EUROPEAN SYLLABUS IN VASCULAR SURGERY

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Introduction
In 2005, Vascular Surgery was recognized as a separate and independent section within the UEMS. This recognition of Vascular Surgery as a monospecialty in Europe was important because it implies that Vascular Surgery is officially represented and involved in a number of political and professional issues regarding our profession.

One of these issues is certification. Since 1996 a European Vascular Examination has been conducted. It started as the EBSQ-VASC and was changed to “Fellow of the European Board in Vascular Surgery” (FEBVS) in 2005. During the last five years this examination has been improved and includes a series of technical skills assessment including endovascular.

Within the UEMS, increasingly more Sections and Boards are actively involved in specialist certification on a European level. Our Section and Board was involved in an initiative to interchange ideas and procedures regarding training and certification resulting in the “Glasgow Declaration”. This initiative has evolved last year in a group of UEMS Sections and Boards called “Council for European Specialists Medical Examinations (CESMA)”. CESMA explores among the UEMS Sections the wish to prepare a model for examinations (and those issues that are related) and work towards a formal status within the UEMS (e.g. like the EACCME as an Advisory Council on CME). Within CESMA a substantial number of UEMS Sections and Boards are preparing a description of the content of their specialty, i.e. a “syllabus” and/or a “curriculum” related to assessments and certification on a European level in their specialty.

In summary, many UEMS Sections and Boards are increasingly involved in certification and the development of curriculae and assessments. It is proposed that the Section and Board of Vascular Surgery should take the initiative to develop a European Vascular Surgery Curriculum. This appears particularly important because similar initiatives are currently being organized by our vascular collegues in the USA and in Australia. It would be very worthwhile if various vascular curriculae could be harmonized, at least as much as possible.

Vascular Specialist / Surgeon Training and Certification
Currently a European specialist qualification in any specialty does not replace an accreditation by the national authorities, which remains the primary specialist accreditation recognized by law by all member countries. There are, however, a number of countries which have expressed an interest in the FEBVS as part of their exit strategy.
from their national training programmes. As soon as examinations, assessments, etc. result in certification that is acknowledged in Europe, personal interests will become more prominent.

Taking an examination/assessment requires a formal and comprehensive description of the content of the knowledge and skills of the specialty. This enables the candidates to prepare for that assessment and is aware of what is required.

Such a formal description is not only important for the candidates but also for the assessors. It provides an excellent opportunity to describe the content of our specialty and helps to develop (1) our vision and mission and (2) identification and focussing on “gaps” in training and practice. Finally it provides an opportunity to compare and harmonize training not only in Europe, which will be ultimately required by the UEMS, but also outside Europe.

A Syllabus and a Curriculum in Vascular Surgery
The Section and Board of Vascular Surgery has defined the specialty of Vascular Surgery as “the clinical and scientific discipline concerned with the diagnosis, treatment and prevention of diseases affecting arteries, veins and lymphatics”. This definition of our specialty is the basis for a syllabus which is defined as an outline and summary of topics to be covered by Vascular Surgery. It contains an outline of what is being covered by Vascular Surgery and all information on training, assessments, and certification for the FEBVS examination. The Vascular Syllabus can be used to ensure consistency throughout and that all staff and trainees know what is required and what is not.

A European Vascular Surgical Curriculum has been developed in line with those from the UK, USA and Australasia. The curriculum sets out the theoretical knowledge and practical courses and other training offered at the European training centers. Since training varies between different European countries, it is conceivable that such a curriculum consists of a part defined by the country and a part that is defined by the Section and Board of Vascular Surgery and has also been finetuned with the FEBVS assessment.

Vascular and Endovascular Surgery (VES) is an established monospecialty within Europe. It requires specialized knowledge and skills in managing vascular conditions (arterial, venous and lymphatics)

VES should be provided in Vascular Surgical Units based in centres where a full range of medical and surgical facilities. These centres should provide postgraduate training in vascular and endovascular surgery and research facilities, and should be headed by a trained vascular surgeon.
A Vascular and Endovascular Surgeon is a surgeon specifically trained in the care of vascular patients, according to the rules and standards specified in this document.

Post-graduate training leading to recognition as a specialist in VES should equip the candidate with knowledge and skills which enable him/her to be competent in the entire field of the specialty, which might include the following activities:

- Acting in a consultative capacity
- Running a specialist practice
- Directing a programme of VES (in and outpatient) in a clinic, a hospital or in connection with a private practice
- Actively participating in providing students and patients education.

This document has been prepared for and approved by the European Board of Vascular Surgery (EBVS), the Section of Vascular Surgery, the European Society of Vascular Surgery and the Union of European Medical Specialists (UEMS), in its capacity as coordinating and monitoring authority at EU level. It provides reference documents that reflect the general criteria laid down in the Charter on Training of Medical Specialists in the EU – requirements for the speciality of Vascular Surgery (UEMS, Brussels, 1994) and should be read in conjunction with the existing national programmes within Europe.

This document is designed to:

- harmonise training programmes in VES between different European countries
- establish defined standards of knowledge, skills and attitude required to practice VES at secondary and tertiary care level
- foster the development of a European network of competent tertiary care centres for VES improve the level of care for vascular patients, and to thereby further
- Enhance the European contribution to clinical and academic VES worldwide.

2. Contents of training

2.1 Basic sciences

Vascular and Endovascular Surgeons are expected to have a knowledge and understanding of:

**Embryology**, with particular emphasis to the causes and embryologic mechanisms leading to common problems in vascular and endovascular practice;

**Anatomy**, to understand the basic anatomy and competently recognise the applied anatomy in both clinical and operative settings relevant to individual surgeons practice;
**Physiology and biochemistry**, to understand the effects of common surgical disease and injuries upon the normal structure and function of the various systems of the body, and including the physiological principles of *fluid balance* and *nutrition* of vascular surgical patients;

**Pathology** including the principles of *immunology* and *microbiology* relevant to vascular surgical practice;

**Pharmacology** including actions and toxic effects of drugs commonly used in perioperative and intraoperative care and in the management of critically ill vascular surgical patients;

**Epidemiology and statistics**, to allow for critical appraisal of publications, reviews and audit programs.

### 2.2 Professional skills and attitude

#### 2.2.1 Communication and behaviour

**Clinical contact with the patient**

Ability to take a history and carry out a clinical examination of a vascular patient.

**Acquire counselling and communication skills**

Ability to counsel parents / carers, patients and health professionals in the many varied situations in clinical PS such as information about prenatally diagnosed malformations, psychological effects of surgery and hospitalisation - particularly if prolonged - on the child development, and in stressful circumstances e.g. critically ill and dying patients. Knowledge of transcultural communication, including informing patients and carers via an interpreter.

**Understand the role of staff management and of referral in particularly complex vascular surgical disorders**

Knowledge of the role of allied medical and surgical specialties in the management of complex vascular surgical disorders; recognition of the complex conditions occurring beyond the limits of the experience and expertise gained by the trainee at the end of the
training. Indications for appropriate referrals to Colleagues with specific expertise or to national designated centres for specified rare conditions.

2.2.2 Management

*Acquire management skills in running a VES Unit*
Some knowledge of management skills, including strategies for minimising intervention, costs, as well as avoiding unnecessary investigations.

*Understand the socioeconomic and legal aspects of vascular surgical patients*

Direct contact with the medical social worker and other groups involved in the postoperative care and discharge from hospital. Ability to deal with medical / legal ethics and medico-legal aspects of VES will also be required.

2.2.3 Teaching and research

*Acquire teaching experience*
Demonstrate the ability to teach medical and paramedical staff by experience and attending specific courses.

*Develop research experience*
Training in the analysis of data and an understanding of the principles and practice of clinical research, literature research and review.

2.2.4 Quality control

*Understand the value of Audit Methodology and Specific Outcome Measures and Quality management*

Recognising the values of audit and outcome measures and risk management, and ability to analyse results and participate in audit relevant to VES.

2.3

2.3.1 General Surgery

*Surgical Infections and their Prevention*
Surgically important micro-organisms; pathophysiology of the body’s response to infection; septic shock; sources of surgical infection-prevention and control; principles of asepsis and antisepsis; aseptic techniques; sterilisation; antibiotic prophylaxis and therapy of infections.
Hepatitis and HIV carriers-special precautions; avoidance of infections transmitted by blood and body fluids.

**Surgical Technique and Technology**
Skin preparation; incisions and their closure; suture and ligature materials; patients' positioning; dressings; disorders of coagulation and haemostasis; diathermy-principles and precautions, alternative energy sources; lasers-principles and precautions; pathophysiology of wound healing; classification of surgical wounds; principles of wound management; scars and contracture; wound dehiscence; excision of cysts and benign tumours of skin and subcutaneous tissues; principles and techniques of biopsy and cytological sampling; modalities of tissue probe sampling for frozen section and paraffin histology, cytology and bacteriology; sampling of body fluids and/ or body excretions for laboratory investigation, interpretation of results; drainage of superficial abscesses; basic principles of bowel, urinary tract and blood vessel anastomosis.

**Organ Transplantation**
The knowledge of the problems related to organ transplantation and vascular disease, and the use of allografts.

2.3.3 **Vascular Anaesthesia**

**Anaesthesiology Techniques**
Basic understanding of the different techniques of general anaesthesia; their indications and contra-indications; local and regional anaesthesia; explosive hazards relating to general anaesthesia and endoscopic surgery; central venous catheterisation; fluid replacement, infusion therapy and parenteral alimentation; blood transfusion and serology; blood coagulation disorders and substitution measures; blood gas analysis and acid base balance.

**Critical Surgical illness and Intensive Care Medicine**
The applied basic science relevant to the clinical assessment of critically ill vascular patients and to the understanding of disorders of function caused by haemorrhage, shock and sepsis: posttraumatic, preoperative, perioperative and postoperative intensive care medicine; cardiopulmonary and pharmacological resuscitation; single organ failure (heart, liver, kidney); multiple system organ failure (pathophysiology and treatment); respiratory failure, pulmonary oedema “shock lung”, acute respiratory distress syndrome; septic inflammatory response syndrome; malignant hyperthermia.

2.4 **Vascular and EndoVascular Surgery**
Vascular and Endovascular Surgical core activity covers elective and emergency procedures and their pre-, peri- and postoperative aspects.
VES includes surgical pathologies of the arterial, venous and lymphatics systems.

Within the domain of VES specific skills in the areas above written in *italics* are not included in the core curriculum in some European Countries; basic understanding of the principles of these subspecialties is nevertheless required.

### 2.4.1 Preoperative and postoperative care

**Screening programs**
Knowledge of the AAA screening

**Laboratory tests**
Knowledge of the haematological, immunological, biochemical and histo-pathological changes that accompany vascular surgical diseases. Ability to interpret and relate such knowledge and results to clinical scenarios.

**Imaging**
Knowledge of the indications for, and basic interpretation of, imaging techniques such as conventional X-rays, sonography, Doppler sonography, CT / MRI / PET scans and radio-isotope techniques in the investigation of the vascular surgical diseases. Understanding of security measures in Radiology. Knowledge of radiation-sparing indications for X-ray investigations.

**Endoscopic techniques**
Knowledge of the indications and technical skills required for employing various endoscopic techniques such as gastrointestinal, for diagnostic and therapeutic purposes. Handling of endoscopes and hygiene measures. Exposure to the opportunity of gaining knowledge and experience of evolving technological methods.

### 2.4.3 Emergency Surgery

Care of critically ill vascular patient with underlying conditions including coordinated multidisciplinary management; clinical assessment of more or less severely injured vascular patient and to the understanding of disorders of function caused by trauma, thermal injuries, haemorrhage and shock.

Principles of pre-hospital care; clinical assessment of critically ill and severely injured vascular patient - scoring systems; management of the unconscious vascular patient; monitoring of vital functions in critically ill or severely injured vascular patient; initial management of surgical patients with multiple trauma; resuscitation and haemodynamic support; haemorrhage and shock; maintenance of airway in severely injured and unconscious patients; management of cranial, thoracic, abdominal and pelvic trauma; management of soft tissue trauma.
2.4.4 Vascular and EndoVascular Surgery

Abdominal Aortic Aneurysms

Basic Science
To describe the anatomy, physiology, pathology and natural history of diseases which affect the abdominal aorta and their subsequent effects.

Diagnostic Evaluation, Screening and Imaging
To understand the incidence and prevalence of aneurysmal disease according to age, co-morbidity and familial history.

To understand the natural history of abdominal aortic aneurysms.

To understand the genetic distribution of the disease.

To discuss the place and role of national screening programme for AAA.

To understand the roles of ultrasound, angiography, CT and MRI/MRA in screening and in planning surgery.

Treatment

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the blood pressure control, renal function, subsequent cardiovascular events and patient survival.

To describe the surgical management of complex aortic aneurysms (including horseshoe kidneys, aortocaval and aorto duodenal fistulae, mycotic, inflammatory and associated intraabdominal malignancy).

To have knowledge of both the immediate and long-term outcomes of surgery for aortic aneurysmal disease (including symptomatic, asymptomatic, thoracoabdominal, juxtarenal, infrarenal and recurrent).

To describe the management and prevention of surgical complications including spinal cord ischaemia, distal embolisation, myocardial infarction, acute renal failure, and graft infection.
Peripheral Vascular Occlusive Disease (Acute and Chronic)

Basic Sciences (Acute and Chronic)

To describe the anatomy, physiology, pathology and natural history of diseases which affect the lower limb and upper limb arterial system and their subsequent effects.

To describe the mechanism of early and late graft failure, fibro-intimal hyperplasia and progression of disease.

Diagnostic Evaluation, Screening and Imaging

Acute Peripheral Ischaemia

To describe the signs and symptoms characteristic of acute arterial ischaemia and the differential diagnosis.

To discuss the role of IA DSA, MRA, CT and duplex imaging in the assessment of acute peripheral ischaemia.

To develop a management plan based upon the clinical history, blood investigation and imaging.

Diagnostic Evaluation

Chronic Peripheral Vascular Ischaemia

To describe the characteristic signs and symptoms of chronic peripheral vascular ischaemia relative to the patient's history and physical examination.

To discuss the various roles of imaging studies.

To describe the basis of the ankle brachial index and its use in the assessment of patients chronic peripheral vascular ischaemia

To develop a management plan based upon the clinical history, blood investigation and imaging.

Treatment

Acute Peripheral Vascular Ischaemia

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the management of acute peripheral vascular ischaemia including graft patency, limb salvage rates and overall patient survival
Treatment

Chronic Peripheral Vascular Ischaemia

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the management of chronic peripheral vascular ischaemia including graft patency, limb salvage rates and overall patient survival.

Renal Artery Disease

Basic Sciences
To describe the anatomy, physiology, pathology and natural history of diseases which affect the renal arteries and their subsequent effects on renal function.

Diagnostic Evaluation, Screening and Imaging
To describe the indications and limitations of imaging studies for renal disease:

To describe the role of renal protective agents in preventing contrast induced nephropathy

Treatment

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the blood pressure control, renal function, subsequent cardiovascular events and patient survival.

Visceral Ischemia

Basic Sciences
To describe the anatomy of the mesenteric blood supply and the various pathological processes which result in acute and chronic disease.

Diagnostic Evaluation Acute Mesenteric Ischaemia
To describe the signs and symptoms of acute mesenteric ischaemia.

To develop a management plan based upon the clinical history, blood investigation and imaging.

Chronic Mesenteric Ischaemia
To describe the signs and symptoms of chronic mesenteric ischaemia.
To develop a management plan based upon the clinical history, blood investigation and imaging.

**Treatment Acute Mesenteric Ischemia**

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes in terms of the management of intestinal necrosis, long term nutritional support and overall patient survival.

**Chronic Mesenteric Ischemia**

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (patient survival, vessel patency, freedom from restenosis).

**Carotid Artery Disease**

**Basic Sciences**
To describe the anatomy, embryology and pathology of the arch, great vessels, and intracranial arteries.

**Diagnostic Evaluation, Screening and Imaging**

To describe the signs and symptoms of (i) transient ischemic attack (TIA), (ii) reversible ischemic neurologic deficit (RIND), (iii) stroke in evolution and (iv) completed stroke.

**Treatment**
To develop a management plan based upon the clinical history, blood investigation and imaging.

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, stroke rate, restenosis and patient survival).

**Innominate, Subclavian and Vertebrobasilar Arterial Disease**

**Basic Sciences**
To describe the anatomy of the innominate, subclavian and vertebral arteries.
To describe the embryology of the above and relate the common anomalies to the embryology.

To describe the pathophysiology of atherosclerosis, trauma, dissection, arteritis and radiation as it applies to the innominate, subclavian and vertebrobasilar arteries.

**Diagnostic Evaluation, Screening and Imaging**

To describe the symptoms and signs of brain ischaemia and that of the upper extremity

To describe the role of non-invasive tests in the identification of these lesions of the innominate, subclavian and vertebrobasilar arteries and how these tests may preclude

Define the most appropriate diagnostic steps for the evaluation and for the choice of treatment of these conditions or indicate arteriography.

To discuss the value and shortcomings of CT and MRA/MRI imaging techniques in the diagnosis of these entities.

**Treatment**

To discuss the options for (a) medical treatment, (b) surgical repair or (c) endovascular and the outcomes (complications, and patient survival).

**Thoracic Outlet Syndrome**

**Basic Sciences**

To describe the anatomy of the thoracic outlet, including the anatomic variations in bones, muscles, and cervical ribs.

**Diagnostic Evaluation, Screening and Imaging**

To describe the symptoms associated with thoracic outlet syndrome (arterial, venous, neurogenic).

To discuss the role of imaging in TOS

To develop a management plan based upon the clinical history, blood investigation and imaging.

**Treatment**

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, stroke rate, restenosis and patient survival).
Diabetic Foot

Basic Sciences
To define the normal arterial and venous anatomy of the circulation of the foot.

To demonstrate an understanding of the aetiology of the underlying problems of the diabetic foot.

To outline factors that can affect blood glucose levels in the peri- and postoperative period

Diagnosis, Screening and Imaging

To demonstrate an understanding of the presenting signs and symptoms of the diabetic foot:

To discuss the role of non-invasive and invasive imaging in the diabetic foot

To develop a management plan based upon the clinical history, blood investigation and imaging

Treatment

To discuss the indications for treatment and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, graft patency, limb salvage and patient survival).

Management of Vascular Trauma and Iatrogenic Injuries

Basic Sciences
To describe the mechanism of vascular injury and sequelae thereof to the upper extremity, thoracic aorta, abdominal aorta and its branches, and lower extremities.

Diagnostic Evaluation and Imaging

To describe the characteristic signs and symptoms of acute vascular (arterial and venous) compromise secondary to trauma.

To describe the role of imaging in the management of vascular trauma, and associated fractures and neurological injuries.
To develop a management plan based upon the clinical history, blood investigation and imaging.

Treatment

To discuss the indications for treatment of acute arterial and venous injuries and complications thereof including nerve and bony injuries, AVF and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, graft patency, limb salvage and patient survival).
Chronic Venous
Basic Sciences

To describe the normal venous anatomy of the lower and upper limbs

To describe the embryology of venous development and the important variants.

To describe the physiology and common pathological conditions which affect the venous systems.

Diagnostic Evaluation, Screening and Imaging
To describe the "CEAP" classification system of chronic venous insufficiency: Clinical condition, aetiology, anatomic distribution and pathophysiology.

To discuss the aetiologic categories of venous dysfunction:

To discuss the role of noninvasive and invasive evaluation of the venous system including ascending & descending venography, photoplethysmography, air plethysmography, and duplex scanning.

Treatment

To discuss the indications for treatment of acute and chronic venous disease including the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (complications, graft patency, limb salvage and patient survival).

To describe the types of available therapy for superficial venous insufficiency (varicose veins) including elastic stockings, elevation, sclerotherapy, laser treatment, stab avulsion, stripping.

Lymphoedema
Basic Sciences

To describe the anatomy of the adult lymphatic system from the level of the terminal lymphatics to the cisterna chyli

To describe physiological determinants of lymph flow, including intrinsic contractility of lymph vessels, increased interstitial pressure, muscular activity, arterial pressure, respiratory pressure, and gravity.
To discuss the consequences of the loss of chyle into body cavities or through a chylocutaneous fistula.

**Diagnostic Evaluation, Screening and Imaging**

To describe clinical classifications of lymphoedema

*To discuss the role of imaging in patients with lymphoedema*

*To develop a management plan based upon the clinical history, blood investigation and imaging.*

**Management of Chronic Lymphoedema**

To discuss the indications for treatment of chronic lymphoedema including the various options including medical management, open surgery (including approaches) and the outcomes (complications, graft patency, limb salvage and patient survival).

**Endovascular Therapy**

To understand the basic principles of interventional radiological techniques.

To demonstrate a working knowledge of the equipment, techniques, technical problems, troubleshooting and recovery techniques.

To demonstrate a working knowledge of the physical properties of devices including wires, catheters, balloons, coils, stents, stent-grafts, filters and delivery systems.

**Imaging Modalities**

*To understand radiation physics, safety, risks, cellular effects, somatic effects, dose responses, monitoring, shielding and variations in x-ray equipment as they relate to both patients and personnel including preventative measures for safety.*

To understand the basic principles and equipment used for fluoroscopy and arteriography.
To demonstrate a working knowledge of contrast media, road-mapping, imaging techniques, measurement techniques, parallax, hand and power injection techniques and film sequencing.

To demonstrate a working knowledge of magnetic resonance imaging, computerized axial tomography including helical techniques with 3 dimensional reconstructions and angiography.

**Basic Techniques**

To obtain a working knowledge of basic endovascular techniques including the use of needles, catheters, guidewires, dilators and introducer techniques, balloons, stents and intrarterial drugs

To have a working knowledge of adjunctive interventional procedures required as retrieval, recovery or "bail out" procedures in endovascular surgery including endovascular and open techniques.

**Miscellaneous**

**Cardiac Disease**
To discuss association of coronary artery and peripheral vascular disease.

To understand the risk factors predictive of perioperative myocardial infarction or cardiac death.

To describe the frequency of severe CAD in patients with symptomatic peripheral vascular disease.
To describe the early and late cardiac mortality figures following major vascular surgery.

**Anatomy and Pathophysiology**

To describe normal coronary artery anatomy and the pathophysiology of angina, heart failure and valvular pathologies.

**Diagnosis**

To understand the signs and symptoms of chronic stable angina, unstable angina, myocardial infarction and congestive heart failure.

To describe the risks of operation in a patient with a recent myocardial infarction, unstable angina, or poorly compensated congestive heart failure.

To describe the current methods for screening for coronary artery disease, and their limitations.

To identify which patients should undergo a preoperative test for coronary artery disease.

To discuss the need for coronary angiography prior to vascular surgery.

To discuss the operative approach in relation to the patients known cardiac risk.

To understand when patients are most at risk of a perioperative MI.

**Treatment**

To recognise the need for close peri-operative monitoring, the management of Non ST elevation myocardial infarction and the need for risk factor modification in the long term.

To discuss the indications for CABG prior to peripheral vascular surgery.
Pulmonary Disease

To describe the relationship between poor lung function and prolonged vascular procedures, intra-abdominal and thoracic incisions, and poor left ventricular function.

To understand that cardiac and other co-morbid conditions are more important in determining postoperative pulmonary complications than pre-existing pulmonary disease.

Diagnosis
To describe the risk factors for pulmonary disease,

To describe and demonstrate the signs and symptoms of COPD.

To understand the limited role of clinical assessment in predicting which patients will have a postoperative pulmonary complication.

To understand the role of preoperative pulmonary function studies in identifying the aetiology and treatment alternatives.

Treatment

To describe how to reduce the pulmonary risk of a vascular operation by the choice of operation and anaesthesia.

To describe which pulmonary conditions may benefit from the perioperative use of steroids, bronchodilators, antibiotics and inhalers.

To describe the causes and treatment of the adult respiratory distress syndrome (ARDS).

Coagulation Disorders

To be familiar with the commonly used drugs (heparin, LMWH, warfarin and antiplatelet drugs) in vascular surgery including their complications (Heparin-induced Thrombocytopenia (HIT), excessive bleeding and the need for blood products.

To be familiar with the common hypercoagulability syndromes, the investigation and treatment thereafter.
Premature atherosclerosis

To identify possible premature atherosclerosis and decide on consultation with a vascular internist / angiologist where appropriate.

To analyze possible causes of premature atherosclerosis / vascular occlusions (vasculitis, cardiolipine antibodies, antilupus, etc.

Vascular Access

Anatomy and Pathophysiology

To describe the arterial and venous anatomy of the common arteriovenous fistula of the upper and lower extremities.

To describe the haemodynamic and physiologic effects of creating an arteriovenous fistula. To discuss the anatomic and physiologic aetiologies for arterial steal.

Diagnostic Evaluation, Screening and Imaging

To develop a management plan based upon the clinical history, blood investigation and imaging.

Treatment

To discuss the indications for primary and secondary vascular access and complications and the various options including medical management, open surgery (including approaches) and endovascular techniques and the outcomes (compications, graft patency, limb salvage and patient survival).

Sympathectomy

Basic Science
To describe the anatomy of the autonomic nervous system and the relationship between the sympathetic fibers and the abdominal aorta and iliac vessels.
To describe the functions of the sympathetic nervous system and the pathologic conditions resulting from abnormal sympathetic activity.
To describe the potential beneficial effects of sympathetic ablation and possible adverse side effects.

**Diagnostic Evaluation and Imaging**

*To develop a management plan based upon the clinical history, blood investigation and imaging.*

**Surgical Technique**

To discuss the indications for upper and lower limb sympathectomy and complications and the various options including open and closed techniques of sympathectomy.

**Diagnosis and Management of Miscellaneous Vasculogenic Problems**

These include Raynauds, Causalgia/Reflex Sympathetic dystrophy, arteritis, popliteal entrapment, cystic adventitial disease, fibromuscular disease, mycotic disease, vasospastic disorders, arteriovenous malformations, intravenous drug abuse.
3. Training programme

3.1 Access

Access to the training in VES will be delegated to the responsible Authorities according to the national rules.

In order to train the most suitable individuals for this specialty, a selection procedure on a national basis should be set up. This selection procedure must be transparent and application must be open to all persons who have completed basic medical training. Selection procedure can be based on examinations or interview, or both.

Each country should train only enough vascular and endovascular surgeons to meet its own requirements of specialist manpower. The UEMS vascular shall guidelines for the planning of manpower in VES.

3.2 Duration

The duration of surgical training should be at least six years. The training may not be interrupted for more than one year, unless otherwise allowed by National Regulations. The training should involve the maximum in-hospital hours/week allowed by the EWTD.

3.3 Structure

A basic training programme should be incorporated in the early years of the training during which the vascular surgical trainee shall acquire a central core of knowledge embracing anatomy, physiology, metabolism, immunology, nutrition, trauma, pathology, wound healing, shock and resuscitation, and intensive care.

A possible preliminary common trunk in general surgery is the responsibility of training institutions together with the relevant National Authorities. It can serve as the common basis and prerequisite for the specific programme in VES and can last from one to two years.

Following years of core curriculum training should be structured in a modular system, with modules inserted or omitted according to the national requirements (e.g. orthopaedics, traumatology, urology, etc.).

Active participation in a structured program of formal lectures, seminars, journal clubs, clinical and audit meetings should be an essential part of the training.

3.4 Minimal requirements
In order to enable trainees to practice VES to a reasonable extent unsupervised after completion of the training (see requirements for exam.), the training programme itself must expose them to a sufficient number of patients and procedures of sufficient diversity and complexity.
Trainees must demonstrate competence in a number of areas. The degree of competence will be determined by the trainer and be driven by the trainee. Four areas of competence for each procedure should be identified:

1. Has observed
2. Can do with assistance
3. Can do almost all – may need assistance
4. Competent to do without assistance, including complications

By the end of the training program candidates should reach the appropriate level (2 for complex procedures, 3 for average procedures and 4 for day case procedures) for a minimum number of cases in each of the areas detailed in the trainee’s log-book.

This minimum number - as specified in the following table - is to be considered as a recommendation; it should be weighed against the national structure of the training program and should be linked to a registration of complications and outcomes (possibly documented in the log-book) aiming this Syllabus more for quality than for quantity.

Credit as active surgeon can only be claimed when the trainee has actively participated in all phases of treatment, has made or confirmed the diagnosis, participated in the selection of the appropriate procedure, has either performed or been responsibly involved in performing the surgical procedure and has been a responsible participant in both pre- and postoperative care.