. It's exactly like rotator cuff repair: you don't remove the tissue, you try to preserve it, put it back in place, and optimize its healing. We thus evolved toward an approach of preserving the biological environment in ACL surgery, which remains a hallmark of our surgery today.

Around 2011, we stopped double-bundle reconstruction because the results weren't satisfactory. In 2012-2013, I was somewhat lost as I no longer had a gold standard for ACL surgery. We were either doing hamstrings left attached to the tibia (since 2003) or Chambat's BTB technique. I reserved lateral tenodesis almost exclusively for professional athletes, following Pierre Chambat's teaching.

In 2011, we published an article in the American Journal of Sports Medicine that made waves, particularly at FIFA. We showed there was a higher risk among professionals of developing septic arthritis after ACL reconstruction, with two risk factors: being a professional athlete and having a Lemaire-type lateral tenodesis. Following this, I began in 2011 to perform a "percutaneous Lemaire" with the Gracilis tendon, proximal and distal to Gerdy's tubercle with return upon itself, fixed in full extension to resolve fixed external rotation problems.

In 2013, there was media buzz around the discovery of the anterolateral ligament (ALL) by Steven Claes, my Belgian friend. I then modified the placement of my "percutaneous Lemaire" at the tibial level to reproduce the ALL. This evolution from classic Lemaire to ALL allowed us to publish the first series of combined ACL + ALL ligamentoplasties in AJSM in 2015. Gradually, this technique became established both through clinical results and, importantly, through its technical simplicity.

The following ten years were marked by heated but absolutely fascinating debates on podiums worldwide, with some contesting the very existence of the anterolateral ligament and/or its utility. This controversy led us to multiply clinical studies, unite a global group of brilliant young surgeons worldwide within the SANTI Group (Scientific ACL Network International), and ultimately obtain clinical results showing that the association of an anterolateral plasty reduces the iterative ACL rupture rate by 3 to 5 times. It's Lemaire 2.0 without its complications!

Recently, we completed at Santy with Jean-Marie Fayard and Mathieu Thaunat a prospective randomized study of 593 patients with a minimum 5-year follow-up. We compared patellar tendon reconstructions versus hamstring + ALL. The results are striking: 11% re-ruptures for patellar tendon versus 4% for hamstring + ALL, 24% reoperations for patellar tendon versus 7% for the other group. In patients under 25, it's even more pronounced: 18% ruptures with patellar tendon versus 5% in the hamstring + ALL group.

After all this controversy and these debates over 10 years, we finally reached the conclusion that anterolateral plasty with ALL significantly reduces the rate of ruptures and reoperations. It's becoming almost more important than the choice of the graft itself. Most importantly, we have improved our clinical results, which represents a major advancement for our patients.

So today, after all this journey, you've finally arrived at a technique that satisfies you?

That's not exactly right. I would say we still have 4% left to improve, and I have the utopian belief that we'll get there! What's particularly interesting is that we've noticed that regardless of which ACL graft is used, we bring the patient back to the same risk level of ACL rupture, whether for the operated knee or the other one. Let's take some examples: for people who participate in high-risk sports, like the French national ski team, more than 30% re-rupture their operated knee and have an identical percentage of rupture in the contralateral knee. Among professional athletes, this rate is generally around 15%, and for the general population, amateur athletes, it's around 5%. However, when we perform an associated anterolateral plasty, the risk is 2 to 3 times lower than for the contralateral knee. This means we're achieving better results than the natural risk for a patient returning to sports. This is a real breakthrough, and it has been the true evolution in ACL surgery over the past 10 years. There isn't an international congress anymore where anterolateral plasty isn't discussed, which is truly exciting. It's a return to the past and modernization of a French concept from Marcel Lemaire's brilliant plasty.

This evolution once again highlights the quality of French orthopedic surgeons. Michel Latarjet, Marcel Lemaire, Albert Trillat, the concepts of dual mobility, reverse shoulder prosthesis... It's incredible how many techniques the French have invented in orthopedics. It's truly remarkable, and our predecessors would probably have had even more impact if French had been the international language of scientific communication... I would add that the future of French orthopedics is bright with the emergence of incredible "young" Professors whom I greatly admire. Among those I know well, I would mention Jean David Werthel in Paris, Sébastien Lustig in Lyon, Thomas Neri in Saint-Etienne, the three from Toulouse - Etienne Cavaignac, Nicolas Bonnevial and Nicolas Reina, and Matthieu Ollivier in Marseille. Minds seem to be opening up, and the appointment of two former SFA presidents, Olivier Courage and Johannes Barth, as "Associate Professors" at the University Hospital is also wonderful news. Our young colleagues are very fortunate.

How do you integrate technological innovation into your practice?

The integration of technological innovation into my practice has been gradual, particularly in the field of ligament surgery. It all began around 2016-2017, when my friends Pierre Imbert, Christian Lutz, and I published research on the anatomy, biomechanics, and kinematics of the famous anterolateral ligament. For the cadaveric biomechanical study, we used Praxim's navigation system, though we were aware of its limitations, particularly the prohibitive need to insert pins. We then envisioned the future use of robots or other technologies that could provide us with complementary information for our ligament surgery, similar to what the constraining Praxim system offered.

This reflection matured over the years. While preparing for a conference at ESSKA 2022 in Paris, we revisited the topic of robots and noticed their rapid development in prosthetic surgery, but there was nothing comparable for our arthroscopic surgery. We decided to look into this matter. After careful consideration, we concluded that robotics was too expensive and constraining for ligament surgery, which needs to be quick and cost-effective. We then turned our attention to mixed reality, an emerging technology in orthopedics. Again, following Gilles Walch's advice and network, we created AREAS in 2021 with Christian and Pierre, which now employs about twenty engineers. Our company is based in Grenoble, truly the heart of the French "Digital Valley." All our engineers come from this dynamic technological ecosystem.

Our goal was to avoid modifying the patient's journey while improving the precision and efficiency of the procedure by providing assistance to surgeons:

- We began by transforming conventional MRIs into automatic 3D reconstructions using artificial intelligence. We are currently validating the accuracy of this reconstruction compared to 3D scans.
- We are simultaneously working on transforming arthroscopic images into 3D images.
- Obtaining these two 3D models - MRI and arthroscopy - will allow us to merge the images and provide surgeons, equipped with mixed reality glasses, with both the usual arthroscopic image and a 3D intra- and extra-articular view of the joint they're operating on, including all ligament insertions.

Thus, the surgeon's vision will be complete and totally different, subsequently allowing automatic guidance based on preoperative planning. This technology represents a true revolution and will be developed for all joints. Our assistance works like an airplane cockpit: it provides the surgeon with crucial real-time information. Moreover, through voice commands, it will be possible to access tutorials for specific or complex procedures.

In essence, we're creating real-time augmented arthroscopic surgery based on patient-specific anatomy. It's fascinating to see how quickly this field is evolving. Advances in artificial intelligence and access to open-source software allow us to progress faster than anticipated. What seemed almost impossible in 2021 is becoming achievable today.

These advances are very promising for the future of orthopedic surgery, particularly arthroscopic surgery. They pave the way for more precise interventions by all surgeons and a better understanding of each patient's specific anatomy. If we succeed, it will truly be something extraordinary.

Which scientific societies interest you or which ones do you enjoy being involved with, or at least attending their conferences?

> I am particularly interested in all societies that deal with sports surgery, as I always find them extremely enriching. I greatly appreciate ESSKA, which I consider a very dynamic and successful society. ISAKOS is somewhat larger, but I appreciate it as well.

> Obviously, the American societies, particularly AOSSM (American Orthopaedic Society for Sports Medicine), are essential. You tend to see the same people there, but it's always interesting. I also became a member of the highly prestigious Herodicus Society this summer, and I'm very proud of this - it's the culmination of 20 years of work and numerous publications. I thus join Pierre Chambat, who always spoke about it with emotion.

> Overall, these conferences are very enjoyable for three main reasons. First, you can listen to original presentations. Second, and perhaps most importantly, they offer the opportunity to reconnect with colleagues and friends. Finally, they allow for the resumption of in-person exchanges. At the beginning of the pandemic, we discovered videoconferencing, and everyone was happy to stay at home. But gradually, we realized that nothing truly replaces face-to-face interactions.

The French-speaking Society of Arthroscopy (SFA) became an important element of your career. What initially attracted you to this society, and how did your involvement deepen over time?

> My journey with the SFA is fairly typical. Although I started my practice with Pierre Chambat, who was close to the SFA, he wasn't the one who encouraged me to get involved with this society. The real catalyst was Philippe Colombet. He had noticed that I was beginning to publish on hamstrings for ACL reconstruction, which was rather original in the Lyon context at that time. Before he became president, he asked me to participate more actively. I found it very nice that someone from outside whom I didn't know would reach out to me like that.

> I started attending SFA quite early, during my residency, initially attracted by the friendly atmosphere and excellent social events. But quickly, the scientific dimension took precedence. In 2014, François-Xavier Gunepin and I were responsible for a symposium on meniscal sutures. This experience taught me a lot, particularly that progress only comes through analyzing our failures. As early as 2012, I had asked a fellow to review my medial meniscal suture cases, all "all-inside" at the time. When I asked about my secondary meniscectomy rate, I discovered it was 30%. I told myself this wasn't acceptable for young patients. This realization coincided with Romain Seil's first presentations on posteromedial approach medial meniscus suturing. I went to see him in Luxembourg with Nicolas Graveleau in 2012, and I eventually went to Korea to learn these hook techniques for medial meniscal suture through accessory portals. I completely changed my medial meniscus repair technique in September 2012, which reduced our failure rate from 30% to 7% today.

> My involvement in the SFA thus deepened naturally. Christophe Hulet asked me to run for board membership, which greatly flattered me, and I enthusiastically accepted. I was particularly drawn to the group spirit and unity in promoting science and training young surgeons in arthroscopy.

> What makes the SFA so special is the human adventure. Unlike what may have happened in the past, where there were apparently some conflicts, we have always worked in a spirit of goodwill and dedication to the cause. It's a society where people stay involved for a long time, even after

leaving their official positions. I think we all leave with a heavy heart when it's time to pass the torch.

How is the board organized?

It's a continuous progression with evolving responsibilities. Generally, one starts by managing scientific programs. Then, every two years, one progresses through different positions - treasurer, secretary general... After six years, one can apply for the presidency. At that point, you become vice-president for two years, which is beneficial as it allows for proper training. Then, you serve as president for two years. Nicolas Bonnevial, whom I'm very fond of, will be our president in 2025.

Initially, I didn't want to be president because I already had many commitments. I was very satisfied with my journey within the SFA and didn't wish to go further. It was my friend and past-president, Thomas Bauer, incredibly intelligent and astute, who brought in Gilles Walch. The latter told me it was inconceivable that I wouldn't run for the SFA presidency, arguing that it was too prestigious a society to abandon without at least running for presidency, and also that there hadn't been anyone from Lyon in this position!

What I greatly appreciate about the SFA board is the mix between private and public practice. It's one of the few places where we can still have serene dialogue in an atmosphere of mutual respect. Everyone can express their views and challenges, which is absolutely necessary. There aren't many sectors left where you still find this diversity, and it's extremely interesting. This is a crucial point in my view: the fact that there's a coexistence, even an institutionalized succession between private and public practice. I sincerely believe this configuration is truly beneficial for everyone. Our board brings together wonderful and motivated people; it's diverse, friendly, warm, and mixed. It's gradually becoming more gender-balanced - Christel Conso masterfully initiated this movement, which reflects the current gender distribution among residents. Florence Aim and Cécile Toanen follow in her footsteps. They bring consistently relevant and interesting analysis to our discussions. This evolution was necessary and will further improve the life and vision for the future of our fine society.

When did you take office as president?

I was elected last year. We had the opportunity to organize the SFA congress in Lyon with Arnaud Godenèche. I assumed the presidency at the end of this congress. So I officially began my duties after the Lyon congress and will complete them in December 2025 in Nantes.

The first congress as president will take place this year in Bordeaux; I believe we were already there in 2013. It's particularly pleasant because I'll be reuniting with people I greatly appreciate, especially the Congress Presidents, including Yacine Carlier, who has been a board member for years. There's also Nicolas Graveleau, whom I'm close to and who was my resident when I was a senior surgeon in Paris. Philippe Colombet was president of the society, and many physicians from Bordeaux have been and are active members of our board.

We will try to highlight what is our trademark. Of course, the scientific aspect will be paramount in Bordeaux, but we will also showcase French excellence in terms of wines and gastronomy. It's looking very promising, especially since there is very strong demand from industry partners. We are therefore very satisfied with the prospects.

What advice would you give to a young surgeon who wishes to pursue a career like yours, with both intense international and scientific activities? What are the essential pillars for success in this path?

> I would say there are three essential pillars:

- The first is about connections. This is what makes our profession strong - the mentorship. If you find benevolent mentors who inspire and attract you, it immediately creates incredible enthusiasm.
- The second pillar is work. Without it, nothing is possible. However, when you‘re passionate, working becomes much easier. This might not be true for everyone, but when you have an absolute passion for your profession, it‘s extraordinary because new projects are always emerging. Thomas Jefferson said, “I’m a great believer in luck, and I find the harder I work, the more I have of it.”
- The third element, I would say, is the support of your family in accepting this lifestyle. If you don’t have a supportive family environment, it‘s mission impossible. Love, well-being, serenity, and tranquility seem mandatory at home. But there‘s no miracle recipe for this - it’s like with our mentors, the luck factor is decisive.

> That being said, luck must also be earned. The recipe to tell young people is: if you don‘t see the opportunity yet, work, keep working. It will eventually come. You might not see it yet, but people will notice you and think: “Hey, they‘re not bad at all.”