

European Board of Phlebology

# Syllabus for Duplex ultrasound assessment of CVD

Working group : JJ Guex, Spyros Vasdekis

DUS - EBP  
23/09/2017

## SUMMARY

### I. Introduction

- a. Indications of Duplex Ultrasound (DUS) for CVD assessment
- b. History of DUS for venous assessment

### II. Basic principles of DUS

- a. Physical principles of DUS
  - i. Grey scale and Colour Duplex Image creation
  - ii. Pulsed Wave Doppler
  - iii. CW Doppler
  - iv. Spectral analysis of flow
- b. Technical Developments
  - i. Transducers
  - ii. Colour Doppler
  - iii. Power Doppler
  - iv. 3D Ultrasound
  - v. Tissue Harmonic Imaging
  - vi. Contrast Enhanced Ultrasound (CEUS)
- c. Principles of intravascular ultrasound
- d. Configuring scanner and transducer
  - i. Configuring scanner for venous examination
  - ii. Configuring scanner for arterial examination

### III. Anatomy of the superficial veins

- a. Nomenclature
- b. Great saphenous vein
  - i. Topographical anatomy of great saphenous (tributaries, variations)
  - ii. Accompanying structures of great saphenous (fascia, nerve etc)
- c. Small saphenous vein (termination, variations)

### IV. Anatomy of Perforating veins

### V. Anatomy of Deep veins

- a. Topographical anatomy
- b. Accompanying structures of deep veins (compartments, arteries, nerves etc)

### VI. Anatomy of pelvic veins and pelvic floor

- a. Leaking points to lower limbs
- b. Compression syndromes

### VII. Physiology of the venous system (flow patterns, muscle pumps)

### VIII. Hemodynamic modifications in CVD

- a. Venous reflux
- b. Venous obstruction
- c. Calf muscle pump failure
- d. Microcirculation changes
- e. Pelvic congestion syndrome

- IX. Dynamic venous function tests**
  - a. Air-plethysmography
  - b. Photoplethysmography
  - c. Strain gauge plethysmography
  - d. Ambulatory venous pressure measurements
- X. Arterial tests**
  - a. Ankle- brachial index
- XI. Other imaging methods**
  - a. Computed Tomography of the venous system
  - b. Magnetic Resonance venography
  - c. Contrast venography
  - d. Lymphoscintigraphy
- XII. Venous reflux assessment**
  - a. Patient position and examination protocol
  - b. Venous reflux measurement
  - c. Anatomical distribution of venous reflux
  - d. Pelvic venous reflux assessment (ovarian vein, leaking points etc)
- XIII. Preoperative venous mapping**
- XIV. Venous thrombosis assessment**
  - a. Patient position and examination protocol
  - b. Thrombus assessment (age of thrombus, extent)
  - c. Pelvic venous thrombosis (compression points, thrombus extension etc)
- XV. Post thrombotic limb assessment**
  - a. Recanalisation
  - b. Perforating veins
  - c. Venous ulcer assessment
- XVI. Ultrasound guided procedures (thrombus, seroma and cysts aspiration)**

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# Syllabus for Compression Therapy

Working group : Fabrizio Mariani

WG Compression Therapy - EBP  
18/09/2017

## **SUMMARY**

### **I. Introduction**

- A. Intention and objectives of syllabus for Compression Therapy
- B. History of Compression Therapy

### **II. Basis of Compression**

- A. Definition
- B. Compression Physics

### **III. Mode of action**

- A. Knowledge in Microcirculation
  - 1. Transmural pressures
  - 2. Tissue pressure
  - 3. Capillary exchanges
  - 4. Venous microangiopathy
- B. Knowledge in Physiopathology of Venous return
  - 1. Vein caliber
  - 2. Venous valves
  - 3. Venous outflow
  - 4. Venous volume
  - 5. Venous capacity
  - 6. Flow velocity
  - 7. Venous pressure
  - 8. Venous refilling time
  - 9. Reflux
  - 10. Venous wall
  - 11. Venous foot pump
- C. Knowledge in Physiopathology of Lymphatic return
- D. Knowledge in Physiopathology of Arterial perfusion
- E. Knowledge in Physiopathology of Vasomotility
- F. Knowledge in Physiopathology of Blood
  - 1. Rheologic properties
  - 2. Coagulation

### **IV. Bandages**

- A. Knowledge in Physical properties of the materials
  - 1. Elasticity, Extensibility
  - 2. Hysteresis
  - 3. Working-Resting pressures
  - 4. Stiffness
- B. Knowledge in Characteristics of bandages
  - 1. Anelastic, Short stretch
  - 2. Medium stretch, Long Stretch
  - 3. Adhesive, Cohesive
  - 4. Multicomponent bandages
- C. Knowledge in Preparation of the limb
- D. Knowledge and practical application of Bandaging techniques
  - 1. Application of the bandage
  - 2. Principles of the techniques
  - 3. Regular spiral turns

4. Turns of eight
  5. Turns of eight fixed at the ankle
  6. Spontaneous unrolling
  - E. Knowledge and practical application of Eccentric compression
  - F. Knowledge and practical application of Bandaging of the upper extremities
  - G. Knowledge of Indications
  - H. Knowledge of Contraindications
- V. Elastic stockings**
- A. Knowledge of Type of stockings
  - B. Knowledge of Regulations and definitions
  - C. Knowledge of Hosiery manufacturing methods
    1. Thread covering
    2. Knit types
    3. Series or custom made production
    4. Pressure profiles
  - A. Knowledge of Compression Classes
  - B. Knowledge of Graduated Elastic Compression stockings
  - C. Knowledge of Support stocking
  - D. Knowledge of Antithromboembolism stocking
  - E. Knowledge of Progressive Elastic stockings
  - F. Knowledge of Sleeves
  - G. Knowledge of Ulcer stocking kits
  - H. Knowledge of Prescription
    1. Taking measurements
    2. Selection of the compression class
    3. Selection of the model
  - I. Knowledge of Indications
  - J. Knowledge of Contraindications
  - K. Knowledge of Additional advices
    1. Instructions for putting
    2. Care
    3. Mobilization
    4. Patient compliance
- VI. Pneumatic compression**
- A. Knowledge of Principles
  - B. Knowledge of Mode of action
  - C. Knowledge of Devices
    1. Single chamber
    2. Sequential
    3. Pneumatic plantar
  - D. Knowledge of Intermittent pneumatic compression
  - E. Knowledge of Intermittent sequential compression
  - F. Knowledge of Plantar pneumatic compression
  - G. Knowledge of Indications
    1. Tromboprophylaxis
    2. Management of edema
    3. Management of lymphedema
    4. Surgery

- 5. Arterial diseases
- 6. Other indications
- H. Knowledge of Complications
- VII. Compression therapy in leg ulcers**
  - A. Knowledge of Methods
    - 1. Bandages
    - 2. Stockings
    - 3. Pneumatic compression
  - B. Knowledge of Techniques
    - 1. Preparation of the limb
    - 2. Application of the bandages
    - 3. Application of the stockings kit
    - 4. Medications
- VIII. Compression therapy in lipodermatosclerosis**
  - A. Knowledge of Methods
    - 1. Acute lipodermatosclerosis
    - 2. Chronic lipodermatosclerosis
  - B. Knowledge of Additional treatments
- IX. Compression therapy in venous thrombosis**
  - A. Knowledge of Methods
    - 1. Superficial venous thrombosis
    - 2. Deep venous thrombosis
  - B. Knowledge of Additional treatments
- X. Knowledge of Compression therapy in peripheral arterial disease**
- XI. Compression therapy in venous procedures**
  - A. Knowledge of compression in Vein surgery
  - B. Knowledge of compression in Endovenous procedures
  - C. Knowledge of compression in Sclerotherapy
- XII. Knowledge of Compression therapy in lymphoedema**
- XIII. Knowledge of Compression therapy in prophylaxis of venous thromboembolism**
- XIV. Knowledge of Contraindications to compression therapy**
- XV. Knowledge of Techniques of measuring compression in vitro and in vivo**
  - A. Direct
  - B. Indirect
- XVI. Knowledge of Managing compression algorithms**

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# Syllabus for sclerotherapy

Working group : Claudine Hamel-Desnos (CHD), Fabrizio Mariani (FM),  
Eberhard Rabe (ER), Tomasz Urbanek (TU)

WG sclerotherapy- EBP  
01/10/2017



## SUMMARY

### Introduction

- Intention and objectives of syllabus for sclerotherapy
- Short history on sclerotherapy

#### I. Prerequisites for commencing a practice of sclerotherapy

- Knowledges in acute and chronic superficial and deep venous diseases and venous malformations
- Knowledges in anatomy, physiology, pathophysiology of the venous system
- Knowledges in indications and contra-indications for sclerotherapy
- Knowledges and good skills in ultrasound imaging: diagnostic ultrasonography of the venous system, pretreatment assessment, mapping
- Knowledges and skills in puncture of vessels wether with or without ultrasound guidance
- Possibility of regular practice of sclerotherapy

#### II. Sclerosing agents

- General knowledge in the various liquid sclerosants

#### III. Sclerosant Foam

- Knowledge in advantages and disadvantages of sclerosant foam compared with liquid sclerosant
- Knowledge and skills in preparation of the sclerosant foam

#### IV. Facilities and general equipment required for sclerotherapy

- Knowledge in required environment, room, facilities, US imaging machine and transducers, specific stool for phlebology, examination couch, emergency equipment...

#### V. Indications for liquid and foam sclerotherapy

#### VI. Contraindications for liquid and foam sclerotherapy

#### VII. Selection of patients; pretreatment assessment, mapping, treatment strategies, planning of the sessions

#### VIII. Visual sclerotherapy

- Knowledge in indications of visual sclerotherapy
- Knowledge in equipment for visual sclerotherapy
- Knowledge in doses (concentrations and volumes)
- Technique for visual sclerotherapy and knowledge in the various methods of injection (needle, butterfly needle, cannula)

#### IX. Ultrasound-guided foam sclerotherapy (UGFS)

- General considerations for UGFS
- Knowledge in indications for UGFS
- Knowledge in equipment for UGFS
- Knowledge and good skills in preparation of the sclerosant foam
- Knowledge in doses for UGFS (concentrations and volumes)
- Technique for UGFS and knowledge in the various methods of infusion (needle, cannula, Butterfly needle, long catheter with or without tumescent anesthesia)

#### X. Precautions and compression management after sclerotherapy

#### XI. Planning of follow-up and complementary sessions

**XII. Complications of sclerotherapy ; management and prevention**

**XIII. Expected Results of sclerotherapy**

- Review of results of sclerotherapy in the literature and comparison with other endovenous methods and surgery
- Knowledge in limits of sclerotherapy

**XIV. Patient information and consent**

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# Syllabus for Endovenous Ablations

Working group : Marc Vuylsteke, Lotte Klitfod, Armando Mansilha

WG Endovenous Ablations- EBP  
18/09/2017

## **SUMMARY**

### **Introduction**

Intention and objectives of syllabus for Endovenous Ablations

History of Endovenous Ablations

### **THERMAL ABLATIONS**

Knowledge in Indications

#### Endovenous Laser ablation EVLA

Knowledge in Technique (saphenous vein, perforators, ..) and postoperative care

Knowledge in way of acting, the role of tumescent anesthesia

Knowledge in different fibres and wavelengths

Knowledge in effectiveness

Knowledge in safety and possible side-effects

#### Radiofrequency RF

Knowledge in technique and postoperative care

Knowledge in way of acting and catheters

Knowledge in effectiveness

Knowledge in safety and possible side-effects

### **MOCA**

Knowledge in indications

Knowledge in technique and postoperative care

Knowledge in way of acting

Knowledge in effectiveness

Knowledge in safety and possible side-effects

### **GLUE**

Knowledge in indications

Knowledge in technique and postoperative care

Knowledge in way of acting

Knowledge in effectiveness

Knowledge in safety and possible side-effects

### **Patient information and consent**

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# Syllabus for open superficial venous surgery

Working group : Oscar Maleti, Ivan Staelens

WG surgery- EBP  
18/09/2017

## SUMMARY

### Introduction

1. Intention and objectives of syllabus for open superficial venous surgery
2. History of open superficial venous surgery

#### I. Prerequisites for commencing a practice of open superficial venous surgery

1. Knowledge in acute and chronic superficial and deep venous diseases and venous malformations
2. Knowledge in anatomy, surgical anatomy, physiology, pathophysiology of the venous system
3. Knowledge in general indications and contra-indications for open superficial venous surgery
4. Good skills in ultrasound imaging : diagnostic ultrasonography of the venous system, pre-treatment assessment, mapping
5. Possibility of regular practice of open superficial venous surgery

#### II. Facilities and general equipment required for open superficial venous surgery

1. History of surgical instruments
2. Knowledge in surgical instruments for treating sapheno-femoral and sapheno-popliteal ligation
3. Knowledge in surgical instruments to perform perforators ligation
4. Knowledge in surgical instruments for phlebectomy
5. Knowledge in vascular sutures
6. Knowledge in esthetical tricks
7. How to control and repair a femoral or popliteal injury and related tools

#### III. Indications for open superficial venous surgery

#### IV. Contraindications for open superficial venous surgery

#### V. Pretreatment assessment, mapping, treatment strategies, planning of the sessions

#### VI. Open surgical techniques

1. High ligation
2. Saphenous stripping
3. Inversion stripping
4. Phlebectomy
5. Surgical treatment of recurrence varicose veins
  - a. Vascular exposure and dissection
  - b. Blood vessel control
6. SEPS

#### VII. Precautions and compression management after open superficial venous surgery

1. Precautions after surgery
2. Compression bandages
3. Elastic stockings
4. Excentric compression with pads

- VIII. Planning of follow-up and complementary sessions**
- IX. Complications of open superficial venous surgery; management and prevention**
- X. Expected Results of open superficial venous surgery**
  - 1. Review of results of open superficial venous surgery in the literature and comparison with other methods
  - 2. Limits of open superficial venous surgery
- XI. Patient information and consent**

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# Syllabus for venous leg ulcer (VLU) assessment

Working group : Jürg Traber

WG VLU assessment- EBP  
06/10/2017



## SUMMARY

### Introduction

1. Epidemiology of vlu
2. Socio-economical impact

### I. Assessment of the underlying venous disease

1. Knowledge in anatomy, physiology, pathophysiology of the venous system
2. Classification of chronic venous insufficiency
3. Knowledge in deep venous system physiology and pathophysiology
  - a. postthrombotic syndrome
  - b. venous valve aplasia / dysplasia
4. Knowledge in prevention and management of deep venous thrombosis
5. Knowledge of the most common differential diagnosis of leg ulcers

### II. Treatment of the underlying venous disease

1. Knowledge in therapy of superficial vein system
  - a. Interventional
  - b. Surgical
  - c. Medical (eg sclerotherapy)
  - d. Conservative (compression)
2. Knowledge in therapy of deep vein system
  - a. Reconstructive deep vein surgery
  - b. Interventional therapy
  - c. Conservative therapy (compression)
3. Knowledge in therapy of perforators
  - a. Interventional
  - b. Surgical
  - c. Medical (eg sclerotherapy)
  - d. Conservative (compression)
4. Knowledge in compression therapy
  - a. Physiological effects / indication / contraindications
  - b. Bandages / stockings
  - c. Intermittent compression therapy devices

### III. Ulcer assessment

1. Ulcer history
2. Ulcer description and documentation
3. Knowledge in wound healing phases / wound classification
4. Knowledge in ulcer / skin biopsy
5. Knowledge in bacteriology, pathogenic germs
6. Knowledge in relevant comorbidities wound healing influencing factors
  - a. Nutrition
  - b. Lifestyle
  - c. Hygiene

### IV. Ulcer treatment

1. Knowledge in cleansing/debridement techniques
  - a. Wet to dry / Cleansing / antiseptically agents and solutions
  - b. Surgical debridement
  - c. Biological debridement
  - d. Enzymatical debridement

- e. Autolytic debridement
- 2. Knowledge in exsudat management
  - a. Cause of, Appearance, viscosity and volume
  - b. Different types of dressings (absorption, gelling, retention and moisture vapour transmission)
  - c. TNP Treatment
  - d. Compression treatment
- 3. Knowledge in bacterial reduction, infection control
  - a. Extent of microbial contamination
  - b. Diagnostic challenges and therapeutical strategies in reducing degree of contamination
  - c. Knowledge in management of multiresistent microbials
  - d. Knowledge in systemic treatment of wound infection
  - e. Dressing strategies in infected ulcers
- 4. Knowledge in pain management
  - a. Locally
  - b. systemically

**V. Advanced ulcer treatment techniques**

- 1. skin substitutes, bio engineering
  - a. living cell products
  - b. cell products
- 2. cold plasma
- 3. light therapy
- 4. oxygen therapy
- 5. shock wave / ultrasound therapy

**VI. Surgical ulcer treatment**

- 1. surgical ulcer treatment
  - c. shaving therapy
  - d. ulcus excision / fasciectomy
- 2. knowledge in (split) skin grafting
- 3. knowledge in plastic surgery (muscle/skin flaps)

**VII. Hemostasis**

- 1. Knowledge in hemostasis
- 2. Knowledge in anticoagulation and prevention of thromboembolism

**VIII. Skin care and ulcer prevention**

- 1. knowledge in ointments and skin care products
- 2. knowledge in patient education

**IX. Patient information and consent**

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# Syllabus for open deep venous surgery

Working group : Oscar Maleti, Ivan Staelens

WG surgery- EBP  
18/09/2017

## SUMMARY

### Introduction

1. Intention and objectives of syllabus for open deep venous surgery
2. History of open deep venous surgery

#### I. Prerequisites for commencing a practice of open deep venous surgery

1. Knowledge in acute and chronic superficial and deep venous diseases and venous malformations
2. Knowledge in anatomy, surgical anatomy, physiology, pathophysiology of the venous system
3. Knowledge in venous system physiology and related hemodynamic modifications after any action directed to deep venous system
4. Knowledge in coagulation diseases
5. Knowledge in anticoagulant therapy
6. Regular practice and experience in open superficial venous surgery
7. Skills in microsurgery
8. Regular practice as vascular surgeon involving lower limb open surgery arterial procedures
9. Possibility of regular practice of open deep venous surgery

#### II. Facilities and general equipment required for open deep venous surgery

1. History of surgical instruments
2. Knowledge in surgical instruments devoted to vascular surgery and microsurgery
3. Knowledge in microsurgery techniques
4. Knowledge in any kind of procedure to correct deep venous reflux control
5. Knowledge in any kind of procedure to correct deep venous obstruction
6. How to control and repair severe bleedings
7. Knowledge in vascular sutures
8. Knowledge in esthetical tricks

#### III. Indications for open deep venous surgery

#### IV. Contraindications for open deep venous surgery

#### V. Patient selection

1. Evaluation of previous correct application of conservative therapy
2. Evaluation of improvable Quality of Life by means of surgery
3. Knowledge in diagnostic investigations:
  - a. Ultrasound imaging
  - b. Air Plethysmography
  - c. Venous pressure
  - d. Venography
  - e. IVUS
4. Correct application of investigation protocol

#### VI. Pretreatment assessment, treatment strategies, planning of the sessions

#### VII. Open surgical techniques

1. Vascular exposure and dissection

2. Vessel control
3. Valvuloplasty
  - a. Internal
  - b. External
4. Vein Transplant
5. Vein Transposition
  - a. Profunda vein
  - b. Saphenous vein
6. Neovalve
7. Venous bypass
8. Endophlebectomy
9. Venous aneurysm correction

**VIII. Precautions and compression management after open deep venous surgery**

1. Precautions after surgery
2. Compression bandages
3. Elastic stockings
4. Pneumatic intermittent compression

**IX. Planning of follow-up and complementary sessions**

**X. Complications of open deep venous surgery; management and prevention**

**XI. Expected Results of open deep venous surgery**

1. Review of results of open deep venous surgery in the literature and comparison with conservative therapy
2. Limits of open deep venous surgery

**XII. Patient information and consent**