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Society of European Robotic Gynaecological Surgery
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THE CONSOLE

SERGS Publication

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Message from the Editor-in-Chief

Dear SERGS members and SERGS friends,

With great pleasure, we present this new issue of The Console, the official journal of SERGS—a publication that continues to reflect the innovation, collaboration, and academic excellence of our international community.

In this edition, we are proud to feature a collection of contributions from distinguished colleagues, each offering valuable insights into the evolving landscape of robotic gynaecological surgery.

The first article introduces our new series: Women in Robotic Surgery. **Marielle Nobbenhuis, a robotic gynaecological oncologist at the Royal Marsden,** reflects on her career journey, the evolution of robotic surgery, and the progress made for women in surgery. She highlights the importance of mentorship and emphasises that it is possible to build a successful surgical career alongside a fulfilling family life.

In the Mentor's Corner, **Jordi Ponce shares the wisdom gained from 16 years of experience with robotic surgery.** His reflections provide not only technical perspective but also a deeper understanding of mentorship and surgical evolution.

Education remains a cornerstone of SERGS, and **Simone Bruni introduces the development of the Video Portal,** a forward-looking initiative designed to enhance learning and accessibility for SERGS members worldwide. This platform represents an important step toward structured, high-quality digital education.

In our Corners of the World section, **Rooma Sinha, president of ASGRS, shares a compelling vision for global collaboration.** Her contribution highlights the importance of building bridges between societies and fostering partnerships that extend the reach of robotic surgery to every corner of the world.

Scientific advancement is further explored through the contribution of **Sergi Fernández-Gonzalez**, who presents his perspective as **principal author of the YEARS study**, offering

critical insights into its implications for clinical practice. Complementing this, **Victoria Psomiadou provides a comprehensive update on the most important publications of the past six months,** ensuring that our readers remain at the forefront of current evidence.

Finally, **Tommaso Simoncini** addresses **one of the key challenges in pelvic reconstructive surgery by presenting alternatives to robotic sacrocolpopexy for apical pelvic prolapse.** His work stimulates thoughtful discussion on technique selection and individualised patient care.

Together, these contributions exemplify the diversity, depth, and forward-thinking spirit of the SERGS community.

As we look ahead, **we are delighted to welcome all members of the SERGS family, as well as our friends and collaborators, to the upcoming SERGS 2026 Annual Meeting in Stockholm.** This gathering promises to be an inspiring event where knowledge, innovation, and collegiality converge. It is an opportunity not only to exchange ideas but also to strengthen the bonds that define our society.

SERGS is more than a professional organisation—it is a global network united by shared values, scientific curiosity, and a commitment to advancing women's health through robotic surgery. As we come together in Stockholm, we continue to shape the future of our field.

On behalf of the editorial team, I extend my sincere gratitude to all authors and contributors whose work makes this journal possible.

We look forward to welcoming you in Stockholm.

With warm regards,

Christos Iavazzo

Editor, *'The Console'*

SERGS

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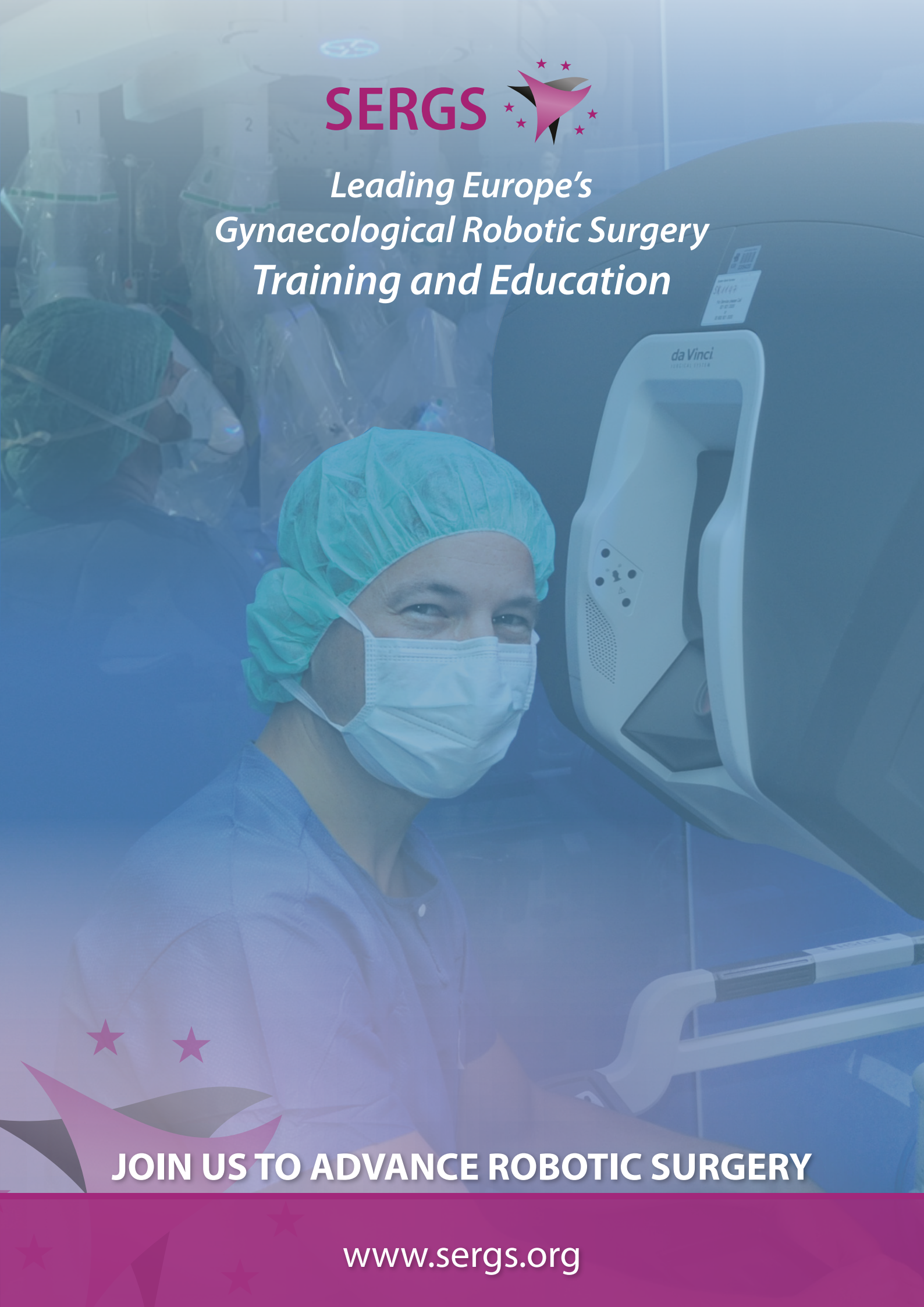
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Women in Robotic Surgery

Interview with Marielle Nobbenhuis,UK

Interviewer: To begin, could you introduce yourself?

Dr. Nobbenhuis: I am a gynaecological oncologist and robotic surgeon. I'm originally from the Netherlands, where I completed my training in obstetrics and gynaecology. I then moved to London to undertake a subspecialty fellowship in gynaecological oncology. Although I initially planned to return to the Netherlands, I stayed in the UK and have been working at the Royal Marsden since 2008.

My first day there was quite memorable. We were assisting in a major surgery when a fire alarm went off. There was an actual fire in the hospital, and we had to stop the operation, evacuate the patient on a mattress, and navigate the building, which I didn't yet know. It was a dramatic introduction.

At that time, the robotic surgery programme had just begun, but the fire interrupted its progress. We restarted it in 2011, by which point I was a consultant. I trained in robotics, became certified in 2013, and later became a proctor in 2015—likely one of the first female robotic proctors in Europe.

Today, about half of my surgical work is robotic, and the rest is open surgery. I also serve as head of surgery at the Royal Marsden.

On a personal note, I'm a mother of two—my daughter is 23 and my son is 20. I had them during my training. I enjoy skiing, reading, and spending time with friends. Now, at 57, I feel I've reached a point where I'm truly comfortable in my career and have a good work-life balance.

Interviewer: What drew you to surgery? Was that always your goal?

Dr. Nobbenhuis: Initially, I was more interested in obstetrics. However, after completing my PhD in cervical cancer, I became increasingly involved in gynaecological oncology.

A pivotal moment was spending six months in Cape

Town, where I worked with two female gynaecological oncologists.

They were exceptional surgeons and strong role models—skilled, patient-focused, and grounded. That experience made me realise I wanted to pursue more advanced surgical work, and that's when my path toward oncology surgery truly began.

Interviewer: Were there many female surgeons during your training?

Dr. Nobbenhuis: No, very few—especially in surgical subspecialties. Obstetrics and gynaecology had many women, but oncology surgery was different. When I moved to the UK for my fellowship, I was the first female subspecialty trainee in my hospital.

That period was challenging. I had two young children, and my husband was still living in the Netherlands for a year, commuting on weekends. I had to be extremely efficient to balance work and family life.

Although my colleagues were supportive, many senior male doctors didn't fully understand my

situation. Still, I remained committed to both my career and being a mother. It wasn't easy, but it was possible, and I hope that example helps younger doctors today.

Interviewer: Have conditions improved for women entering the field now?

Dr. Nobbenhuis: Yes, definitely—though there is still progress to be made.

It's now much more common for both partners to work, and childcare responsibilities are more shared. Flexible working options exist and working hours are regulated—unlike in the past, when 100-hour weeks were not uncommon.

There's also more acceptance of needing to leave work for family responsibilities. When I was training, I felt I couldn't show vulnerability. Now that culture is changing, which is a positive step forward.

Interviewer: Have you experienced discrimination or sexism in your career?

Dr. Nobbenhuis: Occasionally. Patients sometimes assume I'm a nurse rather than the surgeon, even now. But I haven't had any severe negative experiences.

When faced with bias, I've chosen not to internalise it. I distance myself and don't let it affect me. That approach may not suit everyone, but it has worked for me.

Interviewer: How has being a woman influenced your training and career?

Dr. Nobbenhuis: During my training in the Netherlands, it didn't have much impact because obstetrics and gynaecology is a female-dominated field. However, in subspecialty surgery, it was more noticeable.

One significant development is robotic surgery itself. Traditional surgical instruments were designed for male hands, making some techniques physically challenging. Robotics has levelled that playing field, offering ergonomic advantages that benefit many women. Representation also matters. Seeing more female robotic surgeons and educators helps inspire the next generation.

Interviewer: What has been the most rewarding part of your career?

Dr. Nobbenhuis: Without question, it's helping patients. When a patient has a good outcome and is happy with their care, that's the most meaningful reward. The technology is fascinating, and surgery is intellectually stimulating—but ultimately, it's about making a difference for patients.

Interviewer: What challenges did you face in building your reputation as a robotic surgeon?

Dr. Nobbenhuis: I was fortunate to work with supportive colleagues and to be involved early in the development of robotic surgery in the UK.

Today, it may be more challenging due to increased competition and visibility through social media. However, building a reputation still comes down to being open to opportunities—teaching, mentoring, participating in professional societies—and consistently developing your practice. Mindset is also important. You need to be proactive and willing to engage.

Interviewer: Have you had to make personal or professional sacrifices?

Dr. Nobbenhuis: Yes - primarily in terms of work-life balance. There were times when I couldn't attend important moments in my children's lives due to work. That comes with a sense of guilt many working parents, especially mothers, experience.

However, a few years ago, my daughter told me she was proud of what I had achieved. That meant a great deal to me and reassured me that the balance I chose was the right one for my family.

Interviewer: What advice would you give to young female surgeons?

Dr. Nobbenhuis:

Find a mentor. Having someone to guide you, answer questions, and share their experience is invaluable.

Another common question I'm asked is: "When is the right time to have children?" My answer is that there is no perfect time. If you are passionate about your career, you will find a way to make both work. It is absolutely possible to have a fulfilling career and a family. You don't have to be extraordinary—you can be a normal person and still achieve these goals.

SIXTEEN YEARS LATER:

Confessions of an Early Robotic Surgeon

Jordi Ponce, Spain

My name is Jordi Ponce, gynaecological oncologist at Bellvitge University Hospital in Barcelona - and today, I have to admit, I feel a little older than I'd like.

Because when someone asks you to reflect on your "experience" in robotic surgery, it usually means one thing: you've been around long enough to remember when all of this was not normal.

In my case, that takes me back more than 16 years.

> *It was 2009 when the first da Vinci robot arrived at Bellvitge. At the time, it was a big deal—the third system installed in Spain. It was a bold institutional bet between the university, the research institute, and the hospital. The idea was simple, but ambitious: take a team with strong laparoscopic experience and turn it into a national reference in robotic surgery.*
>
> *No pressure.*

I still remember the feeling. Excitement, yes - but also a very real sense of responsibility. We were expected to translate what we had learned since the early days of laparoscopy in the 1990s into something completely new. And expectations were… high. Very high.

So, we did what surgeons tend to do in those situations: we moved forward anyway - somewhere between fear, curiosity, and a stubborn refusal to step back.

> *Very quickly, we understood that robotics was not just an incremental improvement - it was an opportunity. It allowed us to approach procedures that, in laparoscopy, had always felt just a little too difficult to standardise.*

Pelvic lymphadenectomy? We were comfortable with that. Para-aortic lymphadenectomy? That was a different story.

So, we made it our challenge.

Back then, working with the da Vinci Si, things were… let's say, less flexible than today. The robot could work either "up" or "down," but not both. Which led us to what became our solution: double docking.

And, yes, this is not a joke. It was often easier to move the patient, together with the ventilator and the anaesthesiologist, than to move the robot across the operating room.

Different times.

> *We standardised the technique and published our results, and that was the moment everything clicked. Robotic surgery was not just something we were learning - it was something that was going to redefine us.*
>
> *And it did.*

It changed my career completely. And I say this without exaggeration: without robotics, neither I, nor my department, nor probably many of us, would have evolved in the same way.

From there, things grew. A team formed. Then a programme.

Then a network. More surgeons, more specialties, more hospitals. What started as a risky bet slowly became a movement.

And then something unexpected happened.
I began traveling.

Hospitals, courses, congresses - across Spain, Portugal, and Europe. Acting as a proctor, helping teams take their first steps in robotic surgery. Being there at the beginning, just as others had once been there for us.

Sixteen years later, there is one thing I can say without hesitation: there is no greater satisfaction than walking into a hospital or attending a congress and hearing someone say, "Jordi, you were the one who came to teach us robotics for the first time."

Nothing compares to that.

Being recognised not just as a surgeon, but as a teacher - that is something truly special.

My relationship with SERGS has been part of that journey from the very beginning. I was there in Milan for the first congress, and I have not missed a single edition since. In 2016, we had the privilege of hosting the congress in Barcelona, at Bellvitge - a moment I remember with particular pride.

Of course, the road was not always smooth. In the early days, there was scepticism—sometimes even open criticism. Some said we were using robots because we didn't know how to operate. That we were spending excessive resources to perform procedures that could be done with "a bipolar and scissors."

Time, however, has a way of putting things into perspective.

Today, the conversation is no longer about whether robotics makes sense. It is about how far we can push it. About precision, reproducibility, and better outcomes for our patients.

And that, ultimately, is the only metric that matters.

I remain a firm believer in robotic surgery. It has transformed complex procedures into feasible, minimally invasive approaches and has expanded what we can offer to our patients.

Looking back, I feel incredibly fortunate: fortunate to have been there at the beginning, fortunate to have been questioned, and even more fortunate to see how far we have come.

What once felt like a leap of faith is now standard of care.

And being part of that story - of this community, this society, and this shared progress - **is, without a doubt, the greatest reward of all.**

SERGS VIDEO PORTAL

Simone Bruni, Italy
Editor, SERGS Video Portal

Empowering Robotic Gynaecological Surgery Through Education, Innovation, and Global Collaboration: The Role of the SERGS Video Portal

In the ever-evolving field of gynaecological surgery, staying at the forefront of innovation and best practices is both a challenge and a necessity. SERGS has long been committed to meeting this challenge by promoting surgical excellence, continuous education, and the exchange of knowledge among specialists across the globe. At its core, SERGS champions not only technical advancement but also the human experience and expertise that underpin surgical mastery.

A Hub for Education and Global Dialogue

Education remains one of the cornerstones of the SERGS mission. With the rapid development of robotic surgical systems and techniques, the Society plays a pivotal role in educating gynaecological surgeons at various stages of their careers. Each month, SERGS hosts a rich array of webinars covering cutting-edge topics in robotic and minimally invasive surgery.

These sessions feature renowned medical professionals and thought leaders from around the world, creating a dynamic platform for learning and discussion. The webinars are designed to be timely, relevant, and deeply informative, addressing current trends, technological advances, and evolving standards of care in gynaecological surgery.

In addition, one of the Society's most anticipated events is the annual SERGS European Congress. This international gathering brings together experts, surgeons, and medical professionals to present their latest research, share clinical experiences, and foster new collaborations. The Congress has become a vital forum for advancing the global field of robotic gynaecological surgery and creating lasting professional networks.

To ensure the long-term impact and accessibility of the knowledge shared across its platforms, SERGS has created a comprehensive video portal. Accessible exclusively to registered members, the portal serves as a digital library housing a vast collection of recorded content. With a simple login using SERGS credentials, members can explore the portal's structured and intuitive interface.

The portal is divided into four main categories:

- **SERGS Conferences** – recordings and highlights from past European congresses
- **SERGS Webinars** – a library of monthly online sessions

The Role of Robotics in Uterus Transplantation: A New Era in Fertility

Radical hysterectomy - My way

Marielle Nobbenhuis: Surgery for recurrent gynaecological tumours

• **YEARS Webinars** – content curated for the Young European Advocates of Robotic Surgery

Balancing robotic surgical training with patients safety

Zooming into robotic endometriosis excision

• **Surgical Videos** – a growing repository of operative videos, demonstrating real surgical cases and techniques.

This resource allows members to access content at their own pace and revisit material whenever needed, fostering continuous learning and professional development.

The Value of Human Experience in a Technological Era

As artificial intelligence and advanced technologies continue to revolutionise medicine, including robotic surgery, SERGS recognises a critical truth: technology can enhance performance, but it cannot replace human insight. The value of seasoned surgical judgment, intuitive decision-making, and accumulated experience remains irreplaceable.

Sharing knowledge of experienced surgeons is a vital component in shaping the next generation of robotic gynaecological surgeons. This belief has inspired a new initiative within the SERGS Video Portal: expansion of the Surgical Videos section. SERGS is actively encouraging members to contribute to this section by submitting their own recorded surgical cases.

All contributions are welcome, especially those that follow a step-by-step format designed to clearly illustrate each phase of a surgical procedure. This structured approach enhances educational value and allows viewers to better understand complex interventions.

In line with this, SERGS has introduced the Step-by-Step Project, a structured educational initiative designed to transform surgical procedures into clear, reproducible, and high-quality learning pathways. The initiative focuses on breaking down surgical interventions into easily understandable, sequential steps, ensuring that each phase of the procedure is comprehensively explained. This project aligns with the core values of SERGS, emphasizing precision, clarity, and educational integrity.

Each video in the Surgical Videos section may belong to one of the following categories:

- Benign surgery
- Oncology
- Urogynecology
- Endometriosis

Through this instrument, users can quickly find the material most relevant to their interests and clinical needs. Whether reviewing a complex myomectomy, exploring a novel approach to pelvic organ prolapse repair, or facing any oncological surgical case, the portal will serve as a living atlas of robotic gynaecological surgery.

Moreover, visiting the surgical videos section of the SERGS Video Portal offers an opportunity to explore a growing library of instructional videos and join a global community of surgeons and robotic enthusiasts committed to collaboration, innovation, and continuous professional development. The Step-by-Step Project is not just a collection of videos, but an invitation to actively engage in a dynamic learning process, bridging the gap between theory and practice, and enhancing surgical education worldwide.

> *The strength of the SERGS community lies in its openness, diversity, and shared dedication to excellence. By creating a digital space where surgical expertise can be shared, preserved, and accessed on demand, the Society ensures that its mission extends beyond borders and generations. It is a place where beginners can learn from masters, where peers can exchange techniques, and where every contribution helps raise the standard of care for women's health.*

Conclusion

In a world where surgical technology is evolving faster than ever, SERGS stands as a beacon of responsible progress championing both innovation and the irreplaceable value of human experience. The SERGS Video Portal is a testament to this mission: an evolving educational platform, a collaborative space for surgeons, and a bridge between knowledge and practice.

We invite all SERGS members to engage with this platform, watch, learn and contribute.

Send your surgical videos to: ***info@sergsmail.org***

ASGRS AND SERGS:

From Regional Leadership to Shared Global Values

Rooma Sinha, India

Robotic gynaecological surgery has progressed from an emerging innovation to a standard practice. As its use expands worldwide, professional societies have a crucial role in setting standards, building competence, and improving patient outcomes.

In this context, ASGRS and SERGS are two key organisations, and their collaboration signifies a broader move toward global partnerships in robotic gynaecology.

The two societies were shaped by very different healthcare environments. Asia experiences rapid, sometimes uneven, expansion of robotic platforms, with high surgical volumes and significant infrastructure variability across countries.

Europe, in contrast, has mature healthcare systems, where the focus has been on standardisation, credentialing, and outcome validation. These differences reflect each society's priorities, but they complement each other's strengths.

ASGRS emphasises capacity building through academic activities and training to broaden access to robotic education across Asia via structured master classes, workshops, surgical demonstrations, mentorship programmes, and society-led meetings.

Rooma Sinha

President, Asian Society of Gynaecological Robotic Surgeons (ASGRS)

Founder and President, Association of Gynaecological Robotic Surgeons of India (AGRS)

Importantly, ASGRS recognises that robotic surgery cannot be directly copied from Western models; it must be adapted to local realities, including cost constraints, case mix, and resource availability. Promoting mentorship and surgical coaching for young surgeons and women nurtures future surgeons to embrace robotics responsibly.

By developing structured, competency-based curricula and focusing on assessment and certification, SERGS has helped establish robotic surgery as a discipline that requires measurable proficiency rather than just exposure.

Despite these differences, the

philosophical similarities between ASGRS and SERGS are remarkable. Both societies prioritise patient safety over technological excitement, training over granting autonomy, and evidence over expansion.

They recognise the ethical challenges with robotic learning curves and the risks of unstructured adoption.

In an era when industry-driven dissemination can outpace academic oversight, such shared values are crucial. Collaborative leadership between these two regions provides a pathway toward common standards with local flexibility.

Several areas show particular promise for collaborative progress.

First, integrated training pathways could promote cross-regional fellowships and faculty exchanges.

Second, collaborative registries and research among Asian and European centres would support comprehensive analyses of outcomes, learning curves, and cost-effectiveness.

Third, the societies can work together to develop position statements and practice guidelines.

Finally, shared investment in digital education, including webinars, video-based peer learning, simulations, and telementoring, offers a scalable way to expand access to high-quality training.

This partnership is more than just academic. It reflects deep-rooted friendships and marks the growth of the robotic gynaecological community from local advocacy to global responsibility.

ASGRS and SERGS will shape not only how robotic surgery is performed but also how it is taught, evaluated, and ethically upheld.

YEARS STUDY:

Robotic Surgery, Training Gaps, and the Next Generation of Gynaecological Surgeons

YEARS
Young European Advocates of Robotic Surgery

Sergi Fernández-Gonzalez, Spain

Interviewer: Journal of Robotic Surgery

Interviewee: Sergi Fernández-González, principal author of the YEARS study

Interviewer: Dr. Fernández, your recent study from the Young European Advocates of Robotic Surgery (YEARS) explores self-perceived confidence among early-career gynaecological surgeons. Why did you feel this topic deserved focused investigation?

Dr. Fernández-Gonzalez: The idea actually originated around 2021 among the YEARS council members, during repeated discussions about training disparities we were observing across Europe.

Many of us shared concerns regarding unequal access to robotic platforms, limited operative exposure, and how confident young surgeons felt when moving toward independent practice. From those discussions, we collectively decided to design a structured survey to systematically capture these experiences.

Developing, refining, and disseminating the questionnaire across multiple countries took considerable time, so it is particularly rewarding that this collaborative effort has finally resulted in a published study.

Interviewer: Your study highlights that confidence is not uniformly distributed, even among surgeons with access to robotic platforms. What stood out most to you in the results?

Dr. Fernández-Gonzalez: What stood out most was that access alone was not sufficient. Many respondents worked in departments performing robotic surgery regularly, yet their personal, hands-on exposure was limited.

The strongest associations were related to consistent operative participation—specifically, having at least one dedicated robotic operating day per week and institutional volume. This suggests that robotic training is not simply about the presence of technology, but about how deeply it is integrated into routine surgical practice.

Interviewer: You identified a departmental threshold of approximately 55 robotic cases per year associated with higher confidence. How should readers interpret this finding?

Dr. Fernández-Gonzalez: This threshold should not be interpreted as a strict benchmark, but rather as a marker of an institutional environment where robotic surgery is sufficiently embedded to allow

repeated exposure. It likely reflects not only case volume, but also organisational factors such as scheduling priorities, mentorship culture, and structured training pathways.

From a robotic surgery perspective, it reinforces the idea that confidence and proficiency develop through continuity rather than sporadic exposure.

Interviewer: Training appears as a central theme in your work. What message does the YEARS study convey regarding current robotic training models?

Dr. Fernández-Gonzalez: The study highlights that robotic training across Europe remains highly heterogeneous and, in many cases, opportunistic. Surgeons who had undergone structured fellowships or formal industry-supported courses reported higher confidence, yet access to these pathways is far from universal. Our findings support the need for standardised, competency-based

robotic training programmes that combine simulation, mentorship, and protected operative time, ensuring that exposure translates into meaningful surgical autonomy.

Interviewer: Confidence is subjective by nature. Why do you think it remains an important endpoint in robotic surgery research?

Dr. Fernández-Gonzalez: Confidence is indeed subjective. Ideally, to confirm whether self-perceived confidence directly impacts surgical outcomes, one would design a randomized study in which patients are operated on by surgeons with high versus low confidence. However, such a design would be neither ethical nor safe for patients. In this context, self-perceived confidence represents a pragmatic surrogate marker. It reflects readiness, autonomy, and willingness to assume responsibility in the operating room—factors that are particularly relevant in robotic surgery. While it does not replace objective performance metrics, it provides valuable insight into how surgeons engage with robotic platforms in real-world practice.

Interviewer: How do you see the findings of the YEARS study influencing the future of robotic surgery training in Europe?

Dr. Fernández-Gonzalez: I hope the study contributes to a broader discussion about access, equity, and structure in robotic training. As robotic surgery becomes increasingly integrated into standard practice, training models must evolve accordingly.

Our results suggest that regular, protected exposure is essential, particularly early in a surgeon's career. From an institutional and policy perspective, this may also support further centralization and accreditation of centres offering robotic training.

Interviewer: Finally, what are the next steps for the YEARS group following this study?

Dr. Fernández-Gonzalez: This study is clearly hypothesis-generating. The next step is to move beyond self-reported measures and explore objective indicators of progression, such as operative autonomy, case complexity, and surgical outcomes.

Ultimately, the goal of the YEARS initiative is not only to describe existing gaps, but to actively contribute to the development of training strategies that ensure the next generation of gynaecological surgeons is both technically competent and confident in robotic surgery, such as courses, webinars, and many more online resources that we are trying to develop. **We encourage all colleagues to join us and learn together about robotic surgery.**

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- **www.instagram.com/years.network**

TOP ARTICLES AT A GLANCE

in Robot-Assisted Gynaecological Surgery July 2025 – March 2026

Victoria Psomiadou, Greece, Alexandros Fotiou, Greece, and Christos Iavazzo, Greece

Robot-assisted surgery has become an important part of modern gynaecology, expanding the possibilities of minimally invasive approaches across both benign and complex conditions. By improving visualisation, instrument control, and ergonomics, robotic systems have helped address some of the limitations of conventional laparoscopy.

Between July 2025 and March 2026, a growing number of studies have explored the clinical use of robotic surgery in gynaecology. This period is notable for the introduction of new robotic platforms, the expansion of single-port and vNOTES techniques, and increasing attention to training, cost, and surgical outcomes. The available evidence spans a wide range of study designs, from early feasibility reports to larger retrospective analyses.

This article aims to summarise all published studies during this period, providing an overview of current evidence with a focus on general gynaecology.

GENERAL GYNAECOLOGY

Title: A pilot investigation of robot-assisted total hysterectomy using the Toumai® laparoscopic surgical robot system
Author/Journal: Pasquini et al., Minim Invasive Ther Allied Technol, 2026
Study design: Pilot study
Study aim: To evaluate the technical feasibility, perioperative safety, and surgical workflow of the Toumai® laparoscopic surgical robot system in gynaecology
Sample size: 1 patient
Results: Toumai® enabled a safe and efficient multi-port RATH with 70 min total time and 30 mL blood loss, without complications or conversion.

Title: Robotic myomectomy using Hugo RAS platform: a step-by-step on how to be safe and efficient
Author/Journal: Moreira Arcas et al., Minim Invasive Ther Allied Technol, 2026
Study design: Pilot study
Study aim: to describe a safe and efficient approach for robotic myomectomy using the Hugo™ RAS system
Sample size: 1 patient
Results: Robotic myomectomy with the Hugo™ RAS platform demonstrated feasible and safe performance in this selected case.

Title: Robotic-assisted laparoscopic repair of isthmoceles: the feasibility of operative treatment and recommendations for patient selection
Author/Journal: Almasarweh et al., Ther Adv Reprod Health, 2026
Study design: Retrospective observational study
Study aim: To evaluate the efficacy of robotic-assisted laparoscopic repair of uterine niches in improving clinical symptoms and fertility outcomes
Sample size: 51 patients
Results: Robotic-assisted laparoscopic repair was associated with improvement in symptoms related to uterine niches. The technique significantly improves myometrial thickness and supports favourable reproductive outcomes.

Title: Perioperative outcomes and anesthetic challenges of robotic-assisted gynecological surgery: a systematic review
Author/Journal: Ioppolo et al., J Anesth Analg Crit Care, 2026
Study design: Systematic review
Study aim: To evaluate perioperative outcomes across four domains: intraoperative anaesthetic management, postoperative recovery, pain control strategies, and surgical performance
Sample size: N/A
Results: Robotic-assisted gynaecological surgery is a feasible and safe alternative to laparoscopic and open approaches, with advantages in selected surgical outcomes and potential benefits in postoperative pain and recovery.

Title: Optimal tissue retrieval in robot-assisted total laparoscopic hysterectomy
Author/Journal: Matsuzaki et al., J Robot Surg, 2026
Study design: Retrospective observational study
Study aim: To investigate appropriate tissue retrieval methods following robot-assisted total laparoscopic hysterectomy (RA-TLH) based on various factors
Sample size: 381 patients
Results: An appropriate retrieved weight is around 770 g when the retrieval time is set to 30 min, and retrieval via a small incision is appropriate for weights exceeding 1,000 g.

Title: A surgeon-controlled robotic uterine manipulator to improve autonomy, efficiency, and consistency during hysterectomy: a clinical opinion on the InvisiGrasp concept
Author/Journal: Aziz et al., Eur J Obstet Gynecol Reprod Biol, 2026
Study design: Clinical opinion
Study aim: To describe the conceptual design and potential advantages of InvisiGrasp, a patent-pending, surgeon-controlled robotic uterine manipulator
Sample size: N/A
Results: Beyond improving surgical precision and workflow efficiency, InvisiGrasp may also reduce operating room staffing demands and address challenges such as assistant fatigue during prolonged procedures.

Title: Surgical outcomes and learning curve of robotic single-port vaginal natural orifice transluminal endoscopic surgery (vNOTES) hysterectomy using the da Vinci single-port system
Author/Journal: Yang et al., Cureus, 2026
Study design: Retrospective observational analysis
Study aim: To assess the surgical outcomes and learning curve of robotic single-port vaginal natural orifice transluminal endoscopic surgery (RSP-vNOTES) for hysterectomy in benign gynaecological conditions
Sample size: 97 patients
Results: Proficiency in RSP-vNOTES can be achieved with sequential case experience. RSP-vNOTES appears to be a safe and effective surgical approach for hysterectomy, including complex scenarios such as endometriosis.

Title: Comparative outcomes of robotic, laparoscopic, and open hysterectomy for complex hysterectomy: a retrospective study
Author/Journal: Li et al., Front Surg, 2026
Study design: Retrospective analysis
Study aim: To compare perioperative outcomes and complication rates among three surgical techniques — open abdominal hysterectomy (LH), traditional laparoscopic hysterectomy (TLH), and da Vinci robot-assisted hysterectomy (DV-RH) — to provide evidence for individualised surgical decision-making
Sample size: 444 patients
Results: DV-RH offers superior perioperative outcomes in complex and large uterus cases but incurs higher costs.

Title: Two-port robotic-assisted hysterectomy: a case series demonstrating feasibility
Author/Journal: Britton et al., J Minim Invasive Gynecol, 2026
Study design: Feasibility study
Study aim: To demonstrate the feasibility and versatility of two-port robotic-assisted hysterectomy across different patient scenarios
Sample size: 3 patients
Results: Two-port robotic-assisted hysterectomy is a feasible and effective approach for uncomplicated cases without significant pelvic distortion or complex comorbidity.

Title: Outcomes of the da Vinci robotic surgery system in benign gynecological conditions: a retrospective analysis of 50 cases at a single centre
Author/Journal: Latifah et al., Health Care Women Int, 2026
Study design: Retrospective single-centre analysis
Study aim: To analyse the use of the da Vinci robotic surgery system for managing benign gynaecological conditions
Sample size: 50 patients
Results: Robotic surgery demonstrated technical feasibility and safety for patients with benign gynaecological conditions.

Title: Comparing clinical outcomes of robot-assisted versus total laparoscopic hysterectomy for symptomatic uterine fibroids
Author/Journal: Yazawa et al., Fukushima J Med Sci, 2025
Study design: Retrospective cohort study
Study aim: To compare the clinical outcomes of total laparoscopic hysterectomy (TLH) and robot-assisted laparoscopic hysterectomy (RALH) for treating symptomatic uterine fibroids at a single institution in Japan
Sample size: 163 patients
Results: Operative time was significantly longer in the RALH than in the TLH group.

Title: Robotic-assisted hysterectomy using DEXTER®: the first prospective multicentre study
Author/Journal: Imboden et al., Facts Views Vis Obgyn, 2025

Study design: Prospective multicentre study
Study aim: To confirm perioperative and early post-operative safety and evaluate the clinical performance of DEXTER in hysterectomy
Sample size: 34 patients
Results: Hysterectomy assisted with DEXTER can be safely performed even in the early learning phase. DEXTER facilitated an adaptable OR workflow allowing greater flexibility in procedural approaches.

Title: Single-port robotic versus conventional laparoscopic vNOTES hysterectomy: a propensity score-matched comparison of surgical outcomes and literature review
Author/Journal: Kanno et al., Eur J Obstet Gynecol Reprod Biol, 2025
Study design: Retrospective cohort study
Study aim: To compare perioperative outcomes of RA-vNOTES hysterectomy using single-port vaginal-assisted NOTES hysterectomy (SP-VANH) with those of conventional laparoscopic (CL)-VANH
Sample size: 184 patients
Results: SP-VANH offers a safe and feasible alternative to CL-VANH for the surgical management of benign gynaecological conditions.

Title: Gynaecological surgery using the Kangduo robotic system
Author/Journal: Pi et al., Epub, 2025
Study design: Retrospective study
Study aim: To review the safety and effectiveness of the KD-SR-01 system in gynaecological surgery and compare it with conventional laparoscopic operation
Sample size: 144 patients
Results: The Kangduo robotic system was safe and feasible for gynaecological surgery.

Title: Robotic-assisted surgery in benign gynecology: single-centre experience with 106 patients
Author/Journal: Oujjat et al., Front Med (Lausanne), 2025
Study design: Retrospective study
Study aim: To evaluate perioperative outcomes, learning curve, and feasibility of robotic-assisted surgery for benign gynaecological indications using the da Vinci Xi surgical system (Intuitive Surgical) in a single centre
Sample size: 106 patients
Results: Robotic-assisted surgery is a safe and feasible alternative to conventional laparoscopy in benign gynaecology. The learning curve was demonstrated by reduced console time and fewer incisions in later cases, despite higher BMI and uterine weight.

Title: Robotic laparoendoscopic single-site surgery by da Vinci Xi system in gynecology: a retrospective series of 721 cases
Author/Journal: Chen et al., BMC Surg, 2025
Study design: Retrospective study
Study aim: To prove the feasibility, safety, and efficacy of robotic laparoendoscopic single-site surgery LESS (R-LESS) using the da Vinci Xi surgical system in gynaecology
Sample size: 721 patients
Results: R-LESS using the da Vinci Xi system is feasible and safe in performing various gynaecological procedures, especially complex cases, where the surgical challenges of LESS are significantly mitigated with robotic assistance.

Title: Economic evaluation of robot-assisted, conventional laparoscopic, and open myomectomy: a 10-year single-centre retrospective study
Author/Journal: Carbonnel et al., J Robot Surg, 2025
Study design: Retrospective single-centre study
Study aim: To evaluate the economic impact of robot-assisted myomectomy compared with laparotomy and conventional laparoscopy
Sample size: 314 patients
Results: Robotic myomectomy provides clinical advantages over laparotomy but remains associated with substantially higher costs.

Title: A comparative analysis of hysterectomy outcomes: robotic single-port vs. traditional transvaginal NOTES approaches
Author/Journal: Yang et al., Front Med (Lausanne), 2025
Study design: Retrospective single-centre study
Study aim: to explore the feasibility and safety of robotic single-port vaginal natural orifice transluminal endoscopic surgery (RSP-vNOTES) hysterectomy when compared with traditional (T)-vNOTES hysterectomy
Sample size: 135 patients
Results: When compared to T-vNOTES hysterectomy, RSP-vNOTES hysterectomy appears more feasible and safer for surgery, especially in cases involving concurrent endometriosis resection, and warrants further consideration as a skill set in a gynaecological surgeon's toolbox.

Title: Comparison of hysterectomy using four different robotic surgical systems: a retrospective cohort study
Author/Journal: Nagata et al., Jpn J Clin Oncol, 2025
Study design: Retrospective cohort study
Study aim: to evaluate and compare the perioperative outcomes of four robotic systems — da Vinci X, da Vinci Xi, Hinotori™, and Hugo™ — in total hysterectomies
Sample size: 293 patients

Results: Total hysterectomy can be safely and effectively performed using all four robotic platforms.

Title: Team-based learning curve and cost efficiency in robot-assisted hysterectomy: a four-phase CUSUM study of 915 cases
Author/Journal: Sakamoto et al., J Robot Surg, 2025
Study design: Four-phase CUSUM study
Study aim: To evaluate and compare the perioperative outcomes of four robotic systems — da Vinci X, da Vinci Xi, Hinotori™, and Hugo™ — in total hysterectomies
Sample size: 293 patients
Results: Total hysterectomy can be safely and effectively performed using all four robotic platforms.

Title: Multicenter evaluation of the DEXTER® robotic surgery system for total hysterectomy with adnexal surgery
Author/Journal: Gulz et al., J Robot Surg, 2025
Study design: Prospective, multicentre single-arm study
Study aim: To evaluate clinical performance and early postoperative safety of the robotic-assisted hysterectomy with adnexal surgery for benign indications with DEXTER
Sample size: 52 patients
Results: The safety and performance of DEXTER in robotic-assisted hysterectomy was confirmed.

Title: Initial experience with the Saroa surgical system in robot-assisted hysterectomy: first clinical case series and haptic feedback assessment
Author/Journal: Oshima et al., Medicina (Kaunas), 2025
Study design: Case series
Study aim: To report the first clinical use of the Saroa system in gynaecological surgery, aiming to assess its feasibility, safety, and usability in robot-assisted hysterectomy
Sample size: 5 patients
Results: The Saroa surgical system is feasible and safe for robot-assisted hysterectomy.

Title: Versius surgical system: tips and tricks for OR setting and port placement for pelvic surgery, our experience in a multi-robotic referral centre
Author/Journal: Gaia et al., Langenbecks Arch Surg, 2025
Study design: Prospective multicentre study
Study aim: to report technical tips and tricks for OR setup and port placement with the Versius system for benign gynaecological conditions
Sample size: 19 patients
Results: Versius appeared to be a safe option for benign gynaecological surgery.

Title: Implementing robotic gynaecological surgery: early outcomes from a tertiary care hospital in Portugal
Author/Journal: Martins et al., Cureus, 2025
Study design: Retrospective, observational, and descriptive single-centre study
Study aim: To present the early clinical experience of a Portuguese tertiary centre with robot-assisted gynaecological surgery
Sample size: 109 patients
Results: The implementation of robotic-assisted gynaecological surgery in our centre was associated with favourable short-term outcomes, including low complication and readmission rates, minimal blood loss, and rapid recovery. While limited to a single-centre experience, this study adds to the growing evidence on the safe and feasible introduction of robotic surgery in gynaecological practice.

Title: Comparison of single-port robotic surgery using the da Vinci SP surgical system and single-port laparoscopic surgery for benign indications
Author/Journal: Miyamura et al., Gynecol Minim Invasive Ther, 2025
Study design: Retrospective, observational, and descriptive single-centre study
Study aim: To compare the surgical outcomes of conventional single-port laparoscopic surgery and single-port robotic surgery using the da Vinci SP surgical system
Sample size: 23 patients
Results: The da Vinci SP system allows the safe introduction of single-port total hysterectomy and improves surgical outcomes in the early stages compared to conventional single-port laparoscopy

Title: Comparing two types of robotic single-site myomectomy using propensity score matching: coaxial with da Vinci Xi vs. da Vinci SP system
Author/Journal: Lee et al., J Clin Med, 2025
Study design: Retrospective review
Study aim: To evaluate and contrast the surgical outcomes between coaxial robotic single-site myomectomy (RSSM) performed using the da Vinci Xi system and da Vinci SP system
Sample size: 81 patients
Results: Coaxial RSSM was associated with a shorter operative time and lower blood loss compared to SP myomectomy.

Title: Redefining hysterectomy: robotic versus conventional approaches in transvaginal natural orifice transluminal endoscopic surgery and laparoscopically-assisted vaginal hysterectomy

Author/Journal: Lim et al., J Formos Med Assoc, 2025
Study design: Retrospective cohort study
Study aim: To compare surgical outcomes of transvaginal natural orifice transluminal endoscopic surgery (vNOTES) and laparoscopic-assisted vaginal hysterectomy (LAVH) using conventional and robotic-assisted laparoscopy
Sample size: 773 patients
Results: Both vNOTES and LAVH are safe with either conventional or robotic assistance. Robotic assistance prolongs operating time, while surgical approach selection may depend on patient factors such as BMI, uterine size, obstetric history, and prior surgeries.

Title: Feasibility and surgical outcomes of robotic myomectomy for large and multiple uterine fibroids: insights from a decade of experience at a single centre
Author/Journal: Sinha et al., J Robot Surg, 2025
Study design: Retrospective chart review
Study aim: To assess the feasibility and perioperative outcomes of robotic-assisted myomectomy (RM) for large (≥ 8 cm) and multiple (≥ 5) fibroids
Sample size: 260 patients
Results: RM is feasible and efficient in treating uterine myomas larger than 8 cm and in cases involving five or more fibroids.

ENDOMETRIOSIS

Title: Comparison of surgical outcomes between robot-assisted and conventional laparoscopic hysterectomy for stage IV endometriosis: a propensity score-matched analysis and review of the literature
Author/Journal: Higuchi et al., J Robot Surg, 2026
Study design: Propensity score-matched analysis and review of the literature
Study aim: To compare the surgical outcomes between RAS and conventional laparoscopic surgery (CLS) for hysterectomy in patients with severe endometriosis.
Sample size: 223 patients
Results: RAS hysterectomy in patients with severe endometriosis was associated with significantly lower blood loss and comparable operative time compared with CLS, with no differences in perioperative complications.

Title: Robotic assisted versus conventional laparoscopic ovarian suture reapproximation in ovarian cystectomy of ovarian endometriomas in preserving ovarian reserve
Author/Journal: Lin et al., J Robot Surg, 2026
Study design: Retrospective study
Study aim: To assess the efficacy of ROS-RAL in treating ovarian endometriomas (OMA) and preserving ovarian reserve, as measured by anti-Müllerian hormone (AMH) levels compared to conventional laparoscopy (CL)
Sample size: 154 patients
Results: The novel ROS-RAL surgery offers significant advantages in treating OMA and preserving ovarian function postoperatively in patients with OMA.

Title: ENDO-RAS: ongoing trial on robotic vs laparoscopic hysterectomy in DIE
Author/Journal: ClinicalTrials.gov, Trial ID: NCT06232412
Study design: Randomised controlled trial (recruitment phase)
Study aim: To compare complications and surgical outcomes between robotic and laparoscopic hysterectomy for deep endometriosis
Sample size: 224 patients (target)
Results: Ongoing study initiated in April 2025. Early safety reports suggest no increased risk in the robotic arm. Final data anticipated in 2026.

Title: Current status of robot-assisted surgery implementation in endometriosis centers: an international multicentric cross-sectional study
Author/Journal: Krentel et al, Arch Gynecol Obstet, 2025
Study design: International multicentric cross-sectional study
Study aim: To investigate the current use of RAS in certified endometriosis centres in Central Europe
Sample size: 64 endometriosis centres
Results: RAS is already being used in approximately half of the participating endometriosis centres. While the proportion of RAS procedures compared to CLS is increasing, it still remains comparatively low.

GYNAECOLOGICAL ONCOLOGY

Title: Impact of obesity on perioperative outcomes in robot-assisted surgery for endometrial cancer: a single-centre study of 119 cases
Author/Journal: Iida et al., Eur J Obstet Gynecol Reprod Biol X, 2026
Study design: Retrospective single-centre cohort
Study aim: To evaluate whether obesity (BMI ≥30 kg/m²) independently affects perioperative outcomes in robot-assisted surgery for endometrial cancer
Sample size: 119 patients
Results: Obesity increased intraoperative workload (blood

loss and operative time) without reducing lymph-node yield. LOS reflected surgeon- and time-related factors rather than BMI.

Title: Robotic surgical outcomes in endometrial cancer: Does class III obesity matter?
Author/Journal: Capozzi et al., Cancers (Basel), 2026
Study design: Single-centre retrospective study
Study aim: To evaluate the surgical feasibility and safety of robotic surgery in class III obese women with EC
Sample size: 109 patients
Results: Robotic surgery is safe and feasible in class III obese EC patients, with perioperative morbidity comparable to that of lower BMI groups.

Title: Secondary cytoreduction for isolated infra-renal para-aortic recurrence of high-grade serous ovarian carcinoma: a robotic approach
Author/Journal: Dayan-Schwartz et al., J Minim Invasive Gynecol, 2026
Study design: Case report
Study aim: To demonstrate a step-by-step robotic approach to secondary cytoreductive surgery for an isolated infra-renal para-aortic recurrence of high-grade serous ovarian carcinoma
Sample size: 1 patient
Results: This case highlights the technical feasibility and safety of robotic para-aortic lymphadenectomy in the setting of isolated recurrence, even in the presence of vascular injury.

Title: Feasibility and safety of robotic para-aortic lymphadenectomy using the Hinotori™ surgical robot system: a first-in-human experience
Author/Journal: Mabuchi et al., Cureus, 2026
Study design: Case series
Study aim: To report the first cases of para-aortic lymphadenectomy performed using the Hinotori™ surgical robot system (Medicaroid Corporation), Japan's first domestically developed robotic surgical platform
Sample size: 3 patients
Results: Para-aortic lymphadenectomy using the Hinotori™ system is technically feasible and safe.

Title: Robotic surgery in endometrial cancer using robot da Vinci® SP
Author/Journal: Cucinella et al., Ann Surg Oncol, 2026
Study design: Case report
Study aim: To highlight the feasibility of using of robotic single-port surgery using the fourth-generation da Vinci SP surgical system for treating early-stage endometrial cancer
Sample size: 1 patient
Results: Robotic surgical staging for endometrial cancer using the da Vinci SP system is feasible, achieving optimal operative outcomes.

Title: Repair of vesicovaginal fistula in 12 steps using the da Vinci surgical system
Author/Journal: Dayan-Schwartz et al., J Minim Invasive Gynecol, 2026
Study design: Case report
Study aim: To demonstrate the feasibility and effectiveness of a stepwise robotic-assisted vesicovaginal fistula (VVF) repair following oncological surgery and adjuvant therapy
Sample size: 1 patient
Results: Stepwise robotic VVF repair is efficient, offering precise dissection, enhanced visualization, and successful anatomical and functional restoration.

Title: Robotic sentinel lymph node technique in apparent early-stage ovarian cancer
Author/Journal: Rey et al., J Minim Invasive Gynecol, 2026
Study design: Case report
Study aim: To demonstrate the feasibility and technical aspects of robotic sentinel lymph node (SLN) biopsy using indocyanine green (ICG) in a patient with apparent early-stage ovarian cancer
Sample size: 1 patient
Results: This case supports the feasibility of robotic SLN biopsy in ovarian cancer using ICG.

Title: Single-port robotic surgery in gynaecological oncology: feasibility and safety after 1 year of implementation
Author/Journal: Ribero et al., Int J Gynecol Cancer, 2026
Study design: Prospective cohort study
Study aim: To prospectively evaluate the feasibility and safety of single-port robotic surgery in gynaecological oncology within a high-volume referral centre
Sample size: 63 patients
Results: Single-port robotic surgery appears feasible and safe for selected patients with gynaecological malignancies, with no conversions and no intraoperative complications.

Title: Safe trocar placement by transvaginal endoscopic insertion in robot-assisted surgery for endometrial cancer with umbilical incisional hernia and prior mesh repair: two case reports
Author/Journal: Nagasawa et al., Asian J Endosc Surg. 2026
Study design: Case report
Study aim: To report two cases of endometrial cancer with umbilical incisional hernia or prior mesh repair, in

which robot-assisted surgery was safely performed using transvaginal laparoscope insertion
Sample size: 2 patients
Results: Transvaginal scope insertion offers a simple, reproducible method to enhance trocar safety.

Title: Real-world outcomes of robotic and non-robotic hysterectomy for endometrial cancer: insights from a national cohort
Author/Journal: Lau et al., J Robot Surg, 2025
Study design: Retrospective population-based study
Study aim: To compare perioperative outcomes, postoperative complications, and overall survival among patients with endometrial cancer (EC) undergoing open hysterectomy (OH), laparoscopic hysterectomy (LH), or robot-assisted hysterectomy (RAH) using nationwide real-world data.
Sample size: 3,176 cases of OH, 1,760 LH, and 424 RAH
Results: RAH for EC demonstrated significant perioperative and postoperative advantages compared with OH, including lower complication rates and improved survival outcomes. RAH outcomes were largely comparable to laparoscopic hysterectomy.

Title: Outcomes of cervical cancer treatment using total mesometrial resection (TMMR) performed with the robotic system: a preliminary report
Author/Journal: Opławski et al., Clin Med, 2025
Study design: Pilot, prospective single-centre study
Study aim: To evaluate the perioperative, histopathological, and early oncological outcomes of TMMR performed using the da Vinci Xi robotic system in patients with early-stage cervical carcinoma
Sample size: 20 patients
Results: All procedures were completed robotically without conversion to laparotomy. Robotic TMMR for early-stage cervical cancer is feasible and safe, and it provides complete oncological radicality with low perioperative morbidity.

Title: Robotic single-port (da Vinci SP) versus multiport (da Vinci Xi) for the treatment of atypical endometrial hyperplasia and endometrial cancer: a multi-institutional comparison of surgical outcomes
Author/Journal: Cucinella et al., Eur J Surg Oncol, 2025
Study design: Multi-institutional study
Study aim: To compare the surgical outcomes between da Vinci SP and da Vinci Xi
Sample size: 189 patients
Results: The da Vinci SP system appears to be non-inferior to the multiport da Vinci Xi for surgical staging of early-stage EC.

Title: MIRaGE (Minimally Invasive suRGery in recurrent Endometrial cancer)
Author/Journal: Vargiu et al., Int J Gynecol Cancer, 2025
Study design: Retrospective study
Study aim: To identify clinical and radiological preoperative predictors of successful MIS
Sample size: 192 patients
Results: MIS may represent a feasible option for selected patients with recurrent endometrial cancer, providing perioperative advantages with comparable survival outcomes.

Title: Comparison of robotic and natural orifice transluminal endoscopic surgical technique procedures in patients undergoing sentinel lymph node biopsy during endometrial cancer surgery
Author/Journal: Şimşek et al., Surg Oncol, 2025
Study design: Retrospective study
Study aim: To assess the safety and applicability of the two methods by examining the results in the identification of the sentinel lymph node during endometrial cancer surgery
Sample size: 76 patients
Results: The vNOTES technique demonstrates comparable sentinel lymph node detection rates to robotic surgery in the management of uterine endometrial cancer.

Title: Surgical approach and outcomes in early-stage endometrial cancer: a molecularly stratified comparison of open, laparoscopic, and robotic surgery
Author/Journal: Abdelaziz et al., Medicina (Kaunas), 2025
Study design: Retrospective study
Study aim: To compare the surgical approach incorporating molecular classification to control for case selection bias
Sample size: 512 patients
Results: When controlling for tumour biology, minimally invasive approaches offer superior perioperative outcomes with equivalent oncological safety.

Title: Innovations in robotic surgery: fertility sparing stage IV endometriosis resection with the da Vinci single-port (SP) system
Author/Journal: Sendukas et al., J Minim Invasive Gynecol, 2025
Study design: Single-centre study
Study aim: To show a complex fertility-sparing resection of stage IV endometriosis with the da Vinci single-port (SP) robot system
Sample size: 512 patients
Results: When controlling for tumour biology, minimally invasive approaches offer superior perioperative outcomes

with equivalent oncological safety.

Title: Robotic-assisted vs conventional laparoscopy for endometrial cancer staging: a comparative two-centre study
Author/Journal: Januszewski et al., Cancer Manag Res, 2025
Study design: Retrospective, two-centre case-control study
Study aim: To compare surgical outcomes between conventional laparoscopic and robotic-assisted laparoscopic approaches in the treatment of endometrial cancer
Sample size: 136 patients
Results: Robotic-assisted laparoscopic surgery for endometrial cancer is a safe and effective alternative to conventional laparoscopy, offering advantages in blood loss reduction while requiring longer operative times.

Title: Patient-related factors for surgical modality selection in early-stage endometrial cancer: a retrospective comparative study of laparoscopic and robotic surgery
Author/Journal: Yokozawa et al., J Robot Surg, 2025
Study design: Retrospective comparative study
Study aim: To compare the performance of the two MIS approaches in early-stage endometrial cancer and to identify patient-related factors influencing modality selection
Sample size: 204 patients
Results: In institutions offering both laparoscopic and robotic surgery, a BMI of 30 may serve as a practical threshold for selecting the MIS modality in early-stage endometrial cancer.

Title: Endo-cost: efficient economic model of adopting robotic versus laparoscopic gynaecological surgery for endometrial cancer
Author/Journal: García-Álvarez et al., J Robot Surg, 2025
Study design: Retrospective cost-analysis study
Study aim: To evaluate and compare the economic and clinical outcomes of laparoscopic versus robotic surgery in the treatment of endometrial cancer at a single centre
Sample size: 153 patients
Results: Robotic surgery resulted in a shorter average hospital stay compared to laparoscopy, but it was associated with significantly higher costs in both consumables and fixed amortization and total cost per procedure. No significant differences were observed in surgical time or postoperative complications.

Title: Comparison of laparoscopic and robotic-assisted minimally invasive surgery with sentinel lymph node navigation in low-risk endometrial cancer: a retrospective analysis
Author/Journal: Togami et al., J Gynecol Oncol, 2025
Study design: Retrospective study
Study aim: To evaluate and compare the perioperative and oncologic outcomes of laparoscopic and robotic-assisted surgeries in patients with low-risk endometrial cancer who underwent minimally invasive surgery (MIS) for complete surgical staging, including sentinel lymph node mapping
Sample size: 190 patients
Results: MIS combined with SNNS is a highly effective approach for managing low-risk endometrial cancer, providing comparable oncological outcomes to laparoscopy while enhancing the quality of life of patients.

Title: Robotic single-port versus robotic single-site hysterectomy in early endometrial cancer: a case control study
Author/Journal: Vizza et al., Int J Med Robot, 2025
Study design: Retrospective case-control study
Study aim: To compare surgical outcomes of robotic single-port (RSPH) versus single-site (RSSH) hysterectomy in early-stage endometrial cancer
Sample size: 25 patients
Results: The safety and feasibility of RSPH is confirmed for endometrial cancer without major differences from the RSSH in terms of surgical outcomes.

Title: Implementation of robotic-assisted surgery for the treatment of patients with endometrial carcinoma
Author/Journal: Shaalan et al., Cancers (Basel), 2025
Study design: Retrospective cohort study
Study aim: To compare surgical outcomes among patients with endometrial carcinoma (EC) after the implementation of a robotic-assisted (RA) surgical programme at a tertiary care centre
Sample size: 122 patients
Results: The integration of RA laparoscopy significantly reduced laparotomy rates and hospital stays while increasing SLN mapping.

Title: Robotic versus laparoscopic pelvic lymphadenectomy for endometrial cancer under the Japanese public health insurance system
Author/Journal: Imatake et al., In Vivo, 2025
Study design: Retrospective analysis
Study aim: To evaluate the efficacy of robotic surgery in pelvic lymphadenectomy for stage IA endometrial cancer
Sample size: 69 patients
Results: Robotic surgery is a feasible and safe procedure

for total hysterectomy and pelvic lymph node dissection in patients with preoperative diagnosis of stage IA and G1-G2 endometrial cancer.

Title: Comparing the KangDuo Surgical Robot-01 and da Vinci Xi system for endometrial cancer surgery: a multi-centre, randomised, parallel-controlled, noninferiority trial
Author/Journal: Li et al., Int J Surg, 2025
Study design: Multicentre, randomised, parallel-controlled noninferiority trial
Study aim: To evaluate the efficacy and safety of the KD-SR-01 system for surgical staging of endometrial cancer by comparing short-term outcomes to those of counterparts who underwent surgery using the da Vinci Xi system
Sample size: 99 patients
Results: The clinical application of the KD-SR-01 system for endometrial cancer staging surgery is safe and effective, with short-term results comparable to those achieved with the da Vinci Xi system after sufficient training.

Title: Surgical outcomes of open, laparoscopic, and robotic-assisted approaches for stage I endometrial cancer: insights from a real-world study by the Indian Gynaecological-Onco Study Group
Author/Journal: Jain et al., Cureus, 2025
Study design: Multicentre, retrospective, non-randomised comparative study
Study aim: To evaluate and compare the perioperative and short-term outcomes of the above-mentioned techniques across high-volume Indian institutions
Sample size: 2,090 patients
Results: This study reports the first multicentric evidence for RAS in Indian settings, compared to conventional approaches, and offers encouraging outcomes.

Title: Feasibility and safety of robotic single-port surgical staging in epithelial ovarian cancer using the da Vinci SP platform: a preliminary experience
Author/Journal: Chiofalo et al., Int J Gynecol Cancer, 2025
Study design: Retrospective case series
Study aim: To explore the role of the da Vinci SP system in staging epithelial ovarian cancer
Sample size: 7 patients
Results: Single-port robotic staging using the da Vinci SP system appears to be a safe and feasible option for selected patients with early-stage ovarian cancer.

Title: Robotic radical trachelectomy in early-stage cervical cancer
Author/Journal: Heras et al., J Robot Surg, 2025
Study design: Retrospective single-centre study
Study aim: To present a review of the centre's experience with robotic radical trachelectomy
Sample size: 7 patients
Results: In selected cases, robotic radical trachelectomy is a safe option for patients who wish to preserve their fertility with similar rates of oncological safety and complications than open procedures and a shorter recovery time.

Title: Impact of obesity on the outcomes and cost of robotic surgery for stage IA endometrial cancer: a regional perspective from Japan
Author/Journal: Mizuno et al., Int J Clin Oncol, 2025
Study design: Retrospective single-centre study
Study aim: To examine the impact of obesity on surgical outcomes, prognosis, and costs.
Sample size: 197 patients
Results: While obesity (BMI ≥ 30) did not significantly impact surgical outcomes or cancer prognoses, it did increase treatment costs and the risk of lifestyle-related diseases. Thus, preventive strategies, including lifestyle counselling, are needed to reduce obesity-related health burdens.

Title: ROCC/GOG-3043: a randomized controlled trial of robotic versus open surgery for early-stage cervical cancer
Author/Journal: Leitao et al., Int J Gynecol Cancer, 2025
Study design: Multicentre, randomized non-inferiority trial
Study aim: To compare three-year disease-free survival after robotic-assisted or abdominal radical or simple (in select cases) hysterectomy in early-stage cervical cancer
Sample size: 840 patients (randomly allocated)
Results: Estimated date for completing accrual and presenting results: 2030.

UROGYNAECOLOGY

Title: Reported outcomes and outcome measures in RCTs of laparoscopic and robotic interventions for pelvic organ prolapse in women: a systematic review
Author/Journal: Pagkaki et al., Eur J Obstet Gynecol Reprod Biol, 2026
Study design: Systematic review
Study aim: To create an inventory of selected and reported outcomes and outcome measures in published RCTs evaluating laparoscopic and robotic surgical treatments for POP and to assess their variations
Sample size: 4,566 patients
Results: Robotic surgery is safe and feasible in class III

obese EC patients, with perioperative morbidity comparable to that of lower BMI groups.

Title: Tele-robotic pectopexy across cities using an indigenous robotic platform: a case report
Author/Journal: Bhave et al., Cureus, 2026
Study design: Case report
Study aim: To demonstrate the feasibility of long-distance tele-robotic pectopexy in India
Sample size: 1 patient
Results: Long-distance tele-robotic pectopexy is safe, feasible, and effective, with the potential to expand access to advanced gynaecological care in resource-limited settings.

Title: How to perform unilateral pectineal suspension for apical prolapse by robotic assistance: a technical note with video
Author/Journal: Lamblin et al., J Gynecol Obstet Hum Reprod, 2026
Study design: Feasibility study
Study aim: To describe the standardized steps of this surgical procedure, along with the specific advantages of the robotic approach
Sample size: N/A
Results: Unilateral pectineal suspension (UPS) by robot-assisted approach represents an interesting alternative to apical prolapse repair techniques using mesh.

Title: Uterine-sparing robot-assisted sacrocolpopexy for pelvic organ prolapse in women aiming for pregnancy
Author/Journal: Shimomai et al., Gynecol Minim Invasive Ther, 2025
Study design: Case report
Study aim: To present three cases of uterine-sparing robot-assisted sacrocolpopexy (RSC) in women aiming for pregnancy
Sample size: 3 patients
Results: Uterine-sparing RSC represents a valuable surgical option for patients with POP who wish to become pregnant.

Title: Tunneling versus dissection technique during robotics-assisted sacrocolpopexy: a randomised clinical trial
Author/Journal: Do et al., Int Urogynecol J, 2026
Study design: Randomised single-centre trial
Study aim: To compare the retroperitoneal tunnelling technique versus dissection technique during sacrocolpopexy (SCP)
Sample size: 39 patients
Results: During RA SCP, operative time is longer when using retroperitoneal dissection than when using the tunnelling technique. However, both techniques offer comparable anatomical and quality-of-life outcomes in the short-term postoperative follow-up.

Title: Quality-adjusted life-years outcome 1 year after surgery by robotics-assisted sacral hystero-colpopexy versus vaginal mesh for pelvic organ prolapse repair
Author/Journal: Poutakidis et al., Int Urogynecol J, 2026
Study design: Secondary analysis of a previously published cohort study
Study aim: To compare the quality-adjusted life-years (QALYs) attained one year after robotics-assisted sacral hystero-colpopexy (RASC) versus Uphold™ vaginal mesh surgery for pelvic organ prolapse repair
Sample size: 65 patients
Results: RASC and Uphold™ are both meaningful surgical treatments for prolapse, with significant improvement in the HR-QoL and the one-year QALY gain and no significant difference between the two surgeries.

Title: Feasibility and early outcomes of robotic sacrocolpopexy with the Versius® platform: a prospective single-centre experience
Author/Journal: Panico et al., Facts Views Vis Obgyn, 2025
Study design: Feasibility study
Study aim: To report the first series of robotic sacrocolpopexy (RSCP) performed with the Versius® robotic surgical system (CMR Surgical, Cambridge, UK)
Sample size: 20 patients
Results: All procedures were completed successfully with no complications or conversions. Surgical and functional outcomes were consistent with those reported for other minimally invasive techniques.

Title: Comparative outcomes of Hugo™ robotic and laparoscopic sacrocolpopexy in a high-volume tertiary centre: a propensity-matched study
Author/Journal: Mastrovito et al., J Robot Surg, 2025
Study design: Propensity-matched retrospective study
Study aim: To evaluate the safety and feasibility of novel multi-arm robotic platforms.
Sample size: 450 patients
Results: The Hugo™ RAS system proved safe and effective in performing SCP for symptomatic POP, representing a feasible alternative to laparoscopy.

Title: Comparison of perioperative and postoperative outcomes between single-port robotic sacrocolpopexy and multi-port approaches
Author/Journal: Ferrigni et al., Int Urogynecol J, 2025

Study design: Retrospective cohort study
Study aim: To evaluate the feasibility and perioperative outcomes of single-port robotic (RSP) sacrocolpopexy (SCP) in comparison with the multi-port approach (RMP)
Sample size: 109 patients
Results: Single-port robotic sacrocolpopexy is a safe and feasible minimally invasive technique to address apical pelvic floor prolapse.

Title: Comparison of surgical outcomes between robotic and laparoscopic sacrocolpopexy with concomitant total hysterectomy for pelvic organ prolapse: a retrospective cohort study
Author/Journal: Ota et al., J Obstet Gynaecol Res, 2025
Study design: Retrospective cohort stud
Study aim: To compare short- and long-term surgical outcomes between robotic sacrocolpopexy (RSC) and laparoscopic sacrocolpopexy (LSC), performed with concomitant total hysterectomy, in patients with symptomatic pelvic organ prolapse (POP)
Sample size: 167 patients
Results: RSC with concomitant hysterectomy is a safe and effective alternative to LSC with comparable short- and long-term outcomes. Despite longer operative times, RSC offers anatomical benefits without increasing the risk of postoperative complications or recurrence.

Title: Feasibility and clinical outcomes of robot-assisted sacrocolpopexy using autologous round ligament grafts: a novel non-mesh surgical approach for pelvic organ prolapse
Author/Journal: Togami et al., Medicina (Kaunas), 2025
Study design: Retrospective study
Study aim: To evaluate the feasibility and clinical outcomes of a novel non-mesh robot-assisted sacrocolpopexy (RSC) using autologous round ligament (ARL) grafts in patients with pelvic organ prolapse (POP)
Sample size: 92 patients
Results: The procedure is feasible and effective, avoids the use of synthetic mesh, and offers short-term outcomes comparable to those of mesh-based RSC. ARL-based RSC represents a promising alternative, especially for patients at risk of mesh-related complications.

TRAINING AND SIMULATION

Title: A deep dive into the essential steps of robotic-assisted laparoscopic hysterectomy for trainees
Author/Journal: Timoh et al., J Gynecol Obstet Hum Reprod, 2026
Study design: Retrospective observational study
Study aim: To evaluate robotic-assisted laparoscopic hysterectomy (RALH) procedures from an educational perspective and compare trainee versus expert surgical performance across various phases and steps using a surgical process model (SPM)
Sample size: 57 sequential RALH video recordings
Results: Expert surgeons (n=38 procedures) consistently outperformed surgeons with limited RALH experience. Given the evidence indicating a significant skill gap, it is critical for surgeons with limited RALH experience to prioritize refining specific technical skills.

Title: Evaluation of robotic exposure among gynaecological surgeons: results of survey from the Young European Advocates of Robotic Surgery (YEARS)
Author/Journal: Fernandez-Gonzalez et al., J Robot Surg, 2026
Study design: Cross-sectional survey
Study aim: To identify factors associated with higher self-perceived confidence in performing robotic surgery among early-career gynaecologic surgeons and to assess satisfaction with current surgical activity among young consultants
Sample size: 81 respondents
Results: Being older than 35 years and performing robotic surgery at least once weekly are associated with greater confidence in the robotic approach, emphasizing the importance of experience and exposure.

Title: Learning curves, safety, and experiences of a tertiary surgical centre in the introduction of robotic-assisted surgery in gynaecological oncology
Author/Journal: Jung et al., Arch Gynecol Obstet, 2026
Study design: Retrospective data analysis
Study aim: To specifically examine the learning curve progression and to present the trend of the professionalisation process in implementing the methodology in gynaecological oncology
Sample size: 107 patients
Results: Rapid learnability of robotic-assisted operations was demonstrated. A positive effect on the learning curve of individual surgeons was evident after approximately 20 procedures.

Title: Equivalent certificate training programme for gynaecological robotic surgery: a multicenter feasibility study
Author/Journal: Komatsu et al., Asian J Endosc Surg, 2026
Study design: Multicentre feasibility study

Study aim: To evaluate the feasibility, safety, and short-term effectiveness of a society-led, proctor-guided equivalent certificate programme designed to support the supervised initiation of robot-assisted gynaecological surgery in Japan
Sample size: 14 surgeons
Results: A structured, society-led equivalent certificate program is a feasible and safe approach for the supervised introduction of robot-assisted gynaecological surgery.

Title: Implementation of the Hugo robotic system: early outcomes and learning curves in hysterectomy by surgeons with and without prior robotic experience
Author/Journal: Komatsu et al., Asian J Endosc Surg, 2026
Study design: Retrospective analysis
Study aim: To characterize early learning curves for two gynaecological oncologists and their first assistants using the Hugo robotic-assisted surgery system for hysterectomy in benign uterine disease or FIGO stage IA endometrial cancer
Sample size: 2 surgeons
Results: In early Hugo RAS adoption, prior robotic experience led to a shorter learning curve, but robotics-naïve surgeons achieved proficiency within approximately 15 cases without compromising safety.

Title: Minimally invasive hysterectomy approaches: comparative learning curves and perioperative outcomes of robotic versus V-NOTES techniques
Author/Journal: Kantarcı et al., J Clin Med, 2025
Study design: Retrospective cohort study
Study aim: To compare perioperative outcomes and learning curves of robotic hysterectomy and transvaginal natural orifice transluminal endoscopic surgery (V-NOTES) hysterectomy performed for benign gynaecological conditions in a high-volume tertiary centre
Sample size: 100 patients
Results: Both techniques are safe and effective. Robotic hysterectomy offers shorter operative time and less blood loss, while V-NOTES provides cosmetic and recovery advantages. Learning curve analysis indicates a longer adaptation period for V-NOTES, with anterior colpotomy as the most critical step, whereas robotic hysterectomy demonstrates a shorter and more straightforward learning process.

Title: Evaluating the learning curve in robot-assisted laparoscopic total hysterectomy: single-port versus multi-port da Vinci platforms
Author/Journal: Vizza et al., J Robot Surg, 2025
Study design: Retrospective comparative study
Study aim: To assess and compare the learning curves of the da Vinci S multi-port (MP) and da Vinci single-port (SP) platforms for total hysterectomy, with particular attention to how prior MP experience influences SP performance
Sample size: 147 patients
Results: Much of the experience gained with the da Vinci multiport system is transferable to the SP platform, allowing for a shorter learning curve and rapid achievement of surgical mastery with similar learning phases.

Title: Surgical efficiency for gynaecological surgery with a single robotic console: the value of the surgical team and robotic technology in maximizing efficiency on intensive surgical days: a comprehensive analysis
Author/Journal: Zachariou et al., J Robot Surg, 2025
Study design: Retrospective study
Study aim: To evaluate the surgical efficiency based on the number of daily procedures by analysing various time components of the surgical process
Sample size: 108 patients
Results: Robotic surgery is feasible and efficient, whether the day is intensive or relatively easy. We can greatly increase efficiency by standardizing the preparation processes and improving the time taken to dock and undock.

OBSTETRICS

Title: Robot-assisted transabdominal cervical cerclage with the Hugo RAS system: surgical technique and perioperative outcomes in a high-risk obstetric case
Author/Journal: Stefano et al., J Minim Invasive Gynecol, 2026
Study design: Case report
Study aim: To demonstrate the RA-TAC technique and setup in a complex patient using the Hugo™ RAS system (Medtronic, Minneapolis, MN)
Sample size: 1 patient
Results: Robotic-assisted surgery represents a feasible option for transabdominal cerclage, particularly in patients with obesity or intra-abdominal adhesions. This article illustrates technique, feasibility, and potential benefits of RA-TAC.

FERTILITY

Title: Outcome and surgical technique of robot-assisted living donor hysterectomy for uterus transplantation
Author/Journal: Tamate et al., J Minim Invasive Gynecol, 2025
Study design: Feasibility study
Study aim: To demonstrate the RA-TAC technique and setup in a complex patient using the Hugo™ RAS system (Medtronic, Minneapolis, MN)
Sample size: 18 patients
Results: While the primary goal of UTx is to achieve live birth, it is crucial that donor surgery remains safe and efficient. All uteri were successfully implanted in recipients, resulting in 10 successful live births to date. The presented standardised technique represents a safe approach that minimises donor harm and allows for the preservation of donor ovaries.

CONCLUSION

The recent literature confirms that robotic surgery in gynaecology is safe and feasible across a range of procedures, including hysterectomy and myomectomy. It appears particularly useful in complex cases, although higher costs and, in some cases, longer operative times remain limitations.

The emergence of new robotic systems and techniques highlights the rapid evolution of the field, but most available data are still based on small or retrospective studies. Further prospective and comparative research is needed to better define the role of robotic surgery and its long-term benefits.

Overall, robotic surgery continues to develop as a valuable tool in gynaecological practice, with outcomes strongly influenced by surgical experience and appropriate patient selection.

ROBOTIC ALTERNATIVES

to Sacrocolpopexy for Apical Pelvic Organ Prolapse

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Introduction

Pelvic organ prolapse (POP) is a common, distressful condition affecting women around the world, with a prevalence ranging from 3% to 56%.[1,2] It refers to the downward displacement of the vaginal apex, uterus, or cervix and is frequently associated with descent of adjacent pelvic organs (including the bladder and rectum), resulting in protrusion into the vaginal canal or - depending on severity - beyond the vaginal introitus. Common symptoms include vaginal bulging, pelvic pressure, pelvic pain, and urinary and bowel dysfunction.

Advanced prolapse with apical failure is the most challenging, as it reflects failure of the primary support structures of the pelvic floor. It is frequently associated with anterior and/or posterior compartment prolapse, resulting in multicompartmental defects. Therefore, surgical correction must address multiple anatomical compartments.[3]

Since the 1990s, sacrocolpopexy (SCP) has been considered the gold standard for the surgical treatment of apical prolapse due to its high anatomical success rates. Transabdominal approaches are particularly suitable for advanced apical prolapse and multicompartmental defects. These procedures typically involve suspension of the vaginal apex, cervix, or uterus using prosthetic materials and may include correction of anterior and posterior vaginal wall defects. The widespread adoption of minimally invasive approaches, including laparoscopy and robotic surgery, has further increased the use of abdominal suspension techniques.[4]

Despite its excellent outcomes, SCP requires technically demanding surgical steps, particularly sacral promontory dissection, which may be associated with increased operative complexity and potential complications. Consequently, alternative abdominal suspension techniques have been developed to reduce surgical morbidity while maintaining comparable anatomical outcomes.[5]

Abdominal Lateral Suspension

Abdominal lateral suspension (ALS) is a transabdominal technique developed to correct apical and anterior compartment prolapse without requiring sacral promontory dissection. During ALS, the anterior vaginal wall, uterine cervix, and isthmus are sutured to a T-shaped synthetic mesh implanted in the vesicovaginal space *[Figures 1,2]*.

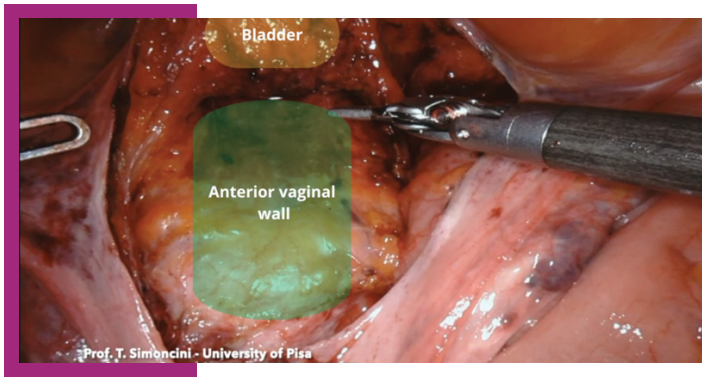

Figure 1, Robotic dissection of the vesicovaginal space during abdominal lateral suspension. The anterior vaginal wall is exposed prior to mesh positioning.

Figure 2, T-shaped synthetic mesh positioned over the anterior vaginal wall and cervix during robotic lateral suspension prior to fixation.

The lateral arms of the mesh are anchored bilaterally to the abdominal wall posterior to the anterior superior iliac spine, providing apical suspension and anterior compartment support *[Figures 3,4]*.

This technique allows simultaneous correction of apical and anterior prolapse. Several studies on laparoscopic lateral suspension have demonstrated anatomical success rates exceeding 90%, comparable to laparoscopic SCP.[6–11] Data on robotic lateral suspension remain limited.[12,13] However, recently was demonstrated that robotic lateral

suspension achieved an objective cure rate greater than 90% at two-year follow-up in patients with advanced apical and anterior prolapse.[14]

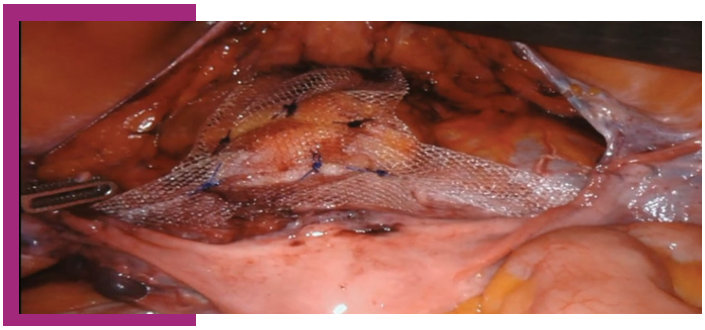

Figure 3, Final configuration of the T-shaped mesh during robotic abdominal lateral suspension. The central portion is secured to the anterior utero-vaginal wall, and the lateral arms have been passed bilaterally toward the abdominal wall to provide apical and anterior compartment support.

Furthermore, a recent prospective, multicenter non-inferiority study comparing abdominal lateral suspension (ALS) and abdominal SCP demonstrated comparable outcomes. The objective cure rate for apical prolapse was 92% for ALS and 94% for abdominal SCP, confirming non-inferiority ($p<0.01$). Subjective cure rates exceeded 90% for both procedures, and no major postoperative complications were reported. These findings are consistent with previous studies evaluating laparoscopic and robotic suspension techniques.[7,15]

Interest in ALS has increased due to its technical advantages. Specifically, ALS avoids sacral promontory dissection and rectovaginal space dissection, thereby simplifying the procedure and potentially reducing operative risks.[16,17] The overall anatomical success rate reported in the literature exceeds 90% for the apical compartment.[18] However, important anatomical differences exist between ALS and SCP. While both procedures provide effective apical correction, SCP remains superior for treating posterior compartment defects. In contrast, ALS is particularly effective for anterior compartment prolapse. The specific mesh configuration used in ALS allows restoration of pubocervical fascia support through combined lateral traction and central suspension, effectively correcting anterior prolapse.

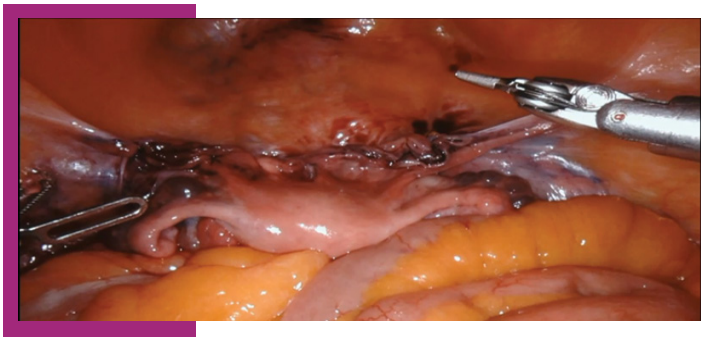

Figure 4, Final intraoperative view after complete peritoneal reclosure. The mesh is fully covered by the peritoneum, restoring normal anatomical planes at the end of robotic abdominal lateral suspension.

However, ALS does not address posterior compartment defects and does not provide posterior displacement of the vaginal apex, resulting in a wider Douglas pouch compared with SCP. Despite these limitations, ALS represents an important alternative surgical strategy. It may serve as a primary procedure in selected patients or as a backup strategy in cases of SCP failure or when sacral dissection is technically challenging, such as in patients with anatomical variations including low vena cava bifurcation.

Pectopexy

Pectopexy is an emerging abdominal suspension technique first described in 2007. In this procedure, the vaginal apex is suspended bilaterally to the iliopectineal (Cooper's) ligaments using a synthetic mesh. Unlike SCP, pectopexy does not require sacral promontory dissection, thereby avoiding potential complications associated with sacral fixation.

Importantly, fixation at the iliopectineal ligaments preserves the physiological vaginal axis, as the fixation points correspond closely to the S2 level, which represents the natural axis of vaginal support. The procedure can be performed via laparotomy, laparoscopy, or robotic surgery. Laparoscopic mesh-supported pectopexy was introduced by Banerjee et al. in 2011[19] *and has since been increasingly adopted worldwide.*[20,21]

Robotic pectopexy remains relatively underreported. However, Bolovis et al.[22] described a series of 30 patients treated using the da Vinci Xi robotic system, demonstrating excellent anatomical outcomes and safe perioperative management. The robotic approach facilitates precise anatomical dissection and mesh placement, improving surgical accuracy compared with conventional laparoscopy.

Preservation of the physiological vaginal axis may contribute to the favorable anatomical outcomes observed with pectopexy. In contrast, SCP and sacrospinous fixation have been shown to alter vaginal axis orientation.[23]

Uterosacral Ligament Suspension

Growing concerns regarding synthetic mesh use have increased interest in native tissue repair techniques, although abdominal mesh procedures have lower complication rates compared with vaginal mesh repairs.[24] Uterosacral ligament suspension (USLS) is one of the most commonly used native tissue procedures for apical prolapse repair. In this technique, the uterosacral ligaments are sutured to the vaginal apex or cervix to restore anatomical support.

The procedure may be performed vaginally or laparoscopically. The uterosacral ligaments represent the primary anatomical support of the vaginal apex. However, their anatomy is complex and highly variable, with close proximity to critical structures including the ureters, nerves, and vessels.[25] In vaginal approach, serious perioperative complications, including ureteral injury, bleeding, and pelvic pain, have been reported in up to 16.5% of cases.[26] The laparoscopic approach offers significant advantages over the vaginal approach, including improved visualization of the ureters and safer suture placement.[27]

Laparoscopic/robotic USLS offers several advantages:
- No mesh use
- Preservation of vaginal length
- Maintenance of physiological vaginal axis
- Low rates of dyspareunia and chronic pelvic pain

Despite these advantages, laparoscopic/robotic USLS remains less widely adopted due to its technical complexity.

Role of Robotic Surgery

The introduction of robotic surgery has significantly expanded minimally invasive reconstructive options for POP. It is particularly advantageous for technically demanding reconstructive procedures. Robotic platforms such provide: three-dimensional high-definition visualisation, tremor elimination, motion scaling, and wristed instruments with enhanced dexterity. These features facilitate precise dissection and suturing, overcoming limitations of conventional laparoscopy.

Conclusion

Minimally invasive SCP remains the gold standard for apical pelvic organ prolapse repair. However, alternative robotic techniques have emerged as effective surgical options. Robotic lateral suspension represents a valid alternative, particularly for anterior and apical prolapse. Robotic pectopexy offers promising anatomical outcomes while preserving vaginal axis.

Robotic uterosacral ligament suspension provides an effective mesh-free native tissue repair option. Robotic surgery enhances surgical precision and expands reconstructive possibilities. Individualized surgical planning remains essential to optimise anatomical and functional outcomes.

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