

**ADVANCED TRAINING IN**

**ANDROLOGY**

## **General Introduction**

The trainee will gain:

- 1) an advanced understanding of:
  - a) endocrine physiology, pharmacology of substances that regulate testicular function, penile erection and ejaculation
- 2) the physiology of conception, aspects of basic and applied embryology and the techniques of in vitro fertilisation including assisted fertilisation and assessment of sperm function
- 3) immunology and genetics related to reproduction, a knowledge of clinical pharmacology of hormones
- 4) gross and microscopic pathology related to the genital system
- 5) the ability to interpret and supervise endocrine laboratory diagnostic procedures
- 6) the ability to interpret and perform seminal analyses, this should involve a module of laboratory training with a personal involvement in carrying out semen analyses and other tests in relation to sperm function
- 7) clinical competence in the management of fertility problems including
  - a) the diagnosis and management of endocrine disorders
  - b) the diagnosis and management of azoospermia
  - c) the diagnosis and management of oligozoospermia,
  - d) the diagnosis and management of immunological causes of infertility
  - e) expertise in assisted conception including sperm retrieval techniques and the management of their complications
  - f) expertise in microscopic vas reversal,
  - g) experience in open surgery designed to correct infertility problems
  - h) experience in endoscopic surgery designed to correct reproductive problems
  - i) fertility control and family planning
  - i) the management of infective causes of infertility.
- 8) clinical competence in the management of erectile dysfunction including
  - a) the diagnosis of pituitary, central nervous system disease relating to erectile dysfunction
  - b) the diagnosis and management of testicular disease relating to erectile dysfunction
  - c) the management of endocrine disorders relating to erectile dysfunction
  - d) knowledge of various hormones, peptides and neurotransmitters in relation to erectile dysfunction
  - e) expertise in the medical management of erectile dysfunction
  - f) expertise in the recognition and diagnosis of psychological disorders in relation to erectile dysfunction
  - g) expertise and knowledge of drug therapy and medical conditions affecting erectile dysfunction
  - h) expertise in the use of external devices in the treatment of erectile dysfunction,
  - i) expertise in the treatment of erectile dysfunction using injections and intraurethral therapy
  - j) expertise in the treatment of erectile dysfunction using semi-rigid and inflatable penile prostheses,
  - k) expertise in microsurgical revascularisation of the penis,
  - l) expertise in the performance and interpretation of Doppler studies, dynamic

cavernosography and arteriography of the penis,

- 9) clinical competence in the management of disorders of ejaculation and orgasm including
  - a) diagnosis, medical and surgical treatment of retrograde ejaculation
  - b) diagnosis, investigation and treatment of failure of ejaculation
  - c) knowledge of the use of vibratory and electroejaculatory techniques
  - d) knowledge of the treatment of premature ejaculation
- 10) clinical competence in the management of Peyronie's disease and congenital penile curvature including
  - a) Nesbitt's procedure
  - b) excision and grafting techniques
  - c) topical and systemic therapies
- 11) clinical competence in the management of penile enlargement techniques including
  - a) providing appropriate counselling
  - b) surgical techniques involved
- 12) clinical competence in the management of priapism including:
  - a) appropriate investigation
  - b) medical therapy
  - c) surgical therapy
- 13) experience and knowledge of
  - a) administration and management
  - b) teaching
  - c) legal and ethical issues
  - d) epidemiology statistics, research and audit

## **GUIDES TO LEARNING**

### **Clinical pharmacology of drugs and hormones**

#### **Objectives**

The trainee should understand and be able to discuss;

- 1) absorption, excretion, distribution of drugs and hormones, metabolism,
  - a) enzyme systems, renal hepatic and faecal excretion
  - b) discuss general mechanisms of drug and hormone action including
    - i) structure activity relationships, receptors and sites of action
    - ii) Characterise drug and hormone effects including dose responses, biological variations, spectrum of effects and factors that modify effects (e.g. age, sex, body weight, route of administration, tolerance, drug or hormone interactions, agonist and antagonist),
  - c) Governmental and pharmaceutical regulations pertaining to drugs and hormones and their development
  - d) understand the design analysis and organisation of participation in clinical trials
  - e) understand the toxicity of drugs commonly used for assisted reproduction, erectile dysfunction, disorders of ejaculation, Peyronie's disease and priapism.

### **Pathology**

#### **Objectives**

The trainee should understand and be able to discuss

#### **Testis**

- 1) histological appearance of maturation arrest, Sertoli cell only syndrome
- 2) the various stages of normal and abnormal spermatogenesis
- 3) the possible consequences of exposure to cytotoxic chemotherapy
- 4) obstructive azoospermia
- 5) Young's syndrome, immotile cilia syndrome
- 6) the effects of varicocele,
- 7) mumps orchitis,
- 8) immune orchitis,
- 9) bacterial orchitis.

#### **Penis**

- 1) histological appearance of normal and abnormal corpora cavernosa,
- 2) current data relating to histological appearance of Peyronie's disease
- 3) the relationship of ischaemic change in the corpora to erectile dysfunction
- 4) histochemical changes in diabetic erectile dysfunction
- 5) the response of tissues to the insertion of silastic and other foreign materials.

### **Immunology**

#### **Objectives**

The trainee should understand and be able to discuss

- 1) the essentials of basic immunology,
- 2) the usefulness and limitations of immunological tests in infertility
- 3) the pathophysiology of autoimmune disease to gonadal failure and gonadal dysgenesis
- 4) the developing knowledge of immunology to contraception
- 5) the immunological mechanisms proposed to underlie successful and unsuccessful implantation.

### **Embryology**

#### Objectives

The trainee should understand and be able to discuss

- 1) the embryonic development of the genital tract including the factors controlling gonadal primordia
- 2) internal duct systems and external genitalia,
- 3) how patients with developmental abnormalities of the genital tract should be diagnosed and managed,
- 4) the various stages of sperm maturation and fertilisation,
- 5) the preimplantation development of the human embryo in vitro and in vivo.

### **Genetics**

#### Objectives

The trainee should understand and be able to discuss

- 1) normal genetics (e.g. Mendelian inheritance, the structure and identification of chromosomes and gametogenesis)
- 2) abnormal genetics including chromosome abnormalities and genetically transmitted abnormalities of sexual development, (e.g. hermaphroditism, Turner's syndrome)
- 3) inherited non reproductive disorders referable to reproduction,
- 4) genetic studies including pedigree, karyotype analysis, antenatal diagnosis of genetic disease including use of gene probes and associated techniques
- 5) indications and arrangements for specialist genetic diagnosis and counselling
- 6) inherited causes of infertility,
- 7) genetic aspects of artificial insemination and assisted fertilisation,
- 8) techniques, methods and implications of preimplantation genetic diagnosis.

### **Anatomy, Physiology and Pathophysiology**

Neuroendocrine function CNS/hypothalamic/pituitary/gonadal system and disease states.

#### Objectives

The trainee should understand and be able to discuss

- 1) anatomical/functional aspects of the hypothalamus, neurovascular relationships hypothalamo-hypophyseal portal circulation and target cells of the pituitary
- 2) supra-hypothalamic structures and neuronal systems relevant to regulation of reproductive and erectile processes
- 3) the site of production, biological action and control of secretion of cerebral hormones and chemicals controlling erection

- 4) distribution and cellular characteristics of pituitary hormone producing cells with special reference to gonadotrophes
- 5) anatomical and functional aspects of the peptidergic and catecholaminergic system and their control of erectile function
- 6) control of secretory activities with pituitary hormones including long and short term rhythms and their target organs and feed back systems,
- 7) organic lesions and/or functional disorders of the hypothalamic pituitary system
- 8) the secretion of hormones and the various cell types responsible in the testis, intra and extra testicular control mechanisms
- 9) hormone producing tumours of the testis,
- 10) age related changes in testicular structure and function
- 11) the production, physiology and metabolism of androgens and describe the mechanism of action
- 12) symptoms and signs of androgen depletion and its management
- 13) androgen resistant states.

## **Infertility**

### **Objectives**

- 1) The trainee should be able to take an appropriate history and examine the man including detailed genital examination and arrange/perform appropriate investigations and treatment
- 2) the trainee should understand and be able to discuss
  - a) the formation and content, as well as examination of the seminal fluid
  - b) the cycle of spermatogenesis including endocrinological control mechanisms, its abnormalities and effects of drugs
  - c) the physiology and pathophysiology of sexual function
  - d) the causes of azoospermia and oligozoospermia,
  - e) production of oestrogens, androgens and progesterones by the human testes and the biological action of testosterone in man
  - f) investigation, diagnosis and therapy of infection of the male reproductive system
  - g) cryobiology of semen, counselling of donors and recipients of DI, sperm banking
  - h) in vitro and laboratory tests of sperm function, e.g. mucous penetration, zona free hamster egg penetration, biochemistry etc
  - i) the value and limitation of testicular biopsy and endocrine assessments such as plasma FSH
  - j) vasography
  - k) transrectal ultrasound scanning
  - l) the physiology and endocrine and gametogenic function of the testes and accessory glands
  - m) indications and methods of assisted fertilisation including intracytoplasmic sperm injection
  - n) methods of surgical sperm retrieval.

## **Psychological Aspects of Reproductive Medicine**

### **Objectives**

The trainee should understand and be able to discuss,

- 1) the psychological changes associated with treatment of infertility,
- 2) psychological changes associated with hormonal therapy
- 3) the psychological factors associated with erectile dysfunction

- 4) the effects of infertility upon the family
- 5) the effects of erectile dysfunction upon relationships
- 6) the general concepts of normal and abnormal sexual function and gender and awareness of local facilities for counselling

### **Erectile dysfunction**

#### **Objectives**

The trainee should be able to,

- 1) take an appropriate history including psychological cardiovascular, neurological and endocrine disorders, and examine the man
- 2) arrange/perform appropriate investigations and treatment,
- 3) able to understand and discuss the
  - a) neurological, vascular, hormonal and peptidergic systems responsible for erection and detumescence
  - b) the physiology and pathophysiology of erectile dysfunction
  - c) the causes of erectile dysfunction
  - d) the biological action of testosterone and prolactin
  - e) the investigation, diagnosis and therapy of erectile dysfunction
  - f) endocrine studies
  - g) Doppler studies, dynamic cavernosography, arteriography, nocturnal penile tumescence testing
  - h) methods of assessment of penile rigidity
  - i) the pharmacology, methods of action, side effects
  - j) contraindications of hormones/drugs used to treat erectile dysfunction including Papaverine, Phentolamine, Apomorphine, Sildenafil, Alprostadil, Moxycylite, Yohimbine, Testosterone, Vasoactive Intestinal Polypeptide
  - k) the method of action, indications, complications of vacuum devices
  - l) indications for and counselling of couples requesting or requiring treatment with a penile prosthesis
  - m) indications for and treatment of arteriogenic erectile dysfunction.

### **Ejaculatory Disorders**

#### **Objectives**

The trainee should be able to take an appropriate history and examine the man and perform and arrange appropriate investigations and treatment.

The trainee should understand and be able to discuss

- 1) the physiology and pathophysiology of ejaculation,
- 2) the causes and treatment of premature ejaculation,
- 3) the causes and treatment including drugs and surgery of retrograde ejaculation
- 4) the methods of sperm retrieval in men with retrograde ejaculation
- 5) the investigation of treatment of men unable to ejaculate as a result of psychological or neurological causes
- 6) the value and limitations of vibratory devices
- 7) the mechanisms of action, the use and complications of electroejaculation.

## **Priapism**

### **Objectives**

The trainee should be able to take an appropriate history and examine the man and arrange/perform appropriate investigations and treatment.

The trainee should be able to understand and be able to discuss

- 1) the physiology and pathophysiology of a prolonged penile erection
- 2) the pharmacology of drugs associated with prolonged penile erection
- 3) medical conditions associated with development of priapism
- 4) the treatment of sickle cell crises
- 5) the pharmacology, side effects and complications of drugs used to treat priapism
- 6) the mechanisms involved in high flow and low flow priapism
- 7) the techniques used for the treatment of priapism including aspiration, injection of drugs, embolisation, glandular cavernosal shunting, corpora cavernosa spongiosa shunting, corpora cavernosa saphenous vein shunting
- 8) the treatment of corporeal fibrosis as a result of failure of treatment of priapism.

## **Peyronie's Disease**

### **Objectives**

The trainee should be able to take an appropriate history and examine the man including detailed genital examination and arrange/perform appropriate investigations and treatment including photographic evidence of the degree of deformity.

The trainee should understand and be able to discuss

- 1) the aetiology of Peyronie's disease and distinguish it from congenital penile curvature
- 2) the natural history of Peyronie's disease
- 3) investigation and therapy of Peyronie's disease
- 4) pharmacology, side effects, complications and contraindications of drugs used orally or intralesionally and current knowledge as to the likelihood of response
- 5) the treatment of Peyronie's disease by plication, Nesbitt's procedure, excision and grafting or penile prostheses

## **Clinical Diagnostic Techniques and Imaging**

### **Objectives**

The trainee should:

- 1) be competent in transrectal ultrasound scanning and vasography,
- 2) be able to understand and interpret Doppler studies, arteriography, transrectal ultrasound scans, dynamic cavernosography, vasography
- 3) be able to understand the endocrinological measurement of hormones for evaluation of infertility and erectile dysfunction
- 4) to be able to perform and interpret seminal fluid analysis
- 5) understand the risks and limitations of procedures, diagnosis and evaluation of diagnostic procedures
- 6) understand the validity of diagnostic tests, variability and reliability criteria
- 7) understand the need for clinical record keeping and data storage including the use of photography.

## **Surgical Techniques**

### **Objectives**

The trainee should be competent of independent practise in:

- 1) fertility control including vasectomy and microscopic reversal of vasectomy
- 2) diagnostic tests including transrectal ultrasound scanning, vasography, testicular biopsy
- 3) infertility surgery including vasovasostomy, vasoepididymostomy, microscopic epididymal sperm aspiration
- 4) endoscopic deroofing of cystic structures presenting in the prostatic urethra
- 5) erectile dysfunction surgery, the surgical of congenital venous leakage, the insertion of semi-rigid and inflatable penile prostheses, microvascular surgical arterial reconstruction of penile arteries
- 6) ejaculatory disorders, techniques - the surgical closure of the bladder neck, the use of ejaculatory devices
- 7) surgery of Peyronie's disease and congenital penile curvature including
  - a) Nesbitt's procedure, corporeal plication, excision and grafting of penile prostheses and the management of complications of such insertion
- 8) surgery of priapism, creation of a Winter shunt, corporeal spongiosal and saphenous vein shunts, surgical treatment of corporeal fibrosis as a result of prolonged penile erection.

## **Laboratory Based Training**

### **Objectives**

The trainee should understand and be able to discuss

- 1) tissue and cell structure
- 2) biochemical methodology including extraction, purification and identification of steroid and protein hormones e.g. steroids, proteins, receptors/membrane bound including cyclic AMP generation and cytosol receptors, bioassays, bound versus free, steroid metabolism and appropriate statistical analysis, prostaglandins, LHRH, peptides, adrenalin, etc
- 3) enzyme kinetics as they relate to steroid and protein metabolism,
- 4) growth factors
- 5) basic molecular biology techniques including oligo nucleotide probes insitu hybridisation, Southern Western and Northern blotting, restriction fragment length, polymorphism, polymerase chain reaction,
- 6) national and local regulations related to laboratory safety, animal and human experimentation, radiation hazards etc.

Trainee ..... Year of Training .....

	Completed by Trainee						Completed by Trainer							
	On appointment			At Completion			Competence level at 6 months				Competence level at 12 months			
	Seen	Assisted	Solo	Seen	Assisted	Solo	1	2	3	4	1	2	3	4
<b>Andrology</b>														
Microscopic vasectomy reversal														
Epididymo-vasostomy														
Nesbit's procedure														
Implantation of semi-rigid penile prosthesis														
Implantation of inflatable penile prosthesis														
Epididymal sperm aspiration														
Electro-ejaculation														
Penile lengthening procedures														
Penile thickening procedures														
Micro-revascularisation of the penis														
Phalloplasty														

Date:

Signed Trainee:

Signed Trainer:

LEVELS OF COMPETENCE

- Level 1 Needs training to perform the task
- Level 2 Needs supervision in performing the task
- Level 3 Competent to perform the task unsupervised
- Level 4 Competent to train others to perform the task