MENTORS IN ORTHOPEDICS

ENRIQUE GÓMEZ BARRENA

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SUMMARY

Enrique Gómez Barrena's trajectory reflects a commitment to integrating anatomical precision with international collaboration. Influenced by his father's academic background in Zaragoza, he transitioned from a Madrid residency to a fellowship at the Hospital for Special Surgery. His expertise spans complex joint reconstruction and regenerative medicine, bridging mechanical and biological solutions. As President of EFORT, he advocates for European standardization and evidence-based practice, ensuring the specialty evolves to meet the clinical demands of an aging population.

In this issue, we interview Enrique Barrena, a preeminent figure in Spanish orthopaedics. Enrique shares insights into his career, which was influenced early on by his father, an orthopaedic surgeon himself. His dedication to fostering European dialogue within the profession ultimately led him to the presidency of EFORT. Get to know a man defined by his openness to both people and ideas.

What is your background? Where were you born and raised?

> Enrique Gómez Barrena (E.G.B.): I was born in Zaragoza, a city in the North-East of Spain with a history that spans over 2000 years and a traditional Medical School University that's over 500 years old. My father, an orthopaedic surgeon and a professor of anatomy, had a paramount influence on my trajectory. His open-mindedness and his own partial training in Germany instilled in me a sense of European collaboration. This value was further reinforced when I was sent to France during part of my secondary education.

How would you describe your medical education and residency experience?

> My medical school was highly competitive at that time and held a strong position in the national exam, which is a requirement in Spain to gain access to and select residency programs. This advantage facilitated my acceptance into the most competitive orthopaedic and traumatology residency program in Spain at Hospital La Paz in Madrid. I devoted five intensive years to study and hard work there, during which I concurrently pursued a PhD program in Anatomy.

What inspired you to pursue a career in orthopaedic surgery?

> Naturally, my father's influence played a significant role, but I was also drawn by the tangible benefits this type of surgery can bring to patients. While life-and-death situations are not common in orthopaedic surgery, I find immense satisfaction in helping patients alleviate pain, regain function, and restore activity in their lives, often leading to regained independence. These are aspects that society often takes for granted, which wasn't always the case. Their importance is fully understood only by those who are experiencing pain and disability.

Can you describe your surgical training experience and any fellowships you may have completed (such as at HSS)?

> My surgical training as an Orthopaedic and Trauma surgeon was completed in Madrid. However, during the 90s, the influence of North American surgeons and their techniques was profound. Like many young surgeons of my generation, I felt a strong need to be part of this wave. Renowned surgeons from leading American institutions, such as the Hospital for Special Surgery (HSS) in New York, were greatly respected and their lectures at congresses and courses throughout Europe were highly sought after. Books and journal papers from these leaders captivated young orthopaedic surgeons like myself. Dr. Eduardo Salvati was one of the visiting leaders whose experience, insight, and clarity sparked my interest in HSS. I first visited in 1992 and was accepted for a fellowship in the Hip and Knee service in 1994.

> HSS broadened my perspective of the specialty, addressing both the academic and technical aspects of orthopaedic surgery. It was a privilege and an incredible opportunity to participate in surgeries alongside Dr. Salvati and other members of the Hip service such as Dr. Pellicci and Dr. Padgett, the Knee service with Dr. Windsor and Dr. Laskin, and the Arthritis service with Dr. Sculco. These giants of orthopaedic surgery served as mentors and role models, shaping my career.

> Another significant aspect of my training was the reinforcement of a fundamental concept: every surgical technique and advancement requires enormous multidisciplinary research efforts. I had the opportunity to get involved with the Biomechanics and Biomaterials Department at HSS, where I met basic science leaders like Dr. Wright, Dr. Rimnac, and Dr. Li. They guided my understanding of polyethylene quality and degradation, retrieved implant research, and most importantly, emphasized the significance of a basic experimental approach in surgery, a principle I had sensed in Madrid during my residency and PhD program. These principles need to be firmly established as early as possible in every orthopaedic surgeon's career.

> I believe I have upheld these principles throughout my career, and I was honored to be nominated and awarded the 2022 Pier Giorgio Marchetti, MD, Award for International Achievement at HSS. Established in 2010 to honor another European surgeon, this award recognizes outstanding lifetime achievement in orthopaedic surgery by an international fellow who trained at HSS. Previous recipients include significant international surgeons such as Dr. Bas Masri from Vancouver, among many others.

Who were your mentors or key opinion leaders (KOLs) in Spain during your training?

> My principal mentor in Spain was Prof. Luis Munuera at La Paz Hospital. He was not only an exquisite individual and a prominent surgeon with a keen interest in the scientific foundations of orthopaedic surgery and traumatology, but he also made significant contributions to the field.

> Since the 70s, he's contributed to the understanding of meniscus structure, participated in hip outcome studies, knee implant designs (notably, the Howmedica Interax), and, of particular interest, he was one of the founding fathers of EFORT in the Marentino group, serving as the president of the Spanish society SECOT at the time.

> Other eminent surgeons and anatomists in Spain, including my father, Prof. JM Gómez Beltrán, also provided invaluable guidance during my training. While I'm sure I may overlook some names, I am profoundly grateful to each of them for their contributions and the advancements they spearheaded in Spanish Orthopaedic and Trauma surgery during the 80s and 90s.

Where do you work and what are the specificities of your institution and work environment?

> After working at various institutions across Spain, I am currently a full Professor of Orthopaedic Surgery and Traumatology at La Paz University Hospital, affiliated with the Universidad Autónoma de Madrid. This is a leading tertiary hospital with 1,200 beds and a 44-surgeon Orthopaedics Department, which ranks first in all reputation indices among Spanish hospitals and Orthopaedic Departments. It also holds a strong position in global rankings. In 2022, our department was ranked 19th in Orthopaedics worldwide, 6th in Europe, according to Newsweek's Best Specialized Hospitals, with HSS maintaining the number one spot. As such, this highly esteemed institution carries significant pressure, but it also provides the backing of a well-regarded university and a competitive research institute.

What are your surgical and research interests and fields of expertise?

> My expertise lies in total joint replacement, specifically focusing on the hip and knee. My trajectory in hip reconstruction led me to knee reconstruction, and today, most of my work is related to complex and revision knee surgery. While surgical technique is unquestionably vital for providing optimal care in this and other areas of orthopaedic surgery, a deep understanding of material science, biomechanics, and biology is equally critical to support expertise, research, and progress within the profession.

> In addition, I have conducted significant basic and clinical research in the field of regenerative medicine. I've served as a work package leader in the EU-FP7 REBORNE project and as a coordinator in the EU-H2020 ORTHOUNION project. I believe that surgeons should strive to master both biological and mechanical orthopaedic techniques.

Are you interested in emerging technologies in the field of orthopaedic surgery?

> Orthopaedic surgery is a rapidly evolving field. With growing demands from patients and society at large for efficiency and effectiveness, there is a call for both refining our existing treatments and developing new ones. None of this can be achieved without intensive research. Robotics and potentially new implants may be part of this evolution.

> On another front, we have been struggling for two decades to develop universal therapies that promote tissue regeneration, potentially allowing us to complete the human life cycle in better condition, maintaining independence and function until the end. Both these aspects stimulate interest in the latest technologies aimed at achieving these goals, both on the biological and mechanical fronts.

> Looking ahead, I believe it's essential for us not just to focus on implants and hardware but also to pay more attention to joint-preserving or regenerative biological techniques. Having an open

mind towards these methods will likely aid our evolution as practitioners. While it's true that implant technologies will continue to improve, we shouldn't overlook the potential of biological techniques, particularly those related to reconstruction, which have been somewhat neglected or underutilized. This may well change in the future, especially as more advanced and well-defined procedures are developed, attracting commercial support and development. We're already seeing increasing interest in these areas. As surgeons, it's imperative that we stay informed and develop proficiency in the appropriate indications and techniques. This is particularly relevant in the field of regenerative medicine. We simply can't afford to ignore this aspect, given the increasing complexity of future medical challenges and the absence of a one-size-fits-all solution. The demand is rising from less affected patients who might benefit more from biological solutions.

While these techniques may be considered new, they've actually been in development for some time, and development often takes longer than expected. Nevertheless, these techniques need to be within the orthopedic surgeon's purview as well. We need to keep pace with the evidence emerging from these new techniques to provide the best care for our patients.

20 years ago, we were already discussing regenerative techniques such as cartilage repair and grafting. Yet, 20 years later, we're still having the same conversation without significant advancements in market products. Do you believe we are now entering a new era where these regenerative techniques will become viable solutions for our patients?

I've been engaged in both clinical and basic research in regenerative medicine for two decades. Initially, we thought it would be a panacea, but we now understand the need for careful application. In France, there has been considerable development in bone marrow concentration techniques, which have proven useful despite the lack of clinical trials. Several colleagues have attempted to conduct clinical trials in this area, but they've encountered significant obstacles.

The regulatory challenges are certainly more defined in this field. However, we seem to be moving towards more allogenic solutions. We've primarily focused on autologous solutions based on hospital exception, which, while beneficial, have proven to be costly and difficult to manage. The market is likely to shift towards more allogenic solutions offering different options. We began with one of the most challenging areas - cartilage - which likely won't see a resolution in the short term. My work has been more focused on bone regeneration, which is somewhat easier to manage.

The more evidence we amass supporting these techniques, and the clearer the regulatory pathway becomes, the more solutions we'll see. I believe there's significant potential for these techniques. However, trying to cure osteoarthritis with new cartilage, for instance, doesn't make sense from a pathophysiological perspective. It's a concept we're still struggling with. Remember, it took over 50 years to establish the basis for arthroplasty. The appropriate indications, designs and solutions came to the market after a long struggle with different techniques that were not ideal.

Biology is even more complex than biomechanics and biomaterial science. Yet, as patients get younger, the demand for biological solutions will likely increase, leading to more focused efforts in this field. However, until we establish a clear efficacy and commercial model, progress will be slow.

The regulatory emphasis has been on safety, which is now well-established. We're all convinced there's minimal risk in using regenerative methods involving cells expanded or manipulated outside of the operating room. The concept has significantly evolved, but we still need more

evidence of efficacy. There's a great deal of ongoing research in this area. As long as we have proof of efficacy and a sustainable commercial model, solutions will arise. I believe regulatory restrictions won't be the limiting factor, as there's increasing confidence in the safety of using human-origin cells under Good Manufacturing Practice conditions.

Which scientific societies are you involved in at the national level?

Since my residency in 1988, I've been involved with the Spanish National Society of Orthopaedics and Traumatology (SECOT), serving in various roles. These include Chair of the Spanish EBOT exam since 2016 and co-President of the Scientific Committee at the 2019 National Congress in Zaragoza. I've also participated in the Spanish Hip Society (SECCA), where I'm set to co-preside over the 2023 National Congress in Toledo, and have been involved with the Spanish Knee Society (SEROD) since 1992.
National scientific societies play a fundamental role in our national development and international collaboration. In recognition of my contributions, I was honored to be named a "Membre d'Honneur" at SOFCOT in 2019, with Pr. Philippe Rosset serving as President. This reinforces strong national and European relationships among societies.

Could you elaborate on the roles of these different Spanish national societies?

Absolutely. One could say that we have a significant national society in Spain, akin to SOFCOT. The majority of orthopedic surgeons in the country belong to this society, known as the Spanish Orthopedic and Trauma Society, or SECOT. This society includes associate members, who are residents, and upgrades them to full membership status once they become specialists. Additionally, we have a collaborative relationship with subspecialty societies. While not officially part of SECOT, these societies collaborate with us, contributing to some sessions in the program, much like EFORT or other large societies. At its core, SECOT is the primary organization.

SECOT holds an annual meeting that usually spans three days. The location is decided by the General Assembly. Historically, it used to be held in major cities such as Madrid or Barcelona. However, the venue has since expanded to include other, more appealing cities. While these locations may be less well-structured, the change in scenery adds a level of appeal for the attendees. Currently, the location is selected by election, and we prefer changing the city to enhance its attractiveness to attendees.

In France, orthopedic surgeons are required to attend at least a portion of the annual meeting in order to maintain or renew their accreditation. Does Spain have similar regulations?

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?

Actually, participation is entirely voluntary in Spain. We do have a Continuing Medical Education (CME) system, but it serves more as an informational resource than a binding regulation. We're not obligated to present a CME accreditation to maintain our standing in the regulatory system. It's not compulsory. However, the national meeting is highly valued, especially by residents, because it offers them an opportunity to present their work. It's always easier for them to present

in Spanish rather than English or any other language at an international congress. They typically aim to present as much as possible. Sometimes, we even need to limit the number of submissions due to an overabundance of case-oriented reports or submissions of inferior quality. Reviewers may need to be stringent to ensure quality. The submissions primarily come from residents. Senior surgeons usually give lectures and some of us also contribute free papers. But, essentially, it's a well-accepted method for residents to present their work.

Which international scientific societies are you involved in ?

The more you progress in this profession, the more you realize that serving the community is a duty. Over the past 30 years, international collaboration in Europe has fostered the growth of European societies and organizations, extending our national networks and resources to a European level, from basic research to clinical development.

This realization led me to become a part of the European Orthopaedic Research Society (EORS), where I served as President in 2011. EORS, in collaboration with the American ORS and other ORSs worldwide, helped to establish the International Combined Orthopaedic Research Societies (ICORS). ICORS hosts a triannual congress worldwide, and I had the honor of signing its charter as EORS President in 2013 in Venice, Italy, during a congress organized by EORS under my presidency.

My second area of commitment has been in the field of hip and knee surgery, specifically within the European Hip Society (EHS) and the European Society of Sports Traumatology, Knee Surgery and Arthroscopy (ESSKA). At ESSKA, I am honored to serve as a member of the Basic Science Task Force, a member of the Education Committee, and a Board Member of the Section EKA (European Knee Associates).

A third and major commitment, which I am particularly proud of, is my role in the European Federation of National Societies of Orthopaedics and Traumatology (EFORT), where I am currently serving as President for 2022-23. It goes without saying that large organizations like EFORT, similar to AAOS in Europe, can function well independently due to the support of many surgeons. However, the responsibility to adequately guide the organization is certainly heavy. In the case of EFORT, 41 national societies and more than 45,000 European surgeons are involved in strengthening the network of orthopaedic and trauma surgeons across Europe, and reinforcing ties with surgeons in other parts of the world.

How long have you been involved in EFORT?

I first attended the EFORT Congress in 1993 in Paris, where I quickly realized that a common platform for European Orthopaedics and Traumatology specialists was a project deserving of full attention and support. Since then, Europe has reached many milestones, including the constitutional treaties and the introduction of the Euro.

In 2013, I was nominated as the Chair of the Basic Research Task Force and became a member of the Executive Committee. I was elected to the Board in 2017, and also served as the Chair of the Education Committee. I became the 2nd Vice President in 2020 during a memorable virtual General Assembly we held amidst the pandemic, a time of great uncertainty.

> In EFORT, the presidential line consists of one year as the 2nd Vice President, followed by a year as the 1st Vice President, and finally, a term as President. I assumed the presidency at the Lisbon Congress in 2022 and will serve until the Vienna Congress in 2023.

How does EFORT play a significant role in promoting education, regulation, quality of care, and networking for the orthopaedic European community?

> EFORT's strategy is based on four pillars: Education, European Health Policy, Safe Clinical Practice, and Research and Innovation. Education involves meeting the modern educational needs of patients, healthcare professionals, and society. European Health Policy involves becoming the platform and voice for discussion and promotion of affairs related to Orthopaedics and Traumatology in Europe. Safe Clinical Practice promotes evidence-based patient care based on sound and available data through the sharing of ideas on best clinical practices. Lastly, Research and Innovation involves facilitating and disseminating work in the field of basic and translational clinical research. These principles help guide activities and offer significant opportunities for European surgeons to contribute to these common efforts on behalf of our patients and our profession.

Could you tell us more about the EBOT exam ?

> Among the activities developed by EFORT to support standardization, sustainability, and the training requirements in the Orthopaedics and Traumatology (O&T) specialty is the European Board of Orthopaedics and Traumatology (EBOT) exam, in partnership with UEMS. UEMS initially developed this EBOT exam in 2001, first administered at the EFORT Congress in Rhodes. Since then, more than 1,200 residents sit each year for an interim exam sponsored by UEMS and EFORT. This facilitates understanding for residents and Departments about their training performance compared with other residents across Europe. A final written exam provides a certification of accomplishment. After passing this final written exam, a final oral exam awards the fellowship of EBOT to successful candidates. While this final oral exam is rapidly evolving to be delivered by the National associations to their residents in their national language, the centralized standards and robust methodology will help European residents confirm their qualification in a way non-European or other potential candidates may have to achieve before practicing in Europe. This offers a tool to Member states and authorities to further address the regulation of the European workforce in O&T.

As the current president of EFORT, what is your vision for the future of EFORT?

> EFORT is undeniably required as a common platform to collectively address the European problems related to an aging population, an aging workforce with variable geographic distribution, increasing demand amidst decreasing resources, challenges in standardization, variability in practice opportunities and guidelines, and increased pressure from regulatory authorities and implant manufacturers. Further, complex situations related to European regulations, among many other hot topics, potentially have a serious impact on our patient-surgeon relationship and professional development. These and other issues commonly affect all European countries, and no single country can successfully address these challenges without collaboration and shared strategies. This can only be achieved within a large organization that associates all national societies to strengthen European networks, strategies, and the distribution of educational, research, and policy-related information, as well as joint actions. My vision for the future is that EFORT is needed in the European Orthopaedics and Traumatology scenario, and

> therefore, all European Orthopaedics and Traumatology specialists will contribute to our common future.

What are your hobbies and interests outside of work?

> Time outside of surgery, teaching, and research in orthopedics is certainly scarce. The fact that time for family, friends, and hobbies is so limited makes it all the more precious. With my wife and two sons (now in engineering schools), I still enjoy outdoor activities (mountain trekking, skiing), travelling, visiting museums, etc. Whenever possible, cherishing every opportunity to be together is the best reward for any amount of work.