



Subspecialty training in andrology

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The field of andrology has evolved significantly in both Europe and the United States over the past 30 years. Although andrology fellowship training programs in these two regions share some common aspects, there are substantial differences as well. Andrology is a broader field in Europe, with andrology fellowship training incorporating topics such as prostate disease, testicular cancer, and genitourinary infection/inflammation. In the United States, these issues are more commonly taught during urology residency, with andrology fellowship training focusing more commonly on male sexual and reproductive health. Finally, European and American fellowship training is compared and contrasted in terms of certification and accreditation procedures, with a look toward the future in each region. (*Fertil Steril*® 2015;104:12–5. ©2015 by American Society for Reproductive Medicine.)

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Clinical training in male infertility is most commonly part of andrology training, although the specific clinical conditions covered often differ between training programs and between Europe and the United States. All training includes male reproduction and thus covers male infertility, which is the emphasis of this manuscript. However, most andrology training also includes male sexual dysfunction, which is intimately linked to reproduction. Sexual dysfunction encompasses a variety of conditions including erectile dysfunction, Peyronie disease, priapism, ejaculatory disorders, such as premature ejaculation and retrograde ejaculation, and disorders of sexual desire. Because both sexual dysfunction and male infertility require a proper hormonal milieu, andrology training also encompasses male hypogonadism and hormone replacement. The management of andrologic problems may require medical management and/or surgical management. Owing to

differences in background training, some andrologists manage medical andrologic conditions and refer cases requiring surgery to others. In the United States, most, but not all, andrologists are urologists. Moreover, there are medical andrologists, the majority of which subspecialists are trained in internal medicine and endocrinology. As described subsequently, basic andrology training in the United States is part of urologic residency training requirements. Urologists that want to specialize in male infertility go on to post-residency fellowships in male reproduction/andrology. European training in andrology is filled by a wider variety of specialists that may participate in andrology certification training. While this series focuses on infertility training, it is important to realize that andrology training in Europe covers all andrology-related topics including sexual dysfunction, testis and prostate tumors. In the United States, general urology residencies cover benign and malignant diseases

of the prostate as well as testicular cancer, and therefore patients with these conditions are commonly managed by general urologists or, for the malignant diseases, urologists that are fellowship trained in urologic oncology.

HISTORY OF MALE INFERTILITY TRAINING United States

Organized reproductive medicine in the United States can be traced back to the founding of the American Society for the Study of Sterility in Chicago, Illinois, June 12–13, 1944 (1). This group was the precursor to the American Society for Reproductive Medicine. Twenty-five physicians attended that meeting, and the scientific program was composed of three sessions covering a breadth of male and female reproductive topics. The final session, which was dedicated entirely to male reproduction, was entitled, "Semen Examination and Evaluation." The attendees of the meeting consisted predominantly of obstetricians/gynecologists, urologists, and primary care physicians. Walter Williams, M.D., widely regarded as "the founding father" of the American Society for the Study of Sterility, was neither a urologist nor an obstetrician/

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gynecologist, but rather, he was trained as a primary care physician. Dr. Williams is credited with emphasizing the importance of evaluating both the male and the female partners in infertile couples. For physicians interested in practicing andrology at the time, meetings such as those held by the American Society for the Study of Sterility were a critical source of andrologic education and training.

Andrology progressed as a distinct scientific field of study over the next several decades, in large part owing to increasing interest in the agricultural science of animal husbandry/breeding. However, clinical training for physicians wishing to practice andrology lagged behind significantly. Pioneers in clinical andrology attained their training through a number of creative mechanisms, including “ad hoc” elective time spent with medical endocrinologists, obstetrician/gynecologists, and microsurgeons. Many of these early andrologists also relied heavily on self-instruction. A large percentage of these individuals were committed to advancing the emerging field not only clinically, but also within the realm of basic science. Some pursued basic science training through programs such as the American Urological Association Research Scholars program (precursor to the American Foundation for Urologic Disease Research Scholars program and the Urology Care Foundation Research Scholars program). Some of these individuals subsequently established their own basic science laboratories, and others forged productive relationships with basic scientist partners in their quest to characterize normal male reproduction, elucidate the pathophysiologic mechanisms underlying impaired male reproductive health, and discover new medical and surgical therapeutic modalities to treat the infertile male.

In the 1980s, the first formally designated andrology fellowships were established in the United States. These programs were typically 1–2 years in length and covered the full extent of clinical male reproductive medicine and surgery, as well as male sexual health. Most of these early fellowships remain in existence, and some are still headed by their founding fellowship directors. Although many of the initial andrology fellowship graduates pursued employment in private practice settings, a high percentage of fellowship graduates took faculty positions at academic institutions. Demand was high for these formally trained individuals to staff academic urology departments, train urology residents in this emerging field, and provide male partner care as reproductive medicine overall continued to grow as a medical discipline. Through the 1990s and into the 2000s, the number of andrology fellowship programs continued to grow gradually. These programs have been characterized by heterogeneity in terms of clinical patient volume, surgical caseload, and the presence or absence of a year of bench research. Furthermore, programs also exhibit variability regarding the percentage of fellowship training dedicated to male reproductive health versus male sexual health. It is worth noting that while sexual dysfunction is sometimes linked to impaired male reproduction, the overall patient population suffering from male infertility is quite different from the population suffering from sexual dysfunction. The issues facing these patient populations are often quite disparate as well.

The next major advancement in andrology training in the United States came in 2007 with the establishment of the

“Andrology Fellowship Match Program,” which was developed by a group of andrology fellowship program directors and coordinated through the American Urological Association. Since its inception, there has been significant variability in the number of applicants submitting a rank list per year (range 3–15, median 8, mean 7.5). There has also been substantial variability in the number of programs submitting a rank list per year (range 3–15, median 5.5, mean 6.1). Thirty-eight applicants have secured andrology fellowship positions through this program. Thirty-one of these individuals are male, and seven are female. To date, the cumulative percentage of men submitting rank lists who matched is 57.4% (31/54), whereas the cumulative percentage of women submitting rank lists who matched is 87.5% (7/8). There is no doubt that a higher overall number of male versus female urology residents apply for andrology training, but the exceptionally high placement of female candidates into fellowship programs should be encouraging to female urologists considering andrology fellowship training. The field of andrology is growing steadily in the United States, based on the number of applicants and the number of institutions offering andrology fellowships. In 2007, the first year of the match, four applicants and four programs participated. In 2014, the year of the most recent match, eight applicants and ten programs participated. It is important to note that there are some programs offering andrology fellowship training in the United States that do not participate in the match. A full listing of programs participating in the current andrology match is provided online by the American Urological Association at www.auanet.org/education/residents-fellowships.cfm.

The Accreditation Council for Graduate Medical Education (ACGME) provides oversight and accreditation for all United States residency programs, including urology and obstetrics and gynecology. Urology fellowships in the United States are, in contrast, highly heterogeneous in their oversight, certification, and accreditation. “Pediatric Urology” and “Female Pelvic Medicine and Reconstructive Surgery” fellowships are both accredited by the ACGME, which provides comprehensive oversight to participating programs. The ACGME stipulates criteria for specific aspects of these fellowships, including the length and scope of training, qualifications of the program director and participating faculty, eligibility criteria for prospective fellows, the educational program (including the curriculum, procedural skills, core competencies, and medical knowledge), and fellow supervision criteria. “Urologic Oncology” fellowships are accredited by the Society of Urologic Oncology, and “Endourology” fellowships are certified by the Endourology Society. In brief, these two organizations monitor the quality of their respective fellowships in a fashion overall similar to the oversight provided by the ACGME. The Society of Genitourinary Reconstructive Surgeons is now in the process of implementing standards for “Genitourinary Reconstructive Surgery” fellowship “qualification” and “requalification,” which include parameters similar to those mentioned above. At this time, andrology fellowships in the United States are neither accredited by the ACGME nor are they accredited, certified, or qualified by any professional society. However, in most instances, these fellowships are certified by their respective institutions, which

monitor them for adherence with self-prescribed programmatic standards and benchmarks and ensure compliance with broader training criteria, such as duty hours and fellowship evaluations. At most institutions, formalized annual reviews are also performed as part of the process to evaluate and monitor the fellowship. At the completion of andrology fellowship training in the United States, it is the institution that provides the candidate with his or her training certificate.

Europe

The European Academy of Andrology (EAA) was founded in 1992 to raise the scientific and clinical standards of andrology in Europe by encouraging basic/translational research in all fields of andrology and focusing this work on areas of clinical importance. Consequently, the establishment of clinical training programs for physicians who wish to become specialists in andrology represents one of the principal missions of the EAA. To accomplish that objective, the EAA has established an accreditation procedure that allows andrology clinics and university departments to become EAA training centers. Currently the EAA directs 24 training centers in Europe, 1 in the United States (Los Angeles), and 1 in Egypt (Cairo) (2). In addition, the EAA deals with the accreditation of educational courses and scientific meetings to ensure continuous updates for European andrologists. In parallel with the EAA, the Special Interest Group in Andrology (SIGA), belonging to the European Society for Human Reproduction and Embryology, was established in 1992. Members of SIGA are mainly biologists, embryologists, and gynecologists dealing with male infertility. SIGA's primary interest has been the organization of campus workshops related to laboratory practice, including training courses in basic semen analysis to improve the quality of laboratory andrology. Andrology has been recognized as an independent subspecialty in two European countries. In Hungary, urologists interested in becoming certified andrologists need to perform a 2-year internship, and specialists in internal medicine have an additional 2-year urology training. In Germany the subspecialty is open to specialists in endocrinology, urology, and dermatology. Italy and Spain offer 2-year master courses in andrology that are accessible to a wider community of physicians, including endocrinologists, urologists, and gynecologists, and they are certified by the university in which the courses take place.

At the global European level, the EAA is the main organization dealing with the promotion of education in andrology. The EAA aims to provide education in the prevention, diagnosis, treatment (medical and surgical), and rehabilitation of all andrology-related diseases or pathologic conditions, including male infertility, contraception, sexual dysfunction, endocrine and metabolic diseases, genital tract infections/inflammations, and testis and prostate cancers. The education is based on an 18-month clinical training program in a certified EAA training center. A joint educational curriculum for clinical andrology was established in 2010 with the European Society of Andrological Urology (ESAU). The detailed curriculum is available at the EAA website (3). Fellows are requested to fill out a detailed clinical register based on their clinical

daily practice. At total of 90 credits are required: 80% obtained from case contacts and 20% from EAA-accredited courses. Credits are acquired following the principle of the credit point system outlined in the Sorbonne (May 25, 1998) and Bologna (June 19, 1999) declarations. During the training, much attention is given to male infertility related clinical experience, which includes the acquisition of skills in physical examination, testis imaging, laboratory practice (semen analysis, assisted reproductive technology laboratory, testis histology), genetic testing and counseling, and surgical andrology (particularly testis biopsy). A special surgical track curriculum is available for those interested in learning microsurgical reconstructive techniques. The EAA releases a certificate of "EAA Clinical Andrologist" after an exit exam (written and oral), which is held annually before the EAA examination board. The written exam is based on a multiple-choice exam including basic and clinical andrology questions from the four macroareas: male fertility problems (including male contraception); male sexual dysfunction (including erectile dysfunction, disturbances of desire, arousal, ejaculatory and orgasmic dysfunction); male endocrine dysfunction (including disorders of sexual development and hypogonadism, from puberty to senescence); and andrologic aspects of genital tract infections, inflammation, and cancer. The oral exam involves discussions of clinical cases, interpretation of semen analysis, ultrasound images, and testis histology. Since 1997, a total of 104 trainees (including 28 women) have passed the exam and represent the core of highly qualified clinical andrologists in Europe.

The EAA and ESAU have a strong interest in the recognition of andrology as an independent discipline at the European level. The process for such recognition has been undertaken and hopefully will be achieved in the near future. This recognition is of the utmost importance to increase the number of fully trained andrologists. This approach encourages the view that specialists with global andrology knowledge are best able to deal with male infertility.

FUTURE OF ANDROLOGY TRAINING

The quality and availability of training and infertility has significantly improved in the United States and Europe, though by different mechanisms. In the United States, the quality of male infertility training as part of urology residency has been inconsistent. As a result, the training of the general urologist to manage infertile male patients has been quite variable. This pattern is changing primarily owing to two factors. The development by the American Urologic Association of a core curriculum for urology residencies includes detailed coverage of andrology. In addition, because the numbers of fellowship-trained subspecialists in male infertility has increased, the number of urology residency programs with fellowship-trained faculty has increased. These two factors may lead to improved comfort of general urologists to handle the basic evaluation of the male patient presenting for an infertility evaluation. Patients requiring more complex evaluation or management—surgical or medical—may be referred to fellowship-trained subspecialists. Although the availability of fellowship training has increased, there is no current

standardization of the curriculum of fellowship programs in the United States. Neither the breadth of the conditions managed nor the case volumes of surgical procedures are monitored. In the United States, subspecialty training in andrology is not certified by the governing body of urology, the American Board of Urology (ABU). Fellowship areas that are not certifiable by the ABU are not required to attain specific standards. Thus in the United States, unless ABU certification in andrology develops, voluntary standards, agreed to by the fellowship programs, may be one route to maintaining consistency of training. In addition, the American Society of Reproductive Medicine has developed an online Andrology Certification Program. This program covers educational topics but does not address surgical volume standards. At the 2014 Annual Meeting of the American Urological Association, andrology fellowship directors from numerous programs in the United States met to discuss pertinent issues related to training and certification. This group is to be encouraged in its ongoing efforts as standardization of educational and accreditation issues are contemplated for the future. In addition to these items, consideration could be given in the United States to the development of a standard knowledge curriculum similar to the EAA-accredited courses. As described above, the status of European training in some respects is more developed than in the United States, with the EAA Clinical Andrology Certificate program and designated EAA training centers. Future plans in Europe are aimed at the recognition of andrology as an independent multidisciplinary subspecialty to educate specialists able to deal with all aspects of male reproductive and sexual health.

One striking difference between European and American training in male infertility is the variety of types of physicians that may obtain advanced training, ranging from a completely independent specialty in some countries to advanced training available to a breadth of physician specialties in others. Currently the vast majority of subspecialty training fellowships in the United States are open only to urologists. This variation in training approaches leads to questions about what might be the ideal mechanism of subspecialty training. One option is to develop reproductive fellowships that combine male and female infertility training. Although this offers the potential advantage of one physician

for both male and female partners, it does lead to other challenges that would need to be addressed. With current residency training, gynecologists are not trained in male urogenital conditions that are often associated with male infertility. Similarly, urology training programs do not encompass any substantial female reproductive training. If reproductive medicine developed as an independent specialty with independent residency criteria, residency training in both male and female reproduction could be incorporated. With the current residency paradigm in the United States, this would be a significant challenge. An additional hurdle is the fact that individuals interested in this training would need to identify themselves early on in their medical careers. Finally, another issue with this approach is the fact that REI specialists are board certified. Whether or not this approach would lead to an improvement in training would need study and is not obviously clear. In the United States, there is a current trend to develop Men's Health Clinics to handle male medical problems including andrology. This is similar to the development of Women's Health Clinics. This approach builds on the separation of care between men and women. As men's health clinics develop, there is becoming a need for medical andrologists. Whereas in some European countries, andrology subspecialty training is open to other medical specialties, such as endocrinology, in the United States, training for nonurologists is a challenge, with limited options for clinical training. In the end, whether male and female reproductive training remains separated or begins to merge may be of limited consequence. It is the quality of the training, assurance and maintenance of competency, and willingness of the physician to work with the couple and other subspecialists that will determine quality of care. As with many challenges, there may be many ways to skin the cat.

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