

# Surgical training for resident physicians: a life-saving necessity.

## Formación quirúrgica de los médicos internos residente: una necesidad que salva vidas.

José Felipe Reoyo Pascual, Raquel León Miranda, Nerea Muñoz Plaza, Maria Jose Cardo Díez, Evelio Alonso Alonso, Rosa Maria Martínez Castro, Luciano Ferrando, Mar Viana Miguel, Esther García-Plata Polo

Department of General and Digestive Surgery, University Hospital of Burgos. Avda. Islas Baleares 3. 09006 Burgos, Spain

\* Correspondence: [jreyo@saludcastillayleon.es](mailto:jreyo@saludcastillayleon.es)

Received: 25/3/26; Accepted: 17/4/26; Published: 20/4/26

### Summary.

The Bachelor's Degree in Medicine is one of the most theoretically and practically demanding programs offered by our universities. It includes various subjects designed to cover the surgical theory of the different specialties, as well as complementary practical training. However, graduates often perceive a need for more practical surgical training focused on real-world clinical practice. In this context, the design of a postgraduate training structure to complement the theoretical knowledge acquired during the undergraduate degree is justified. The objective of this training proposal is twofold: firstly, to provide all medical trainees entering clinical practice with basic theoretical and practical knowledge; and secondly, to offer practical courses for resident physicians in surgical specialties, enabling them to develop skills specific to their discipline using experimental models before applying them in real clinical practice. To this end, a training program structured in two levels—basic and advanced—is proposed. The basic level is further divided into a theoretical component—consisting of a rapid orientation course for urgent surgical patients—and a practical component—centered on a suturing workshop. The advanced level includes general training aimed at all surgical specialties, as well as specific training focused on developing skills specific to each specialty. The results obtained from student satisfaction surveys show scores above 9 out of 10 in various evaluated aspects, confirming the usefulness of the training program. In conclusion, both the basic training, aimed at all physicians in training, and the advanced level, aimed at surgical specialties, will contribute to providing future specialists with more comprehensive training. Regardless of their specialty, they will have the necessary theoretical and practical knowledge to make suspected diagnoses and apply therapeutic procedures that improve patient prognosis.

**Keywords:** training, teaching, surgery, students, residents

### Resumen.

El Grado en Medicina constituye uno de los programas formativos con mayor carga teórico-práctica dentro de la oferta de nuestras universidades. En él se incluyen diversas asignaturas destinadas a abordar la teoría quirúrgica de las distintas especialidades, así como prácticas complementarias. Sin embargo, es frecuente que los egresados perciban la necesidad de una formación quirúrgica básica más orientada a la práctica clínica real. En este contexto, resulta justificado el diseño de una estructura formativa a nivel de posgrado que complemente los conocimientos teóricos adquiridos durante el grado. El objetivo de esta propuesta formativa es doble: por un lado, proporcionar a todos los médicos en formación que se incorporan a la actividad asistencial unos conocimientos teórico-prácticos básicos; por otro, ofrecer cursos prácticos dirigidos a médicos internos residentes de especialidades quirúrgicas, que les permitan desarrollar habilidades propias de su disciplina en modelos experimentales, previamente a su aplicación en la práctica clínica real. Para ello, se propone un programa de formación estructurado en dos niveles: básico y avanzado. El nivel básico

se divide, a su vez, en un componente teórico —consistente en un curso de orientación rápida del paciente quirúrgico urgente— y un componente práctico —centrado en un taller de suturas—. El nivel avanzado contempla una formación general dirigida a todas las especialidades quirúrgicas, así como una formación específica orientada al desarrollo de habilidades propias de cada especialidad. Los resultados obtenidos a partir de las encuestas de satisfacción de los alumnos muestran puntuaciones superiores a 9 sobre 10 en distintos aspectos evaluados, lo que confirma la utilidad de la propuesta formativa. En conclusión, tanto la formación básica, orientada a todos los médicos en formación, como el nivel avanzado, dirigido a especialidades quirúrgicas, contribuirán a que los futuros especialistas dispongan de una formación más completa. Independientemente de su especialidad, contarán con los conocimientos teóricos y prácticos necesarios para realizar diagnósticos de sospecha y aplicar maniobras terapéuticas que mejoren el pronóstico de los pacientes.

**Palabras clave:** formación, docencia, cirugía, estudiantes, residentes

During the six years of the Bachelor of Medicine program, various subjects are taught focusing on the surgical theory of the different specialties, as well as complementary practical training. However, recent graduates frequently report a lack of practical training applicable to the start of their clinical activity during their specialization period. This perception, although it may seem subjective, constitutes a persistent concern that has not been resolved over time. In fact, there are numerous publications that address this problem, although they usually focus on specific specialties or pathologies, such as emergency surgery or cataract surgery (1–2).

This limitation is particularly relevant in the field of general surgical pathology, which represents a significant percentage of hospital activity. Likewise, even in specialties traditionally considered “medical,” such as Pediatrics or Psychiatry, surgical knowledge is largely restricted to that acquired during undergraduate studies, which is often insufficient or of limited applicability in real-world clinical practice. Consequently, the identification of this need justifies the design of a postgraduate training structure to complement the theoretical education received.

The objective of this training program is twofold:

1. To provide all medical trainees joining the healthcare activity with basic theoretical and practical knowledge that will allow them to adequately address the surgical problems that may arise in their clinical practice.
2. To offer resident physicians in surgical specialties specific practical training that facilitates the development of skills specific to their discipline in experimental models, prior to their application in real patients.

To this end, a program structured in two levels is proposed: basic and advanced. The basic level is divided into a theoretical component—a rapid orientation course for the urgent surgical patient—and a practical component—a suturing workshop. The advanced level, in turn, includes general training aimed at all surgical specialties and specific training focused on developing skills specific to each specialty.

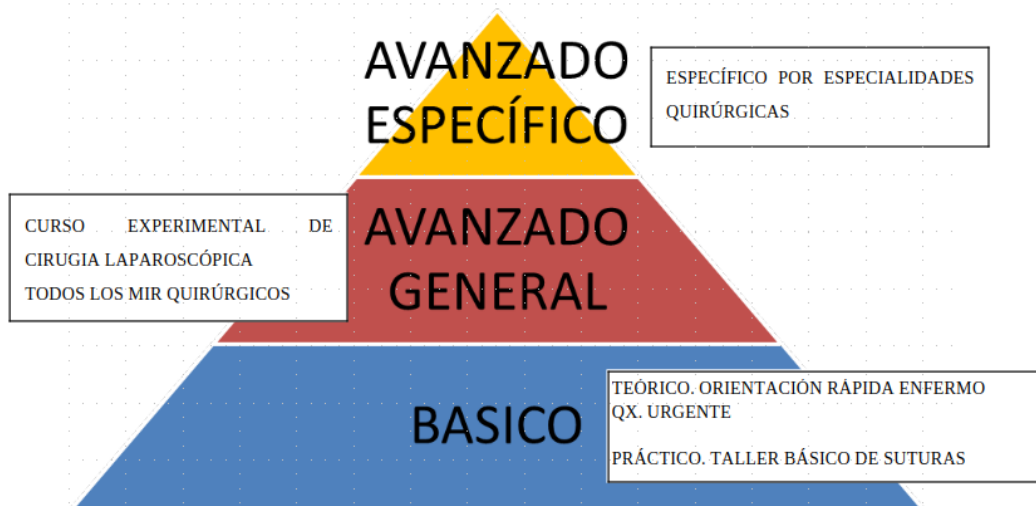
With the aim of serving as a model for other centers, the teaching plan implemented in our hospital since 2012 is presented, aimed at doctors in training (MIR) and structured in the two levels described (figure 1).

## 1. Basic level

### 1.1. Theoretical component

The theoretical component of the basic level is developed through the course "Rapid Orientation of the Urgent Surgical Patient," which has been offered continuously for over ten years. This course, structured in three four-hour sessions, reviews the main urgent surgical pathologies that can be treated by any physician in training, regardless of their specialty. This training is especially relevant during the first year of residency, when physicians perform on-call shifts in emergency departments.

The topics covered include urgent hernia pathology, wound infections, intestinal obstruction, urgent biliary pathology, gastrointestinal bleeding, urgent anal pathology, acute abdomen, abdominal sepsis, and polytrauma, among others. Teaching is complemented by clinical cases that facilitate the integration of knowledge. Student satisfaction is high, and the evaluation using multiple-choice tests reflects a high level of achievement, with an average grade of 7/10. This course is mandatory during the first semester of the first year of residency and has been completed by 387 resident physicians.



**Figura 1.** Esquema de formación quirúrgica ofrecida a los médicos internos residentes del Hospital

### 1.2. Practical component

The practical component of the basic level consists of a four-hour surgical suturing workshop, also mandatory and held during the first semester of the first year of residency. This workshop uses various models (synthetic and biological materials, such as porcine tissue) to teach suturing techniques.

The course content includes instrument handling, different types of sutures (continuous and interrupted), and manual and instrumental knot-tying techniques, with particular emphasis on the latter due to its greater accessibility for non-surgical specialties. This course, offered for over a decade, has trained more than 200 students and boasts high levels of satisfaction.

## 2. Advanced level

The advanced level is primarily aimed at surgical specialties, such as General Surgery, Gynecology, Pediatric Surgery, and Urology, among others. Its objective is the acquisition of skills directly related to real-world clinical practice.

### 2.1. General component

The course entitled “Experimental Course in Laparoscopic Surgery,” offered since 2012, forms the core of the general advanced level. Lasting 12 to 16 hours, it includes theoretical and practical training in laparoscopic suturing using simulators (trainer and virtual reality), as well as practical exercises in basic surgery (intestinal resections, cholecystectomy) and more complex procedures (funduplications, anastomoses, nephrectomies) using a porcine animal model. This course boasts high levels of student satisfaction and is conducted in small groups, preferably during the first years of residency, to optimize the quality of instruction.

### 2.2. Specific component

The specialized advanced level, currently under development, aims to provide theoretical and practical training tailored to each specialty (general surgery, urology, pediatric surgery, etc.), focused on the diagnostic and therapeutic resolution of specific pathologies. This level is designed for the final years of residency, fostering the acquisition of advanced skills. The advanced level is essential to ensure that physicians in training acquire skills and knowledge before applying them to real patients, thus facilitating a safer and more efficient learning curve. It is worth noting that the activities performed with animal models have been approved by the center's Research Ethics Committee for Medicinal Products, as well as supervised by qualified animal welfare personnel and authorized by the relevant authorities.

The overall evaluation of the program, through satisfaction surveys, reflects very high scores, with an average of 9.75/10 in the last edition, both in training and organizational aspects.

As noted, there is a real need for basic surgical training among physicians in training, regardless of their specialty. Acquiring this knowledge improves their diagnostic and therapeutic approach to surgical pathologies, reducing potential clinical consequences arising from training deficiencies, such as patient safety, inappropriate referrals, diagnostic delays, therapeutic errors, or inefficient use of resources (3–5).

Therefore, the implementation of a structured theoretical-practical training program, with a universal basic level and a specific advanced level, can significantly contribute to improving the quality of care and the prognosis of patients.

The program presented has proven to be feasible and sustainable, with over ten years of implementation, although it requires adequate coordination between teaching and clinical services, as well as specific human and material resources. Furthermore, the development of training using animal models demands appropriate infrastructure and compliance with current ethical regulations.

In conclusion, integrating a structured training program with basic and advanced levels significantly improves the training of physicians in training. Regardless of their specialty, future specialists will acquire theoretical and practical skills that will facilitate early diagnosis and the application of appropriate therapeutic measures, thus contributing to improved patient prognosis. This model is transferable to other healthcare centers interested in optimizing the surgical training of their residents.

**Funding:** There has been no funding.

**Declaration of conflict of interest:** The authors declare that they have no conflict of interest.

**Authors' contributions:** JFRP performed the work as a whole, RLM searched for literature, NM and MJC wrote the article, LF made the figure, EA and MV supervised the article, RMC reviewed the final version.

## References.

1. Shebrain S, Coster S, Alfred A, De Cecco D, Khalil S, Munene G, Elian A, Timmons J, Sawyer RG. Resident Autonomy and Performance Independence in Surgical Training Are Time- and Skill-Dependent. *J Surg Res.* **2022**, 279, 285-295. <https://doi.org/10.1016/j.jss.2022.06.027>
2. Sinha S, Nishant P, Morya AK. Integrated approach for cataract surgical training and objective assessment of resident surgeons. *Indian J Ophthalmol.* **2024**, 72(1), 135-136. [https://doi.org/10.4103/IJO.IJO\\_1664\\_23](https://doi.org/10.4103/IJO.IJO_1664_23)
3. Miguelena JM, Landa JI, Jover JM, Docobo F, Morales D, Serra X, et al. Training in general and digestive surgery: new program, same challenges. *Cir Esp.* **2008**, 84, 67-70. <https://www.elsevier.es/es-revista-cirugia-espanola-36-articulo-formacion-cirugia-general-del-aparato-13124938>
4. Montalva EM, Sabater L, Munoz E, Sanchez AM, Vazquez A, Lopez A. Are the general and digestive surgery services prepared to offer quality teaching in accordance with the new training plans? *Cir Esp.* **2009**, 86, 230-41. <https://www.elsevier.es/es-revista-cirugia-espanola-36-articulo-estan-servicios-cirugia-general-del-S0009739X09002930>
5. Reoyo-Pascual JF, León-Miranda R, García-Plata Polo E, Martínez-Castro RM, Alonso-Alonso E, Cardo-Díez MJ, et al. Laparoscopic training in experimental animals in Castilla y León: pre- and post-pandemic experience of the University Hospital of Burgos. *FEM.* **2023**, 26, 227-8. <https://scielo.isciii.es/pdf/fem/v26n5/2014-9832-fem-26-5-227.pdf>



© 2026 University of Murcia. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 Spain License (CC BY-NC-ND). (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).