MENTORS IN ORTHOPEDICS

LUIGI ZAGRA

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SUMMARY

Luigi Zagra's trajectory in orthopedic surgery began with a definitive choice between journalism and medicine in his native Milan. This early pivot fostered a career grounded in intellectual honesty and the systematic use of clinical registries to evaluate surgical performance. A prominent figure in the European Hip Society and EFORT, Zagra specializes in bearing surface optimization and complex hip revisions. His perspective emphasizes international integration and rigorous data analysis as the primary vehicles for advancing the discipline.

We met Luigi Zagra, a Milanese by birth and by residence. Meet a man who is eminently rational, a character trait that would soon lead him, among other projects, to set up clinical registers at regional and national level, and to constantly evaluate and question his practice. A man for whom intellectual honesty is fundamental.

To begin with, could you shed some light on your background, Luigi? We're eager to learn about your origins, upbringing and family life.

> Indeed, I was born and have spent my entire life in Milan. While my father hails from Sicily, located in the south of Italy, my mother is from the northeastern region, spanning from Udine to Venice. My educational journey and initial professional training commenced right here in Milan, at the University of Milan.

Can you share with us the reasons behind your decision to pursue medicine and surgery? Did your family play a role in it?

> That's an insightful question and it delves into personal territory, but since we're friends, I'm willing to share. My father is an orthopaedic surgeon, a spine surgeon to be precise. He just turned 83 , but his passion for orthopaedic surgery keeps him active in the field. Naturally, this influenced my career choices. However, I also held a deep appreciation for literature, writing, and journalism. I initially decided to study journalism at university, but the day before I was to start, my father presented me with a choice. He said, "Luigi, if you wish to become a journalist, you are free to do, but you may walk out the door tomorrow." So, the decision was mine - I could either

> pursue journalism and move out, or stay and become a doctor. At that time, becoming a doctor seemed the more convenient and reasonable choice, and it was something I was already considering.

> I decided to study medicine at the University of Milan. I knew from the outset that I wanted to be an orthopaedic surgeon. Though my father was in the same field, we never worked together directly due to his specialization in spine surgery. We do have some professional interactions, such as when he has a patient with a hip problem or I have a patient with a spine issue, we can refer them to each other. Apart from that, our professional lives are fairly separate.

That's quite a compelling story. During your training, did you have any mentors or influential surgeons you'd like to acknowledge?

> Indeed, I have been fortunate to have been mentored by some truly remarkable individuals. I want to pay special tribute to my primary mentor, the late Professor Roberto Giacometti Ceroni, who passed away just four months ago. He introduced me to the broader professional community and served as one of two Italian members of the International Hip Society at the time, the other being Renato Bombelli. Professor Giacometti was instrumental in guiding me in the realms of hip surgery, registry involvement, and conservative surgery, amongst other areas. He was a pioneer and in many ways a genius; for instance, he was the first to use 36mm ceramic heads in ceramic-on-ceramic procedures back in the late '90s, a practice that has now become standard. In collaboration with Lorenzo Spotorno, he developed the CLS stem. Despite Spotorno being a superb surgeon, he was less proficient in English and had fewer international connections, so Giacometti took the lead in promoting the CLS at the global level. His passing has left a significant void.

> My academic mentor at the University was Professor Giovanni Peretti, who taught me much in the field of orthopaedics. Furthermore, my father was a mentor to me in his own way. Although he wasn't a mentor in the surgical sense since I've never performed spine surgery, he did teach me about the importance of hard work, seriousness, and honesty when interacting with patients.

> In addition to surgical skills, these three individuals taught me invaluable life lessons. Both Professor Giacometti and my father emphasized the importance of intellectual honesty and a systematic approach in everything I do. They taught me to constantly verify my work, never rushing from one technique to the next, but rather progressing step by step. Above all, they stressed the importance of being transparent with patients about their treatment, explaining the risks, benefits, and potential drawbacks. These men not only molded me into a competent surgeon but also guided me on how to be a good doctor and a person of integrity towards my patients.

You've mentioned your involvement with registries, and given your vast experience at regional, national, and international levels, I'm quite interested to know your thoughts on this topic. What is your perspective on the role and importance of registries?

> In my view, registries serve as essential tools, particularly when it comes to identifying what isn't functioning as expected. To illustrate, the major issues with metal-on-metal devices and neck modularity were discovered through registries. We have numerous examples. The success of cemented implants and the significant problem with periprosthetic fractures are both based on

> data gathered from registries. Therefore, registries provide crucial information, particularly regarding pitfalls.

> I've had extensive experience with registries, having established our regional registry many years ago. This subsequently merged with the national one, allowing me to serve on the board of Italy's national registry. Each country's context is unique, of course. I had connections with the European network for a time, but I'm less involved now due to time constraints. However, I consistently review registry data and results, and consider their implications for issues with certain implants in my daily practice.

> Nonetheless, there are limitations, mainly due to the crude nature of the data and potential disparities among individual surgeons. For instance, a surgeon willing to take on riskier cases may end up appearing as an outlier in the data. It can be challenging to distinguish between a surgeon with wrong indications and implants or poor techniques and one who takes on severe cases that others refuse and who, as a result, may experience more complications.

> Therefore, it's crucial when establishing a registry that the board of directors consists of surgeons who can control and analyze the results. If registries are solely managed by authorities or administrative staff, problems may arise. On the flip side, in larger countries like Italy and possibly France, running a registry entirely by surgeons without institutional cooperation is challenging. Voluntary data submission often fails in practice, which necessitates some form of mandatory reporting.

> However, a balance needs to be struck. Collaboration between surgeons, scientific societies, and authorities is vital, with data analysis carried out independently by surgeons. In France, as you study our registry system, you'll find we're aiming to avoid total control by authorities, as this poses risks. Conversely, without enforcing mandatory participation, many practitioners, whether French or Italian, simply won't participate.

You've brought up your international connections and your involvement with the International Hip Society, which is an incredible organization. Could you share your journey with the International Hip Society with us?

> Of course. My journey with the International Hip Society began when Miguel Cabanela from the Mayo Clinic in US, a great friend of mine and the Society's president at the time, was looking to broaden participation, particularly from Latin countries. Back then, only two Italian members were a part of the Society; one was not very active and the other, Giacometti, was nearing retirement. Miguel encouraged my candidacy, which was also strongly backed by Reinhold Ganz, the incoming president, “father” of the modern conservative hip surgery. As such, I had this unique opportunity.

> The International Hip Society is a prestigious, exclusive society. I have numerous skilled surgeon friends who were unable to gain membership due to its stringent requirements. These include having a strong scientific CV and substantial experience in hip surgery. It's truly a top-tier society comprising elite surgeons worldwide. It's my belief that participation from European and Southern European countries should be increased somewhat.

> However, this international involvement has also made it abundantly clear to me that our individual countries are too small to satisfy our ambitions. International connections are vital - they represent the future for our residents and colleagues. The most promising residents and

> colleagues I've worked with are those with an international outlook. If we focus only on our own localities, we risk losing out, including on best practices. This is crucial because improving our skills and scientific knowledge often involves learning from others, and "the others" in the current scenario represent an international community rather than just one country.

> I was fortunate to serve as the president of the European Hip Society (EHS) and am currently the Chairman of the Scientific Committee of EHS. As an international member of the American Association of Hip and Knee Surgeons (AAHKS), an exceptional organization that hosts a high-level congress annually, I've had the opportunity to share the podium. It's one of the congresses I truly enjoy attending, given the wealth of information and high standard of discourse.

> Currently, I'm engaged with EFORT, serving as a member of the Executive Committee and as the Chairman of the Scientific Committee, having previously been the Vice Chairman of the Education Committee. We're vigorously working on the program for the next EFORT Congress in Hamburg next year.

> Last but not least, my national-level connections, surprisingly, came after my international ones. I first secured a position at the international level before transitioning to the national level. Now, I'm a member of the board of directors of our National Orthopedic Association (SIOT) and serve as the Chairman of the International Committee. The focus in our country is clearly on increasing visibility of our surgeons and fostering connections with other societies. I've also served as the president of our Italian Hip Society.

Considering the extensive diversity within Europe, with its multitude of distinct countries, it's a significant challenge to foster connectivity among us. In discussions with Americans, when we refer to "Europe," they often emphasize its diverse nature, not viewing it as one large country but rather a federation of various nations. How do you think EFORT can help unite us, despite these complexities?

> It's true that this diversity poses challenges, but it's also our greatest asset. Our differences are what make us rich and unique. As for the field of hip surgery, which is my area of expertise, European contributions have been pivotal. A great deal of conservative surgery originated here in Europe, from osteotomies to the work done by Maurice Muller, Heinz Wagner, Renato Bombelli, Reinhold Ganz, and the Bernese school, among others.

> When we look at ceramics, they also emerged from Europe – France (Boutin, Sedel), Italy, Germany (Mittelmaier), to name a few. Dual mobility is another concept that was developed in Europe, specifically France. The good results with cemented implants also originated here in Europe before being exported abroad. If we examine the Charnley stem, the Exeter stem, the Corail stem, the Spotorno stem, the Zweymuller stem, the Wagner stem and other implants with a long history of high performance internationally, including in registries, all of them come from Europe.

> From outside Europe, cross-linked polyethylene is a major development, mainly from the U.S. However, Vitamin E, which is less well-known, the idea came from Italy – so again, we return to Europe.

> One of our main challenges is that major companies in this field are not European. Consequently, we must continue to advance our research, skills, and knowledge in Europe, despite the challenging environment. Big companies often resist conducting research or clinical studies in Europe due to high costs and bureaucracy, preferring to go to other countries instead.

> Despite these hurdles, our diversity is a strength, enriching our collective experiences and knowledge. EFORT has a crucial role to play in this process. The pandemic has forced everyone to retreat into their shells to some extent. Now, it's time for us to reemerge and make strides forward in this regard.

Luigi, you brought up ceramics earlier. Can you share your philosophy regarding bearing surfaces? Did you ever experiment with metal-on-metal or did you bypass that trend? Have you always been a proponent of ceramics?

> Indeed, I was fortunate. During the mid-2000s, metal-on-metal was very much in vogue. If you weren't using it, you were considered outdated. Thankfully, it was quite costly, so we never adopted it. We only had limited experience with large-diameter metal-on-metal when we conducted a randomized controlled trial comparing gait analysis with different head sizes.

> I began my career using ceramic-on-polyethylene. At the time, it was ceramic-on-conventional poly. We gradually transitioned to more ceramic-on-ceramic, which initially involved alumina ceramics. Later, we switched to the newer Biolox Delta ceramics. This isn't about specific companies, but about the evolution of ceramics.

> To be honest, in my practice, the use of ceramic-on-ceramic has decreased in the last years. It's crucial that we base our decisions on results, and registry data play a crucial role in this. With the new generation of cross-linked polyethylene, we're not encountering major issues with wear and osteolysis. Initially, there were concerns about this new material, as we only had ten years of follow-up data, which isn't enough. However, now we have between 15 and 20 years of follow-up data with cross-linked polyethylene. And honestly, I've never had to revise a cross-linked poly implant due to wear.

> In my experience, I've used ceramics extensively, especially ceramic-on-ceramic for younger patients. Now, we're still using ceramic-on-ceramic, but primarily for the very young. We're increasing our usage of ceramic-on-cross-linked polyethylene. We no longer use metal heads, except in special cases of revision surgery, as ceramic heads cost the same as metal ones.

> This isn't to say that I'm universally against metal heads. Even though the risk of trunnionosis could be as low as 0.2% or as high as 2% according to different estimates, I have no reason to use a metal head when I can get a ceramic one at the same price. Many decisions are indeed price-dependent. If the prices are equal, you choose the best option for your patient, and in this case, it's ceramic. Particularly when used with cross-linked poly, we don't see failures related to the head or ceramic.

> Ceramic is more biologically inert and we don't risk fracturing the ceramic head when used with poly. Ceramic-on-ceramic is slightly different, it's more sensitive and less forgiving, but we still use it for younger patients. While we often talk about ceramics, both ceramic-on-ceramic and ceramic-on-poly, we don't pay enough attention to the metal backing. Some systems work wonderfully with ceramic-on-ceramic because the metal back was designed for ceramic liners. Other systems work well with poly liners, but have been adapted for ceramic, which can lead to problems. In the past, there were instances of liner breakages in U.S. trials, which significantly delayed the adoption of ceramic-on-ceramic. A good liner needs a good metal back. If the metal back is poor or deforms, it can cause issues. So, the choice of liner is heavily dependent on the

metal back. For some systems, I'm comfortable using a ceramic liner. With others, I prefer a poly liner.

We often neglect the fact that the thickness and flexibility of the cup play a crucial role in the outcomes of ceramic-on-ceramic implants. The cup size also matters. Smaller cups, larger cups, and cup deformities can all impact outcomes. For example, I've used a system for many years that works excellently with ceramic. However, when transitioning from a smaller cup to a larger liner, I'm hesitant to use the smaller cup because of the potential for poor liner-cup fit. These considerations, often overlooked, are incredibly important to me.

Luigi, we often mention younger patients. Are you an advocate for short stem implants?

Yes, I am. In fact, I've conducted a clinical study for a company that develops these implants. However, we only use short stems in very specific cases. I see them as a beneficial addition, but not as an absolute solution. For me, the priority for any patient is a stable implant with good wear performance and, importantly, a good reconstruction of the hip's biomechanics. If I can achieve these objectives with a short stem, then why not?

But in cases of poor bone quality or a large metaphysis with thin cortical bone and then thicker distal cortex, like in a Dorr A type, where short stems are at risk of becoming fixated distally, I would not use them. They're also not suitable for a long valgus neck, where you need to preserve a significant portion of the neck, or when the patient has had prior surgeries in that area.

Short stem implants are an option we utilize, but in my practice, they only account for about 10% of femoral indications. The criteria for their use are very stringent. No single implant is suitable for all situations, particularly when dealing with large numbers of patients. You need different options for different patients.

Luigi, what about the option of using cement? You've mentioned it in the context of registry data.

My use of cement in orthopedic surgery has been on the rise, and I foresee it continuing to increase in the future. When I first began my career, we exclusively used cementless implants. However, for several years now, we've reverted to using cemented implants, predominantly on the femoral side.

We rarely ever cement the acetabular side, but I won't say we never do it, as it remains an option. But if you look at registry data, hybrid systems - cemented stems and cementless cups - yield the best results. There's no study demonstrating superior results with cementless stems in patients over the age of 70 or 75. Therefore, if a patient is over 70 or 75, I see no reason to use a cementless implant. I know I'm being quite categorical about this, but it's what the data tells us. And, from my experience, these patients tend to have the highest satisfaction rates.

They can bear weight immediately, and with cement, you can better adapt to their anatomy and control the antiversion of the stem. It allows for more surgical precision. In my practice, cemented implants account for about 30-40% of all implants we use, based on patient age, bone shape and bone quality, so it's a significant number.

Moreover, the issue of periprosthetic fractures is a substantial one. Even American surgeons are now acknowledging that female patients over the age of 60 have better results, fewer readmissions, fewer complications, fewer dislocations, and fewer periprosthetic fractures with cemented implants.

Do you use dual mobility implants in primary hip arthroplasty for your older patients?

> Indeed, I do use dual mobility implants, but not as a routine. I reserve them for high-risk patients. Dislocation is a multifactorial issue, it's never just one element. We see cases of poorly positioned implants that don't dislocate. But, combine a poorly positioned implant with a challenging patient, such as one with weak abductor muscles and no spine mobility, and dislocations can occur. When you encounter at least two risk factors, there's a problem.

> So, if I'm dealing with an older, unreliable patient, or if I'm facing hip-spine issues, or if there are issues with soft tissues, then dual mobility becomes my choice. It's not my go-to solution for every case, but I do use it in around 10 to 15% of cases.

> In revisions, the challenge is to have a reliable system to reconstruct the bone loss while using dual mobility. I prefer the modular one, which allows the addition of screws to enhance fixation, high porosity surface finishing. However, in all honesty, I try to use as few screws as possible. In most primary cases, I don't use screws—it's less than 5% of the cases.

> I've seen numerous revisions that become nightmares due to broken screws inside the bone. I've also witnessed vascular and nerve injuries caused by screws. Of course, screws can be necessary, and it's good to have the option. But to be honest, in most primary cases, there's no need to use screws.

You mentioned the hip-spine relationship and the potential risks for patients. How do you assess this risk? Do you routinely perform dynamic X-rays, seated, standing, or otherwise? Do you have a specific workflow? How do you handle this in real life?

> First and foremost, we assess a patient's risk based on their history. If they've had spine issues, pain, previous surgeries, etc., we consider them a risk and conduct further investigations. During the clinical evaluation, we pay close attention to the spine—checking for major deformities, a flat back, or any clear clinical issues. These patients must be screened. So, we don't do this for every patient, only those at risk based on their history or clinical evidence.

> For these patients, we routinely take dynamic lateral views, requiring maximum flexion and extension of the lumbar spine. This helps us investigate the stiffness of the spine. Luckily, we have an EOS machine in our hospital, so we perform standing and sitting examinations of the entire spine. We observe changes in the sacral slope—if it changes less than 10 degrees, it's a sign of high risk. Then we examine for flat back and measure the pelvic tilt. Based on these findings, we adapt the position of the implant or opt for a dual mobility implant.

If we consider a revision scenario, specifically focusing on the cup, what's your philosophy? Do you try to avoid allografts and metal cages, leaning more towards metal with augments and large cups? Or do you try to restore the center of rotation with different options? What do you prefer?

> The center of rotation is critically important, but we shouldn't be dogmatic about it. I've seen complicated reconstructions where the center of rotation is restored at the cost of inserting large amounts of metal. Sometimes they can't even relocate the hip stem because of excessive lengthening. So yes, the center of rotation is crucial, and we should try to restore it as best as possible within reasonable tolerance.

> Secondly, if I can handle this with a high grip surface cup, an hemispherical one, which is used in the vast majority of revisions—that's my go-to choice. Then, I fill all the bone loss with strongly

> compacted bone grafting in chips. This approach has both biological and mechanical benefits.Of course, we sometimes see major bone loss in certain cases, such as Paprosky IIIb, and that requires a step-by-step approach. The majority of my cases are managed with hemispherical cups made of high porosity titanium or tantalum, trabecular metal, and they cover most situations. Bone grafting is used when a large space needs to be filled.

> Then of course, if this isn't enough, we progress further. We might use a cage, or better, a cup-cage, when there's significant bone loss. Sometimes we also use augments. To be honest, I'm not a big fan of augments because they can be challenging to handle, especially for surgeons who don't routinely use them, and we don't need them often. Nevertheless, augments, cages, or cup-cages are the next options.

> For very old patients, where we don't anticipate long surgery or any such complications, we just use the cage—the Burch-Schneider cage, for instance. Very selectively, we use custom-made solutions. There's currently a trend for this. It's quite expensive and timing can be a challenge, but of course, it's an option we keep open for severe bone loss cases—particularly when there's no posterior wall or roof, which is the most difficult situation. We also resort to custom-made solutions here. However, I must admit, there's a significant cost issue with this, and it often leads to negotiations with the administration.

Custom implants have their indications, but as you've mentioned, they are time-consuming and if we were to use them for many patients, the costs would be incredibly high.

> Whenever I see theories involving large numbers, I'm always surprised because honestly, even though we perform a lot of revisions, I find very few indications for custom implants—only when there's no other choice. With augments, with the cup-cage system, and with other methods, you can manage most cases. Again, if I have a good rim and the three-point contact, I primarily use high porosity implants such as trabecular metal or trabecular titanium for fixation. We use a hemispherical cup and reconstruct any bone loss with a very strong impaction bone grafting technique.

> We're lucky here in Milan to have a very good bone bank that collects not only heads but also cadaveric materials. Sometimes, we use the all condyle, distal femur, and chips, strongly compacted, to reconstruct. This method provides mechanical support too, of course, provided we have good grafts for it.

You have a lot of experience with allografts since they have been available for a long time. What are your experiences and outcomes with allografts? Do you observe bone integration?

> Yes, as long as the allograft is in bone chips form and impacted. I'm not referring to bulk allografts. I don't believe that bulk allografts work in the long term, as you've mentioned. I need contact and fixation on the native bone, and then I can fill all the defects with impaction bone grafting.

> Why does cemented impaction bone grafting work so well? Because it involves real impaction, both in the acetabulum and on the femoral side. We try to replicate the same process with cementless grafts, fixing on the healthy bone in different areas, and then adding impaction bone grafting. However, it's not bulk grafting. It's chips under pressure.

> I'm aware that the long term results with bulk allografts are not promising, but we've never used them, to be honest. They don't work because there's no osteointegration. With the chip grafts, of course, you must rely on some points of fixation on the healthy bone, at least at three points on the rim, or something similar. After establishing this, you then build upon that. I have extensive experience with this method.

Moving on to the stem revision, which can also be quite tricky. When you're dealing with the femur, are you generally cautious about carrying out an extensive trochanteric osteotomy?

> My approach is to avoid the osteotomy whenever possible. Some of my colleagues perform it as a routine, and they initiate the procedure with an extensive trochanteric osteotomy (ETO). While ETO can make the surgeon's job easier and the operation smoother, I always think about its implications on future reconstructive options. An ETO, by default, necessitates the use of a longer revision stem. Often, the cases that require an ETO are infected hips, which can have a recurrence rate of 10 to 20%. So, if a revision stem becomes re-infected after an ETO, the typical progression is a longer ETO, followed by a proximal femur replacement, then a total femur replacement which might get infected again. I'm slightly exaggerating here, but you get my point. My philosophy is to use as minimal a stem as possible in the femoral canal, and in majority of the cases, we opt for primary stems during revision. We prefer the Zweymuller stem because of its rectangular cross section that provides substantial stability in rotation and subsidence. Of course, if there is significant bone loss in the proximal femur or a periprosthetic fracture, we resort to revision stems with distal fixation. If we perform an ETO, we are compelled to use these kinds of stems. We've been using modular revision stems from an Italian company for over 20 years now. Again, my approach is step-by-step. If I can remove from the top and have the right tools and a well-planned surgery, a standard stem replacement can be achieved in many cases. But when this isn't possible due to reasons like infection or extensive bone loss, I move to a revision stem with distal fixation.

Regarding distal fixation, what's your preference? Do you consider the use of interlocking screws?

> Interlocking screws are not a common choice in Italy; they are more prevalent in France, I believe. Though I acknowledge there are positive results with this method, I don't personally favor it. I view the implant as a stem, not a nail, and therefore, I don't want to rely on screws. My preference is based on the condition of the isthmus. If it's preserved, we typically add a preventive cable. We avoid inserting a revision stem from the top, as it usually only has three-point contact, raising the risk of subsidence. However, for cases involving periprosthetic fractures, extensive trochanteric osteotomy (ETO), or significant bone loss, a cable providing protection suffices. If the isthmus is compromised or short, we usually add two cables to manage this issue. In extreme cases, where everything is destroyed with no proximal bone left, we have a few indications for a proximal femur replacement. We cement the stem at the level of the isthmus or below it. For very rare cases when everything is destroyed, we've had some experience with total femur replacement. However, caution is paramount because if infection occurs, it's a significant problem.

So, if I understand correctly, your philosophy is primarily to use cemented stems for primary procedures, but in revisions, the indications are very limited.

> Correct. We generally don't utilize cemented stems in revision surgeries. We've found that the inner part of the cortex tends to be smooth and doesn't facilitate effective cementation in a femur

> that has previously been operated on. So, cement is not our choice in these scenarios. We only use cement for distal fixation in cases where a proximal femoral replacement is needed.

You've mentioned dealing with infection cases, which are notoriously challenging. Has your approach to these cases evolved over time? Do you prefer a one-stage or two-stage revision procedure? What is your current strategy?

> To be honest, I don't consider myself proficient enough to routinely opt for a one-stage revision surgery. As a conservative surgeon, I generally opt for a two-stage revision procedure for most cases. The only exceptions are in the event of an early infection or late-stage infections that have been detected very early. For these cases, I proceed with a one-stage procedure, but these are highly selective situations. I'm always cautious about the consequences if infection recurs after a one-stage procedure, so I prefer to be methodical, step-by-step. I make sure my patients understand the need for two surgeries.

> The other advantage of a two-stage approach is that it allows twice the opportunity for aggressive removal of all soft tissue and thorough cleaning. In the second stage, we cover all the implants with antibiotics. We have a special gel for that. Interestingly, in many of these two-stage cases, we even use primary stems. For instance, in some cases, we may need to perform an extended trochanteric osteotomy (ETO). However, if we go with a two-stage procedure and the ETO heals, we can still use a primary stem during the second stage. The ETO typically heals in about three to four months.

> One thing we need to be cautious about is that if the ETO doesn't heal very well, it could indicate a lingering infection. To rule this out during the second stage, we have a clear routine, which includes leukocyte esterase, white blood cell counts, and neutrophil counts. If there is any doubt, we take a pause and reassess.

Do you use a spacer during the period between surgeries?

> Yes, I do use a spacer. However, it's not primarily because I believe it significantly increases the rate of infection eradication by itself. Instead, my experience is based on conversions from Girdlestone procedures to total hip replacements, which I've found to be extremely demanding in terms of soft tissue management. I prefer to avoid such complexities.

> In some institutions, they remove the implant and proceed with a two-stage procedure within a span of three to four weeks. In such scenarios, there might not be a need for a spacer. However, given our setup and organization, we're not able to proceed in that manner. So, we use a spacer in all our cases to avoid complications such as shortening. The spacer also helps in locally delivering antibiotics.

> There's extensive literature on the topic, but that's not my primary concern. The crucial issue for me is the complexity of transitioning from a Girdlestone situation back to a total hip reconstruction. That's a very demanding process which I'd prefer to avoid.

What's your perspective on technology in hip surgery? I'm referring to things like robotics or navigation, which aren't currently very popular, or perhaps they are making a comeback?

> Well, technology is indeed making a comeback in hip surgery. However, in all honesty, the most valuable aspect of this technology, in its current state, might be for the surgeon's understanding of the procedure and for training purposes. I question the actual benefits of technology like

> navigation boxes, at least in hip surgery, as opposed to knee surgery. There's a lot of data suggesting better positioning with these technologies, but we don't see a clear-cut clinical advantage yet. That being said, robots are collecting substantial amounts of valuable data, and some companies are marketing this fact very effectively.

> However, what's most important in hip surgery? It's reliable primary fixation, accurate surgical execution, and effective patient treatment. The question is whether these robotic technologies can aid in achieving these objectives without incurring additional costs and time. As of now, I'm not fully convinced.

What about the surgical approach? What's your stance on that?

> That's an excellent question. In essence, the best surgical approach is the one that you are familiar with and one that allows you to use implants that have been proven to work well over time, have strong long-term results, and offer good primary fixation. The approach should respect the soft tissues, and in the event of a complication, it should be manageable with ease.

> However, there's a significant issue regarding the marketing of these approaches. I often tell participants at workshops not to use a surgical approach as a marketing tool with their patients. It's essential to be honest with them. For instance, it's not a good approach if it results in the destruction of the AB muscles and I'm unable to reattach them. A good surgical approach is one that respects the AB muscles and adequately restores the biomechanics of the hip, including the ability to manage complications if they arise.

> Also, the risk of a periprosthetic fracture needs proper management if it occurs, regardless of the approach used. Personally, I believe that the future will mainly involve two approaches: anterior and posterior, with the addition of anterolateral when properly respected.

> The type of approach also depends on whether you handle routine, easy cases, or if you manage a significant number of revisions and complex cases. If you fall into the latter category, you might prefer some approaches over others.

Let's shift gears and discuss what you do when you're not working. You mentioned earlier that your wife often says you're always at work. Is that accurate?

> Yes, it's absolutely true. Like many orthopaedic surgeons, I'm immensely passionate about my work, which does consume a significant amount of my time. Additionally, I have a large family – eight kids, in fact. This leaves me with little time for hobbies.

> My life is incredibly busy with work. To give you an idea, I seldom arrive home earlier than 10 PM. On days we perform surgeries, we often don't wrap up until around 8 or 8:30 PM. After that, we check on our patients, so it's quite late by the time I get back home. Consultation days are similar, often ending around 9 or 10 PM. Especially in the post-COVID era, my schedule has become even more demanding. I typically work on Saturdays as well. When not working, I travel around Europe and the globe, participating in numerous courses, congresses, and other professional events.

> During the weekends, I'm still engrossed with duties related to patients, administrative tasks, and organizing congresses. It's a truly busy period. However, when I do manage to carve out some spare time, it's dedicated to my family – to my children and my wife.

And as a final question, if a young orthopaedic surgeon from Europe, Italy perhaps, approaches you for advice on how to build a successful career and be a proficient doctor, a skilled surgeon – what crucial points would you recommend they bear in mind?

> Firstly, intellectual honesty is paramount. It's important to be honest with your results and maintain objectivity. Always compare your work with others; never isolate yourself.

> Secondly, prioritize developing your skills and personal growth over financial gain. If you commit to being a good surgeon and continually learning, financial success will naturally follow. It doesn't work the other way around – you can certainly make a lot of money without being a skilled surgeon, but that's regrettable.

> Surround yourself with individuals who can teach you, not just surgical skills or techniques, but also a methodical approach to surgery. Learn how to evaluate a patient thoroughly, how to study radiographs, CT scans, or other tests, and how to plan a surgery meticulously. I, for instance, still plan all my surgeries personally and when I undertake a revision, I insist on inspecting all individual pieces of the previous implant alone. So seek mentors who have a systematic approach to their work, are self-critical of their results, and are candid with their patients.And of course, money should come second in this profession. Also, it's vital to set aside some time in your career for research. Clinical research and reading papers play a crucial role in shaping your mind and thought process. Always make time for that.