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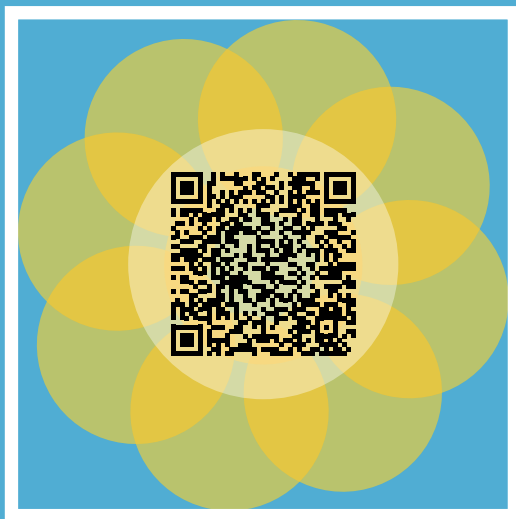
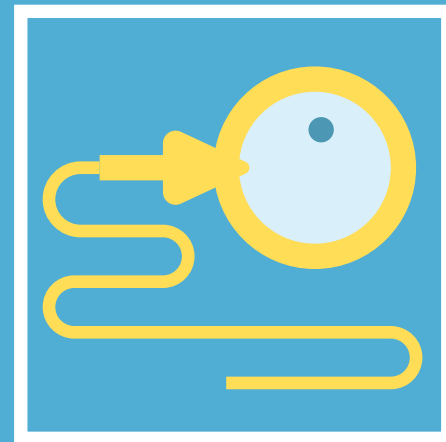
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BACK TO THE FUTURE

Master in Endometriosis: What is needed to become an expert?

H. Krentel¹, S. D. Schaefer², D. Salehin³, J. Keckstein⁴, E. Oral⁵, C. Exacoustos⁶, S. P. Renner⁷, A. Bokor⁸,
H. Roman⁹, H. Tinneberg¹⁰, M. Sillem¹¹, K. W. Schweppe¹², K. Bühler¹³, L. Kiesel², R. L. De Wilde¹⁴

Background: Endometriosis is a frequent benign disease of female patients in reproductive age causing a complexity of symptoms including pelvic pain, dysmenorrhea, dyspareunia, dysuria and dyschezia. The condition presents itself in a wide range of subjective and objective severity. It often coincides with impaired fertility and can present in the form of deep infiltrating endometriosis including organ damage. Endometriosis seems to be a hormon-dependent disease associated with inflammatory reactions. The cause of the disease remains unclear, thus a causal therapy does not exist.

The diagnostic and therapeutic possibilities are as complex as the disease itself, combining a variety of diagnostic methods from clinical examination to MR imaging with surgical and hormonal treatment options, assisted reproductive techniques, pain management, complementary medicine and rehabilitation in order to tailor individual approaches for patients with endometriosis. What is needed to become an expert in endometriosis? A training model including all aspects of the disease has been developed considering the current literature and expert opinions.

Conclusion: The necessary skills to become an expert in endometriosis diagnostics and therapy can be achieved following a structured comprehensive training model including the different fields involved in the treatment of patients with endometriosis.

Key words: endometriosis, adenomyosis, training, skills, minimally invasive surgery, ultrasound, human reproduction, laparoscopy, hysteroscopy, imaging, endocrinology

Master in Endometriose. Was ist nötig, um Experte zu werden? *Hintergrund:* Endometriose ist eine häufige, gutartige Erkrankung der Frau, die zu komplexen Symptomen wie Unterbauchschmerzen, Dysmenorrhoe, Dyspareunie, Dyschezie und Dysurie führen kann. Das Beschwerdespektrum kann individuell sehr unterschiedlich ausgeprägt sein und auch die Fruchtbarkeit kann negativ beeinflusst werden. Endometriose kann als tief-infiltrierende Form auftreten und hierbei betroffene Organe in ihrer Funktion einschränken. Die Erkrankung ist hormonabhängig und führt zu einer Entzündung in den betroffenen Geweben. Die Ursache der Erkrankung ist nicht abschließend geklärt, weshalb eine kausale Therapie bislang nicht existiert.

Die diagnostischen und therapeutischen Möglichkeiten sind umfangreich. Entsprechend der verschiedenen Formen des Auftretens der Erkrankung und der jeweiligen Lokalisation der Endometriose stehen klinische, sonographische und radiologische Untersuchungsmethoden zur Verfügung. Die Therapiekonzepte umfassen Hormontherapien, operative Eingriffe, reproduktionsmedizinische Maßnahmen, Schmerztherapien, komplementäre Ansätze und Rehabilitationen, mit dem Ziel einer individuellen Behandlung der von Endometriose betroffenen Patientinnen. Was ist nötig, um Experte in der Diagnostik und Therapie der Endometriose zu werden? Auf Basis der aktuellen Literatur und Expertenmeinungen wurde ein Trainings- und Ausbildungsmodell unter Berücksichtigung aller Aspekte des Krankheitsbildes entwickelt.

Schlussfolgerung: Die erforderlichen Fähigkeiten und Fertigkeiten auf dem Weg zum Experten für die Behandlung der Endometriose können unter Berücksichtigung der verschiedenen beteiligten Fachbereiche durch ein strukturiertes und umfangreiches Trainingsmodell erworben werden. **J Reproduktionsmed Endokrinol 2022; 19 (5): 296–303.**

Schlüsselwörter: Endometriose, Adenomyose, Training, Fähigkeiten, minimal-invasive Chirurgie, Ultraschall, menschliche Fortpflanzung, Laparoskopie, Hysteroskopie, Bildgebung, Endokrinologie

■ Introduction

Endometriosis is a difficult disease – Difficult for the patient, but also for the physician. The problem starts with the missing answer to the cause of endometriosis and thus a simple causal treatment option. It continues with the difficulties in diagnosing endometriosis leading to misdiagnosis or under- or overestimation of the disease and a diagnostic delay and it ends in the challenge to find a feasible and effective individual mix of medical, surgical and reproductive treatment options. However, there are

reliable diagnostic tools available in order to detect endometriosis and different potential therapeutical approaches exist, in order to effectively help patients with endometriosis in terms of treating pain and/or infertility. The quality of diagnosis, therapy and counseling of patients regarding the complexity of all aspects including fertility, obstetrics, endocrinology, rehabilitation, pain management, psychosomatic medicine and complementary medicine depends on the knowledge and the broad education of the physician and appropriate abilities in diagnostic tools and surgical

techniques. Of course, an expert in endometriosis not necessarily needs to be an expert in transvaginal ultrasound and pelvic laparoscopic surgery and assisted reproductive techniques and psychotherapy and endocrinology and radiology at the same time. But all physicians involved in the treatment of patients with endometriosis at least should have the knowledge and the capabilities to advise the patients in all aspects of the disease and should be able to put all the pieces of the mosaic together. E.g. an endometriosis surgeon should determine the extent of deep endometriosis and adenomyosis

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From ¹Clinic of Gynecology, Obstetrics, Gynecological Oncology and Senology, Academic Teaching Hospital Bethesda Krankenhaus Duisburg, Germany; ²Clinic of Obstetrics and Gynecology, University Hospital Münster, Münster, Germany; ³Clinic of Obstetrics and Gynecology, Evangelisches Krankenhaus Bethesda, Mönchengladbach, Germany; ⁴Endometriosis Clinic, Dres. Keckstein, Villach, Austria; ⁵Endometriosis and Adenomyosis Society, Istanbul, Turkey; ⁶Obstetrics and Gynecology Unit, Department of Surgery, University of Rome "Tor Vergata", Rome, Italy; ⁷Frauenklinik, Kliniken Böblingen, Klinikum Sindelfingen-Böblingen, Germany; ⁸Department of Obstetrics and Gynecology, Semmelweis University, Budapest, Hungary; ⁹Endometriosis Center, Clinique Tivoli-Ducos, Bordeaux, France; ¹⁰Frauenklinik, Nordwest Krankenhaus, Frankfurt am Main, Germany; ¹¹Praxisklinik am Rosengarten, Mannheim, Germany; ¹²Clinic of Gynecology and Obstetrics at Ammerland – Klinik Westerstede, Westerstede, Germany; ¹³Stiftung Endometrioseforschung, Westerstede, Germany; ¹⁴Clinic of Gynecology, Obstetrics and Gynecological Oncology, University Hospital for Gynecology, Pius-Hospital Oldenburg, Medical Campus University of Oldenburg, Germany

Correspondence: Harald Krentel, MD; Clinic of Gynecology, Obstetrics, Gynecological Oncology & Senology, Academic Teaching Hospital, Bethesda Krankenhaus Duisburg, D-47053 Duisburg, Heerstraße 219; e-mail: h.krentel@bethesda.de

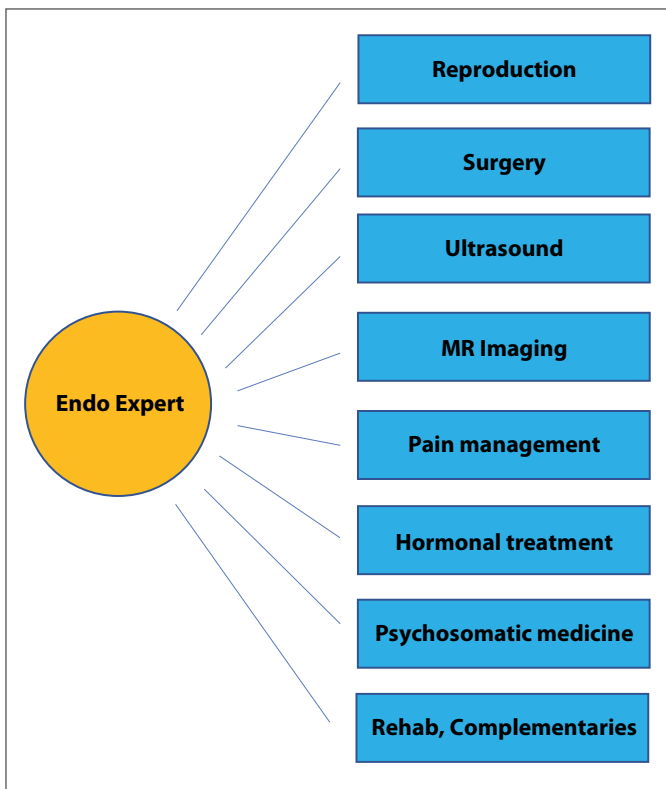


Figure 1. Different aspects of being an endometriosis expert.

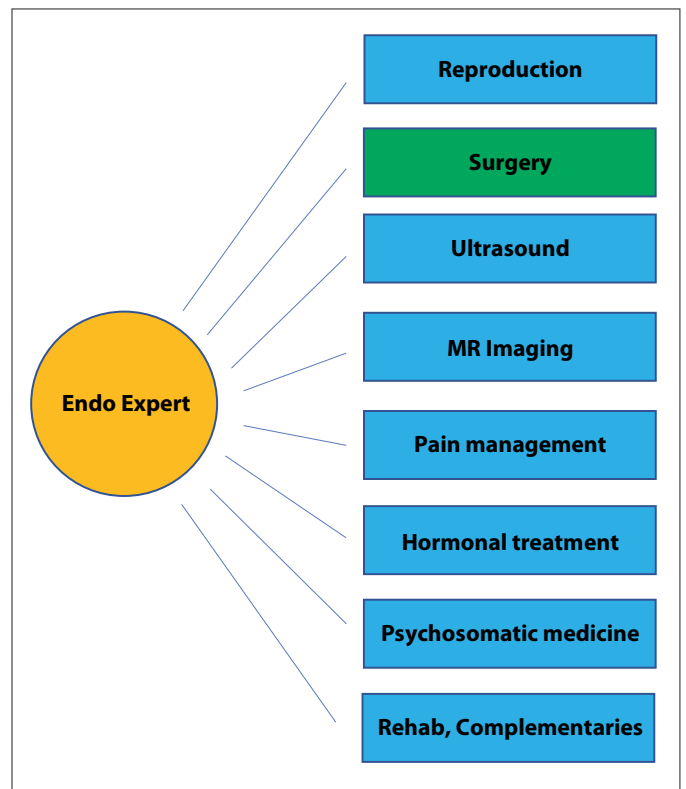


Figure 2. The endometriosis expert with emphasis on surgery.

before surgery, by being able to perform a transvaginal and abdominal ultrasound examination or by being part of an institutional network including experts in imaging. A detailed surgical strategy including informed consent, instrumentation and interdisciplinarity can only be achieved by combining diagnostic and therapeutic skills. The risk of complications and incomplete surgeries can be decreased and the number of successful treatments in terms of pain reduction and fertility might be improved. Additionally the pelvic surgeon should be able to consider the fertility aspects of the treatment and be able to understand the principles of microsurgical approach in order to preserve the integrity of the reproductive organs. Similarly, the understanding of surgical principles and results and the ability to perform ultrasound examinations in patients with endometriosis are indispensable conditions for a successful reproductive treatment of infertile patients with endometriosis, especially in cases with additional adenomyosis. Both, pelvic surgeon and fertility specialist, should not only be able to counsel endometriosis patients in surgical or reproductive questions, but also in medical treatment options, pain medication, rehabilitation, complementary treatment options and social, psychosomatic and psychotherapeutic aspects.

■ The educational model

Nobody can be the best in every detail at the same time, that's why we believe that networks of experts are indispensable for a high quality in the treatment of patients with endometriosis. Nevertheless an expert on endometriosis at least should assume knowledge and skills from all different aspects of importance in the diagnosis and treatment of patients with endometriosis with emphasis on a main specialization. E.g., a pelvic gynecological surgeon places emphasis on surgical aspects of the disease, while a specialist in reproductive medicine places emphasis on reproductive aspects in endometriosis related infertility. However, in order to become an endometriosis expert both specialists also should be trained in all other relevant aspects of the disease including ultrasound skills and interpretation, interpretation of MR imaging, pain management, hormonal treatment options, psychosomatic issues, rehabilitation programs and alternative treatment approaches with complementary medicine (Fig. 1).

And this also applies for radiologists focusing on MR Imaging in endometriosis and adenomyosis, for sonographers specialized in deep endometriosis and adenomyosis, it applies for endocrinolo-

gists, pain therapists, psychotherapists and specialists in rehabilitation. The educational concept presented here respects that all experts involved in the diagnosis and treatment of endometriosis require a specific educational route in order to become an expert in endometriosis in their field. This comprehensive understanding of the educational requirements, enable the counseling of the endometriosis patients from the perspective of all specialists involved. The ideal solution is an interdisciplinary case conference of all specialists involved in the diagnosis and treatment of patients with endometriosis as it is common in gynecological oncology. Together, all experts should master the complete keyboard of diagnostic and therapeutic approaches (Fig. 2).

■ Components of training to become an endometriosis expert

In order to learn and understand the complexity of endometriosis and its diagnostic and therapeutic approaches a variety of educational components on the way to become an endometriosis expert are required: workshops on reproductive medicine, hormonal treatment, pain management, postsurgical treatment, psychosomatic medicine and diagnostics including ultrasonography and MR

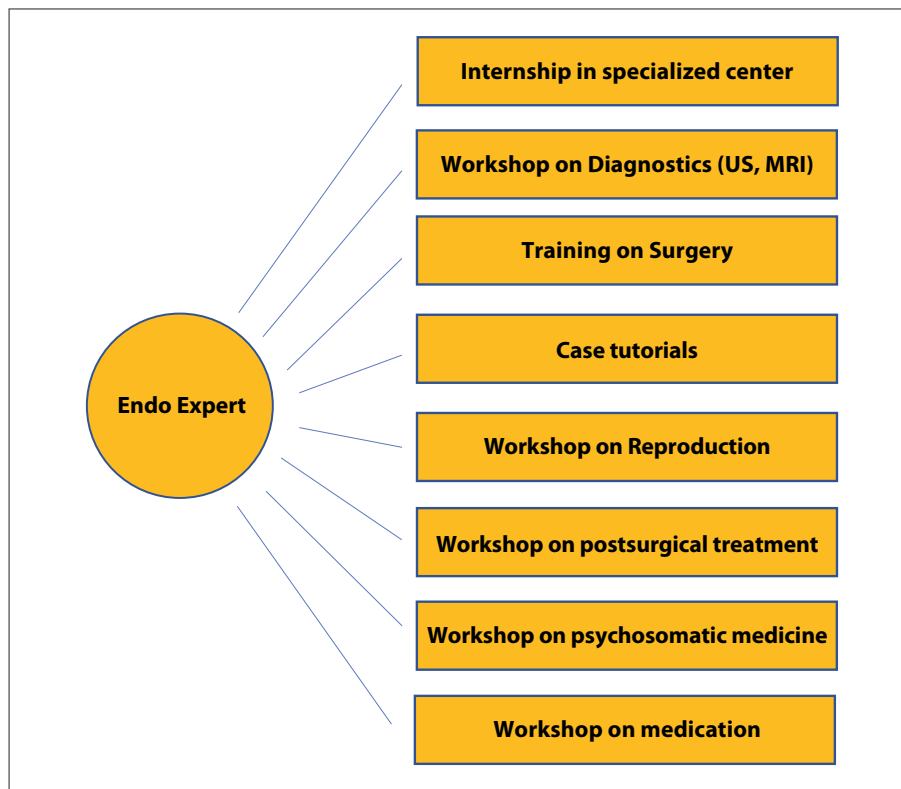


Figure 3. Components of training to become an endometriosis expert.

imaging, an internship in a specialized center, case tutorials and surgical skills training (Fig. 3).

In our opinion an endometriosis surgeon (expert with emphasis on surgery) needs to be trained in all aspects of the disease, while the endometriosis expert with emphasis on reproduction should complete an internship and visit workshops on diagnostics, reproduction and endometriosis, psychosomatic medicine and hormonal medication and pain management but not necessarily needs to complete the surgical skills training. This also applies for an endometriosis expert with emphasis on ultrasound and/or MR imaging. However, the sonographer and the radiologist would be able to enhance their diagnostic forecasts of the extent of the disease, when they could correlate their diagnostic results with the surgical view of the disease and therefore could benefit from a certain surgical training and experiences.

Internship in a specialized center

A center of endometriosis implements all necessary infrastructural pathways in order to guarantee a high quality of treatment. The requirements to become a certified center have been described by Schweppe et al. [1] and recently by Burghaus et al. [2]. An internship in a specialized and certified endometriosis

center offers the opportunity to observe all steps of diagnosis and treatment in patients with endometriosis, regarding individual skills and capabilities in diagnosis and surgery, but also in terms of structural necessities and quality of processes. Thus, the complexity of the disease and the necessity of an interdisciplinary network can be observed.

Workshop on hormonal treatment

Hormonal treatment with gestagens only, combined oral contraceptives, LNG-IUDs, GnRH analogues, GnRH antagonists, aromatase inhibitors, selective progesterone receptor modulators, etc. play an important role in the treatment of endometriosis from adolescence to premenopause. The selection of the individual hormone and dose depends on various factors like age, family planning, type and extend of endometriosis, side effects, additional diseases, etc. In order to be able to tailor the medical treatment approach in every patient, a special training and education is needed.

Case tutorials

From theory to practical understanding: case tutorials can help to train decision taking in real cases of endometriosis. Different cases are presented by a panel of experts and step by step diagnostic and therapeutic decisions are taken by

the participants. All cases should be presented with all relevant details such as clinical history, examination results, ultrasound videos of pictures and MR images if applicable. A possible solution should be presented at the end of every case and be discussed with the participants. In this way case tutorials guarantee an interactive process in order to develop therapy plans for different types of endometriosis and patient constellations. Case tutorials can be part of a combined course or a single event of e.g. two hours in small groups, but also can be realized in larger groups, e.g. as a plenary session in congresses with electronic voting. Small group events guarantee an optimized trainer to trainee relation and thus a more effective team-based learning.

Surgical skills training

A large variety of surgical skills trainings, especially in laparoscopy and hysteroscopy, has been existed for many years. The traditional training approach based on observing and assisting has been modified by incorporating box training or modern digital simulators [3]. Basic skills like hand-eye coordination, hand-hand-coordination and suturing can be learned in these workshops. National and international certification systems are available and facilitate an educational process from beginner to specialist. In 2005 the gynecologic working group of the german society of obstetrics and gynecology (AGE) presented a new concept for individual training and certification in gynecologic minimal-access surgery. The concept is sub-divided into a personal qualification (MIS I-III) and an institutional qualification as approved certified training centers [4]. The European Society for Gynecological Endoscopy (ESGE) established a structured certification and diploma programme with also three levels of expertise from bachelor to laparoscopic pelvic surgeon. These programmes supersedes the traditional surgical apprentice tutor model and increase patient safety and surgical performance [5]. The achievement of a personal certification by e. g. AGE and/or ESGE proves the individual expertise of a laparoscopic surgeon and should be acknowledged in the definition of expert in endometriosis surgery. However, the existing certification systems and skills courses do not focus on certain diseases like endometriosis, but involve all fields

of gynecological minimal-access surgery from urogynecology to oncology. Endometriosis surgery in some aspects needs a more specific training. This includes parametrial dissection techniques, ureterolysis, ureteral suturing, ureteral reimplantation, pararectal dissection, rectal shaving, rectal suturing, different types of rectal discoid and segmental resection, nerve sparing deep pelvic preparation, suturing of bladder and vagina, different techniques of ovarian endometriosis surgery, adhesion prevention, techniques of laparoscopic and open adenomyosis surgery and hysteroscopy in adenomyosis. E. g. to be a MIS III certified gynecological laparoscopist does not necessarily mean that this surgeon is a specialist in laparoscopic surgery in deep endometriosis, but the individual certificate could be a condition to enter a more specific skills course in deep endometriosis surgery. This type of skills training could be offered by certified and highly specialized endometriosis centers for very small groups or be part of intern- or fellowships.

Workshop on reproductive medicine

A workshop on reproductive medicine for endometriosis experts should contain all relevant aspects of endometriosis and adenomyosis related infertility, the respective diagnostic steps, medical and surgical treatment options and standards of assisted reproductive techniques in patients with endometriosis. The following topics should be included: reproductive anatomy and physiology of reproduction; functional diagnostic tests; specific clinical history; the relevance of AMH and AFC; relation of endometriosis and fallopian tube, ovary and peritoneum; possibilities of microsurgery; standard procedures in ART; adenomyosis and ART; ART and endometrioma; endocrinology. This training should be shaped for all experts in endometriosis considering their specific field of interest.

Workshop on pain management

Pain is the main symptom in patients with endometriosis [6]. Most of the patients use one or several pain killers. A standardized pain therapy does not exist and pain treatment is not yet implemented in many endometriosis centers. A workshop on pain management should include the following topics: pathophysiology of pain in patients with endometriosis,

different types of pain, different types of pain killers, combined pain therapy, coping strategies in chronic pain, pelvic floor muscles and pelvic pain, complementary medicine in pain management, pelvic neuromodulation and nerve sparing surgery. The participants should learn when and how to treat pain and what is necessary to implement a pain unit within an endometriosis center.

Workshop on postsurgical treatment

The treatment of patients with endometriosis does not end with the surgery. Every patient with endometriosis needs an individual postsurgical concept considering recovery, follow-up, pain management, fertility, sexual relations, obstetrical aspects, hormonal treatment, nutrition, complementary medicine, rehabilitation and psychosomatic aspects of the disease. The management of the postsurgical period is of high importance for the individual patients' outcome, especially after complex radical deep endometriosis surgery and ongoing family planning. The development of a postsurgical recovery and treatment plan should always be part of the tailored approach for every patient.

Workshop on psychosomatic medicine

Endometriosis can have a huge impact on patients' life including private life, partnership, sexual relations, work, social contacts and private economical aspects [7]. This workshop should show these effects of the disease on the patients' psychological, sexual and social well-being and how psychotherapeutic interventions can help to recover from endometriosis, endometriosis therapies, infertility and how to cope with endometriosis and its direct or indirect symptoms.

Workshop on diagnostics (ultrasonography and MR imaging)

This specific workshop only focuses on the diagnostic steps in endometriosis and adenomyosis. The following topics should be included: clinical history, with an emphasis on sexual function, quality of life and pain, ultrasonography of kidney, ovary, fallopian tube, peritoneum, pouch of Douglas, vagina, rectum, bladder, ureter, uterus, rectovaginal septum, adhesions including criteria of adenomyosis in 2D and 3D ultrasound based on the evidence in recent literature [8–10].

Additionally Doppler sonography, elastography, rectal endosonography should be topics of this diagnostic workshop. The diagnostic techniques and findings in ultrasound should be completed by MRI interpretation and the role of hysteroscopy, colonoscopy and cystoscopy in the diagnosis of the disease. The presentation of cases could be combined with live ultrasound and hands-on training in small groups.

All components of training to become an expert of endometriosis can be acquired in single event courses or combined training courses. A certified training concept including all components based on the recommendations of different societies involved could be an option for a comprehensive education in diagnosis and therapy of endometriosis.

■ Masterclass on Endometriosis

In 2019 a six-day masterclass on endometriosis, combining the above-mentioned components of endometriosis education in one event, has been realized for the first time. A maximum of 15 physicians participated. An application process with CV and application letter guaranteed a homogenous group of specialists interested in a more specific training on endometriosis. Every participant had to be present during the complete six-day programme in order to be able to sit the final exam and to achieve the certification. The initial masterclass programme on endometriosis has been divided into three blocks of two days each with a total of 48 academic teaching hours. Every two-day block contains live surgery in three parallel ORs with approximately three surgeries including deep endometriosis, ovarian endometriosis, peritoneal endometriosis and adenomyosis. The participants are present in the OR and rotate in groups of five from one OR to the other. The faculty consists of the surgeons and the assisting team, but also an endometriosis expert, who is moderating the surgeries, discussing the surgical steps and answering the questions of the participants. Thus, different approaches, tips and tricks in order to solve difficult situations and avoid complications can be discussed and learned by the participants. The instrumentation is presented and the preferences of the surgeons regarding monopolar or bipolar energy and

ultrasound scalpels are discussed with the group. All surgical cases are presented prior to the surgery by a power point presentation including diagnostic steps and results and the individual indication for surgery within the treatment plan for every patient considering symptoms and fertility. The emphasis of this presurgical discussion lies on the description of the extent of the disease by using the #Enzian classification system. After the surgery, all cases are discussed within the complete group of participants, surgeons and faculty. The discussion includes pre- and intraoperative classification and a tailored postsurgical treatment plan incorporating reproductive measures, hormonal treatment, pain medication, complementary treatment options and rehabilitation programmes. Within the six-day event these contents are engrossed by additional case presentations, live ultrasonography of deep endometriosis and adenomyosis and presentation of MR images and their relation to ultrasound and surgery. The additional theoretical content of the masterclass is divided into three thematic blocks.

Day 1–2: Perspective of pain therapist, perspective of pathologist, perspective of gynaecologist, perspective of visceral surgeon, perspective of urologist, perspective of radiologist, perspective of specialist in reproductive medicine, state of the art hormonal treatment, state of the art rehabilitation after endometriosis surgery, self-help groups in endometriosis.

Day 3–4: Endometriosis and fertility, adenomyosis and fertility, hysteroscopy in endometriosis and adenomyosis, future of endometriosis therapy, pathogenesis of endometriosis, clinical diagnosis, ultrasonography in deep endometriosis and adenomyosis, MR imaging in endometriosis and adenomyosis, endometriosis and adhesions, economical aspects of endometriosis, Chinese medicine and endometriosis.

Day 5–6: Nutrition and endometriosis, anatomy of the pelvic retroperitoneum, surgical management of peritoneal endometriosis, surgical management of ovarian endometriosis, deep endometriosis of colon, rectum and vagina, deep endometriosis of bladder and ureter, interdisciplinarity in the management of deep endometriosis, surgical management of adenomyosis, surgical complications, en-

dometriosis and malignancy. At the end of each masterclass, a multiple-choice examination attempts to test the knowledge of the participants. The certification is obtained if more than 80 % of answers are correct. All 15 participants of the first German masterclass on endometriosis passed the exam of 12 MC questions. The educational programme has been evaluated by the 15 participants with an average grade of 9.7 (min. 1–max. 10).

■ Discussion

What may happen if diagnosis and treatment of endometriosis do not lay in the hand of an endometriosis expert? E. g., a retrocervical deep endo nodule can be overlooked and misdiagnosed for years, although the patient is suffering from dyschezia and dyspareunia and the nodule is palpable in clinical examination and visible in transvaginal ultrasound. Failure to perform a gynecological examination under general anesthesia as part of every endometriosis surgery can lead to misdiagnosis in case of hidden deep endometriosis. Adenomyosis could be missed by the examiner in transvaginal ultrasound. All these examples lead to an incorrect or incomplete treatment approach not corresponding to the patient's real situation. But not only the diagnosis of endometriosis and the correct description of the extent of the disease are enigmatic, but also the treatment itself. An endometriosis surgery can be radical, but anyhow incomplete or combined to severe complications. Unnecessary radical surgeries of the uterus or ovaries can negatively affect patients' fertility and thus can cause more problems than relief. On the other hand, a mild peritoneal endometriosis or a deep endometriosis nodule can be missed by an untrained laparoscopist leading to an inadequate diagnosis and therapy. Endometriosis surgery requires a very high level of surgical expertise, especially in cases of severe deep endometriosis including the ovaries, the fallopian tubes, the uterus, the bowel, ureter, bladder and pelvic nerves. Many surgical pitfalls are waiting possibly leading to complex complications. It is often challenging to find an adequate balance between pain management and fertility in surgical and medical treatment approaches.

In order to become an endometriosis expert frequent training and experience is indispensable.

Recently different endometriosis training courses are available mostly with emphasis on surgical aspects of the disease. Multiple studies showed the positive effects of different types of training in surgery and ultrasound examination. A condition for a successful surgery is the presurgical description of the disease by diagnostic tools. In some patients the only diagnostic sign can be a positive history. Especially in cases of a beginning peritoneal endometriosis in very young women, the disease can be invisible and unpalpable in clinical and ultrasound examination. In case of deep endometriosis and adenomyosis, a detailed presurgical staging of the extent of the disease and a potential organ involvement is possible by transvaginal ultrasound and MR imaging [11–13]. Various authors described the learning curve of transvaginal ultrasound for the diagnosis of endometriosis using the cumulative summation test [14–16]. Lazzeri et al. showed the effect of training on the interobserver reproducibility in transvaginal diagnosis of type and degree of adenomyosis [17] and Tammaa et al. described the interobserver agreement and thus the reproducibility of transvaginal ultrasound results in deep endometriosis in a double-blinded evaluation study [18]. Rosefort et al. compared trained and untrained ultrasound examiners in the diagnosis of deep endometriosis with rectal bowel involvement. In case of the untrained examiner transvaginal ultrasound was not significantly predictive for deep endometriosis and none of the bowel involvements was detected [19]. Guerriero et al. described a 2-week training programme based on a mixture of hands-on training and live scanning sessions for the diagnosis of deep endometriosis. The trainees reached competence after an average of 17 evaluations for bladder, 40 for rectosigmoid, 25 for vaginal vault, 44 for uterosacral ligament and 21 for rectovaginal septum locations for deep endometriosis [20]. Recently Leonardi et al reported that the number of performed and supervised scans per trainee can highly vary in order to reach competency in the detection of deep endometriosis [21].

Similar results have been shown for the training in surgical procedures. Kirby showed a decrease in the median duration of a surgical procedure in a simulator-based laparoscopic training model for residents in gynecology depending on

the surgical volume but also on the experience of the trainee [22]. Bojahr et al. reported on the positive effect of high surgical volume on the median duration of laparoscopic subtotal hysterectomy [23] and the correlation of intraoperative complications and surgical volume per surgeon has been shown by various authors using the example of laparoscopic hysterectomy [24–26]. Roman et al. recently described that crude complication rates are not an accurate marker of the skilled surgeons' expertise considering that more and more challenging procedures are related to a higher risk of complications and thus to a flattening of individual learning curve [27].

Since many years different training methods and personal certification systems in minimally invasive surgery in gynecology exist. Thus, a gynecological surgeon has the possibility to obtain a certain level of expertise and achieve a certification as e. g. laparoscopic pelvic surgeon. However a specific certification as endometriosis surgeon does not exist as yet. The learning curve in endometriosis surgery without doubt also depends on the surgical volume and the frequency of training, but as endometriosis surgery is much more complex than a simple hysterectomy, training in endometriosis surgery requires more time and a broader understanding of the complexity of the disease. The question is, what a specific training programme on endometriosis surgery skills should look like. How can surgical techniques like parametrial dissection techniques, ureterolysis, ureteral suturing, ureteral reimplantation, pararectal dissection, rectal shaving, rectal suturing, different types of rectal discoid and segmental resection, nerve sparing deep pelvic preparation, suturing of bladder and vagina, different techniques of ovarian endometriosis surgery, adhesion prevention techniques, approaches in adenomyosis surgery and hysteroscopy in adenomyosis be trained, if not by observing and assisting and performing surgery under the guidance of a skilled mentor. This can't be realized within some days of training in a workshop, but could be part of an endometriosis fellowship or a continuous training programme on endometriosis surgery. An appropriate condition for participants to such a programme could be a successfully completed certification process of AGE, ESGE or other societies. Who could be

able to train specific endometriosis skills in surgery, ultrasound and all the other mentioned components mentioned that make an endometriosis expert according to our model? Who would be appropriate to award an individual certificate of endometriosis surgery or becoming an endometriosis expert? At international level different certification systems for specialized endometriosis units have been established in the last years. These certified institutions should be suitable for personal training and individual certification of endometriosis experts under the roof of national or international societies. However, the criteria of each of these certification processes vary. In order to define globally accepted factors for a standard of individual and/or institutional certification and in order to define specific training criteria in terms of duration and content a consensus between the societies involved bundled in an international endometriosis network could be a helpful solution. Certified centers of excellence in endometriosis then could be approved training institutes of this international network and together cover all aspects of training to become an expert in endometriosis including the possibility of internship or fellowship. The implementation of an internationally recognized endometriosis logbook would then guarantee the acceptance of all approved training courses, masterclasses, workshops, congresses etc. In consequence, the participation in all mandatory workshops and their successful completion could be easily confirmed and finally the applicant would receive an international certification with the aval of the most relevant societies. This would guarantee high quality in training and education and facilitate the implementation of an international network of endometriosis training centers and endometriosis experts.

The idea of quality improvement in the treatment of patients with endometriosis has been described by Schweppe et al. [1]. Ebert et al. reported a 5-year experience of the implementation of certified endometriosis centers in german-speaking countries in 2013 [28]. In 2019 Burghaus et al. described the current standards used by a clinical and scientific endometriosis center according to the certification system of the *German Scientific Endometriosis Foundation* and the *European Endometriosis League* [2].

But these standards only measure the process quality of the certified institutions and their infrastructural conditions, but are, at present, not designed to measure quality in terms of diagnosis and treatment of the individual patient. This discloses a fundamental problem in the treatment of patients with endometriosis: what is a good endometriosis surgery and what is a good endometriosis treatment? Treatment in endometriosis is successful when it allows pain reduction and/or pregnancy. But what is necessary to accomplish these goals? Is radical surgery better than less radical surgery? And how could this quality be measured? In oncological surgery in gynaecology, e.g. in ovarian cancer, the respective studies demonstrated significant results concerning endpoints overall survival and progression free survival allowed a clear analysis [29–30]. In endometriosis these well-defined criteria do not exist. The recent QS Endo study aims to create quality indicators for the diagnosis and treatment of endometriosis bringing out the need for advanced training in all aspects of the disease [31].

An additional internal training can be easily realized in every specialized endometriosis center by implementing a regular interdisciplinary endometriosis conference including sonographers, radiologist, gynecological surgeons, general surgeons and if necessary urologists, pathologists and reproduction specialists. Comparable to interdisciplinary oncological consensus conferences, the endometriosis cases can be presented and discussed both pre- and postsurgical. Ultrasound images and videos, MR images, hysteroscopic and laparoscopic images should be presented in order to guarantee a precise surgical strategy and to find a tailored postoperative treatment plan. The mutual interpretation and correlation of diagnostic and surgical results improve the understanding of the extent of the disease and has a positive learning effect for each professional involved. In our experience an interdisciplinary endometriosis conference is an appropriate method to enhance the learning curve of all physicians involved including specialists and residents. Roman et al described the functions, the modalities of work and the related advantages of multidisciplinary approach in a surgical center exclusively dedicated to endometriosis [32].

A condition for a clear understanding of the disease endometriosis and the interpretation of diagnostic and surgical results is the use of a common language including all specialties involved. Therefore a unique endometriosis classification used in ultrasound, MR imaging and in surgery is needed as common base for clinical application, science and training. Particularly in studies and publications a common classification is indispensable in order to make the results comparable and evident. So far a global consensus on a classification system does not exist, but societies and working groups are currently working on a common proposal. In 2017 the World Endometriosis Society proposed the use of the r-ASRM score, the Enzian-Score and the EFI-Score as the result of a global consensus meeting [33]. In 2016 the International Deep Endometriosis Analysis (IDEA) group described a consensus opinion on the systematic ultrasound evaluation of endometriosis [9]. This classification system is focussed on ultrasonography, and does not offer a complete solution for a surgical classification. In contrast the r-ASRM score and EFI-Score depend on surgery and thus cannot be used in the presurgical situation. The Enzian classification for deep endometriosis published in 2005 [34] and revised in 2011 has been used for various studies in the last years, including comparative analyses of clinical, sonographic, radiologic and surgical findings [35–38]. However, until now, the Enzian classification did not include the peritoneal and tubal involvement and the extend of pelvic adhesions. The upcoming #Enzian classification, a second revision, will serve to classify endometriosis of the peritoneum, ovary, fallopian tubes, deep and extragenital endometriosis and pelvic adhesions and thus provide a uniform and complete assessment of the disease in clinical examination, ultrasound, MR imaging and surgery and may facilitate research and training [39].

To become an expert in endometriosis can't be achieved by a short term training. A constant training from basic skills during residency to advanced skills as specialist is required. Additionally, a broad theoretical knowledge of all fields involved in endometriosis is indispensable. A three-day or six-day training programme, like the masterclass on endometriosis, is a possible strategy to com-

bine all the components of education in endometriosis in one event.

The participants need to be experienced already and ideally at the same step of qualification in order to guarantee training on expert level. The very good results of the evaluation of the first six-day masterclass show that the concept is on the right way and the high demand indicates the need for specific endometriosis training programmes. However, even 48 hours of training with live-surgery, live ultrasound, presentations and discussions cannot respond all questions. In particular, practical skills in specialized endometriosis surgery and examination techniques require a more intense training in very small groups. A possible solution could be a long-term supervision of the individual development of the trainees by regular updates and maintenance of training.

■ Conclusion

Endometriosis is a complex and enigmatic disease. Comprehensive practical and theoretical training is indispensable in order to become an expert in endometriosis. Our new educational concept aims to enhance the quality of diagnosis and treatment bringing all aspects of endometriosis together. An internationally recognized endometriosis logbook and internationally approved training offers could blaze a trail to a network of endometriosis experts with broad education and knowledge.

■ Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

All authors agreed to publish this manuscript.

Availability of data and materials

Not applicable.

Competing interests

The authors have no competing interests. All authors declare that they have no conflict of interest.

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■ Authors' contributions

Krentel: main author of the manuscript
Schäfer: writing, review of literature, concept
Salehin: writing, review of literature, concept
Keckstein: revision of concept, review, manuscript check, discussion
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Bokor: revision of concept, review, manuscript check, discussion
Roman: revision of concept, review, manuscript check, discussion
Renner: revision of concept, review, manuscript check, discussion
Kiesel: revision of concept, review, manuscript check, discussion
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References:

- Schweppe KW, Ebert AD, Kiesel L. Endometriosis centres: quality management. *Der Gynäkologe* 2010; 43: 233–40.
- Burghaus S, Hildebrandt T, Fahlbusch C, et al. Standards used by a clinical and scientific endometriosis center for the diagnosis and therapy of patients with endometriosis. *Geburtshilfe Frauenheilkd* 2019; 79: 487–97.
- Fagotti A, Petrillo M, Rossitto C, Scambia G. Standardized training programmes for advanced laparoscopic gynaecological surgery. *Curr Opin Obstet Gynecol* 2013; 25: 327–31.
- De Wilde RL, Hucke J, Kolmorgen K, Tinneberg H; Gynecologic Endoscopy Working Group of the German Society of Obstetrics and Gynecology. Recommendations by the Gynecologic Endoscopy Working Group of the German Society of Obstetrics and Gynecology for the advancement of training and education in minimal-access surgery. *Arch Gynecol Obstet* 2011; 283: 509–12.
- Campo R, Puga M, Meier Furst R, et al. Excellence needs training „Certified programme in endoscopic surgery“. *Facts Views Vis Obgyn* 2014; 6: 240–4.
- Coxon L, Horne AW, Vincent K. Pathophysiology of endometriosis-associated pain: A review of pelvic and central nervous system mechanisms. *Best Pract Res Clin Obstet Gynaecol* 2018; 51: 53–67.
- Culley L, Law C, Hudson N, et al. The social and psychological impact of endometriosis on women's lives: a critical narrative review. *Hum Reprod Update* 2013; 19: 625–39.

8. Van den Bosch T, Van Schoubroeck D. Ultrasound diagnosis of endometriosis and adenomyosis: State of the art. *Best Pract Res Clin Obstet Gynaecol* 2018; 51: 16–24.
9. Guerriero S, Condous G, van den Bosch T, et al. Systematic approach to sonographic evaluation of the pelvis in women with suspected endometriosis, including terms, definitions and measurements: a consensus opinion from the International Deep Endometriosis Analysis (IDEA) group. *Ultrasound Obstet Gynecol* 2016; 48: 318–32.
10. Bazot M, Daraï E. Diagnosis of deep endometriosis: clinical examination, ultrasonography, magnetic resonance imaging, and other techniques. *Fertil Steril* 2017; 108: 886–94.
11. Piessens S, Edwards A. Sonographic evaluation for endometriosis in routine pelvic ultrasound. *J Minim Invasive Gynecol* 2020; 27: 265–6.
12. Exacoustos C, Zupi E, Piccione E. Ultrasound imaging for ovarian and deep infiltrating Endometriosis. *Semin Reprod Med* 2017; 35: 5–24.
13. Guerriero S, Saba L, Pascual MA, et al. Transvaginal ultrasound vs magnetic resonance imaging for diagnosing deep infiltrating endometriosis: systematic review and meta-analysis. *Ultrasound Obstet Gynecol* 2018; 51: 586–95.
14. Bazot M, Daraï E, Biau DJ, Ballester M, Dessolle L. Learning curve of transvaginal ultrasound for the diagnosis of endometriosis assessed by the cumulative summation test (LC-CUSUM). *Fertil Steril* 2011; 95: 301–3.
15. Young SW, Dahiya N, Patel MD, et al. Initial accuracy of and learning curve for transvaginal ultrasound with bowel preparation for deep endometriosis in a US tertiary care center. *J Minim Invasive Gynecol* 2017; 24: 1170–6.
16. Eisenberg VH, Alcazar JL, Arbib N, et al. Applying a statistical method in transvaginal ultrasound training: lessons from the learning curve cumulative summation test (LC-CUSUM) for endometriosis mapping. *Gynecol Surg* 2017; 14: 19.
17. Lazzeri L, Morosetti G, Centini G, et al. A sonographic classification of adenomyosis: interobserver reproducibility in the evaluation of type and degree of the myometrial involvement. *Fertil Steril* 2018; 110: 1154–61.
18. Tammaa A, Fritzer N, Lozano P, et al. Interobserver agreement and accuracy of non-invasive diagnosis of endometriosis by transvaginal sonography. *Ultrasound Obstet Gynecol* 2015; 46: 737–40.
19. Rosefort A, Huchon C, Estrade S, Paternostre A, Bernard JP, Fauconnier A. Is training sufficient for ultrasound operators to diagnose deep infiltrating endometriosis and bowel involvement by transvaginal ultrasound? *J Gynecol Obstet Hum Reprod* 2019; 48: 109–14.
20. Guerriero S, Pascual MA, Ajossa S, et al. Learning curve for ultrasonographic diagnosis of deep infiltrating endometriosis using structured offline training program. *Ultrasound Obstet Gynecol* 2019; 54: 262–9.
21. Leonardi M, Ong J, Espada M, et al. One-size-fits-all approach does not work for gynecology trainees learning endometriosis ultrasound skills. *J Ultrasound Med* 2020; 39: 2295–303.
22. Kirby TO, Numnum TM, Kilgore LC, Straughn JM. A prospective evaluation of a simulator-based laparoscopic training program for gynecology residents. *J Am Coll Surg* 2008; 206: 343–8.
23. Bojahr B, Tchertchian G, Ohlinger R. Laparoscopic supracervical hysterectomy: a retrospective analysis of 1000 cases. *JLS* 2009; 13: 129–34.
24. Morelli M, Noia R, Chiodo D, et al. Isterectomia sopraccervicale laparoscopica versus isterectomia totale laparoscopica: studio prospettico randomizzato [Laparoscopic supracervical hysterectomy versus laparoscopic total hysterectomy: a prospective randomized study]. *Minerva Ginecol* 2007; 59: 1–10.
25. Lieng M, Qvigstad E, Istre O, Langebrenne A, Ballard K. Long-term outcomes following laparoscopic supracervical hysterectomy. *BJOG* 2008; 115: 1605–10.
26. Boyd LR, Novetsky AP, Curtin JP. Effect of surgical volume on route of hysterectomy and short-term morbidity. *Obstet Gynecol* 2010; 116: 909–15.
27. Roman H, Marabba J, Poxa A, et al. Crude complication rate is not an accurate marker of a surgeons' skill: a single surgeon retrospective series of 1060 procedures for colorectal endometriosis. *JVS* 2020; 1089: 1–10.
28. Ebert AD, Ulrich U, Keckstein J, et al; Endometriosis Research Foundation, European Endometriosis League. Implementation of certified endometriosis centers: 5-year experience in German-speaking Europe. *Gynecol Obstet Invest* 2013; 76: 4–9.
29. Du Bois A, Rochon J, Lamparter C, Pfisterer J. Das Qualitätssicherungsprogramm der AGO Organkommission OVAR (QS-OVAR): Versorgungsstruktur und Realität in Deutschland 2001 [The Quality Assurance Program of the AGO Organkommission OVAR (QS-OVAR): Pattern of Care and Reality in Germany 2001]. *Zentralbl Gynakol* 2005; 127: 9–17.
30. Wimberger P, Lehmann N, Kimmig R, et al. Prognostic factors for complete debulking in advanced ovarian cancer and its impact on survival. An exploratory analysis of a prospectively randomized phase III study of the Arbeitsgemeinschaft Gynaekologische Onkologie Ovarian Cancer Study Group (AGO-OVAR). *Gynecol Oncol* 2007; 106: 69–74.
31. Zeppernick F, Zeppernick M, Janschek E, et al. QS ENDO Real – A study by the German Endometriosis Research Foundation (SEF) on the reality of care for patients with endometriosis in Germany, Austria and Switzerland. *Geburtshilfe Frauenheilkd* 2020; 80: 179–89.
32. Roman H, Chanavaz-Lacheray I, Forestier D, et al. Early postoperative complications in a multidisciplinary surgical center exclusively dedicated to endometriosis: a 491-patient series. *Gynecol Obstet Fertil Senol* 2020; 48: 484–90.
33. Johnson NP, Hummelshoj L, Adamson GD, et al. World endometriosis society consensus on the classification of endometriosis. *Hum Reprod* 2017; 32: 315–24.
34. Tuttlies F, Keckstein J, Ulrich U, et al. ENZIAN-Score, eine Klassifikation der tief infiltrierenden Endometriose [ENZIAN-score, a classification of deep infiltrating endometriosis]. *Zentralbl Gynakol* 2005; 127: 275–81.
35. Burla L, Scheiner D, Samartzis EP, et al. The ENZIAN score as a preoperative MRI-based classification instrument for deep infiltrating endometriosis. *Arch Gynecol Obstet* 2019; 300: 109–16.
36. Morgan-Ortiz F, López-de la Torre MA, López-Zepeda MA, et al. Clinical characteristics and location of lesions in patients with deep infiltrating endometriosis using the revised Enzian classification. *J Turk Ger Gynecol Assoc* 2019; 20: 133–7.
37. Haas D, Shebl O, Shamiyeh A, Oppelt P. The rASRM score and the Enzian classification for endometriosis: their strengths and weaknesses. *Acta Obstet Gynecol Scand* 2013; 92: 3–7.
38. Montanari E, Dauser B, Keckstein J, et al. Association between disease extent and pain symptoms in patients with deep infiltrating endometriosis. *Reprod Biomed Online* 2019; 39: 845–51.
39. Keckstein J, Ulrich UA, Sillem M, et al. The #Enzian classification: A comprehensive non-invasive and surgical description system for endometriosis. *Acta Obstet Gynecol Scand* 2021; 100: 1165–75.

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