



UEMS Breast Surgery Examination Syllabus

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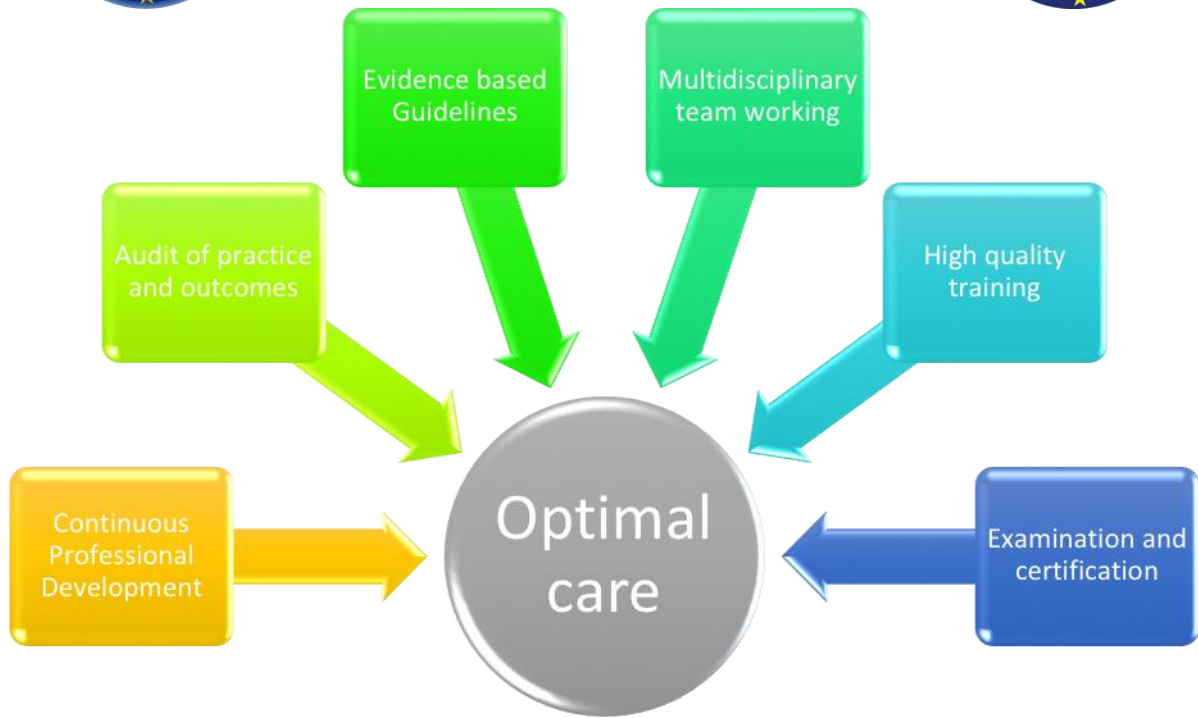
The Breast Surgery Syllabus comprehensively describes the Knowledge and Skills mandatory for the Qualification as Fellow of European Board of Surgery (F.E.B.S.): Breast Surgery. The exam standard is set at the level of a newly qualified but fully trained breast specialist surgeon about to embark on independent practice in Europe. It is therefore likely that candidates will be nearing the end of their formal supervised training or have completed their training. Consequently, the level of knowledge and skills required to pass are high. Before the actual examination takes place, there is also an eligibility assessment to ensure that candidates have undergone appropriate length and quality of training across the required range of subjects in good quality training environments. Surgical experience is also assessed by review of a surgical log-book.

The syllabus gives a structured educational plan and framework for preparation for the qualification of F.E.B.S./Breast Surgery.

The syllabus is not static but will be continuously revised and updated by the executives of the Breast Surgery Division of the UEMS Section of Surgery. Research, as well as technological innovations, will lead to significant changes in knowledge and clinical practise and this will be reflected in future iterations of the syllabus. Candidates are expected to use the most recent syllabus and remain update with current surgical practise, scientific literature and the latest evidence based best practice. Candidates should have taken part in some form of academic publishing, research or audit and have at least a working understanding of research methods such that they may quality assess newly published research.

For pragmatic reasons assessing eligibility for the exam as well as assessment of the individual logbooks takes into consideration the wide range of national requirements and local situations. The exam represents just one component of ensuring that professional standards are met and maintained.

Having completed their training, they must keep up to date with regular continuing professional development, audit their own practice and outcomes and act on the findings, keep abreast of the latest evidence based guidelines and research and work as part of a multidisciplinary team.



The exam tests both knowledge and the application of that knowledge in complex clinical situations using case scenarios, interpretation of complex data (including imaging and pathology data) and understanding of research data and its interpretation.

Simply retaining factual knowledge is not enough to pass the exam and so high quality clinically based training is a mandatory part of eligibility assessment for the exam. Exposure to oncology, genetics, medical imaging and reconstructive practice, as part of the wider multidisciplinary team, is essential.



KNOWLEDGE

The speciality of Breast Surgery requires **Knowledge** of the following topics:

1.0 Physiology of the Breast

- ❖ Development, proliferation during pregnancy, involution after lactation, involution during menopause and the hormonal stimuli that trigger these changes and how these may be affected by drugs, diseases, physiological variation.
- ❖ Abnormalities in breast development including hypoplasia (including Poland's anomaly), hyperplasia, tubular breast, accessory breasts and nipples.
- ❖ The physiology of the male breast, its developmental stages, hormonal regulation and developmental variation (gynaecomastia).
- ❖ Investigative work up and management strategies for developmental and physiological abnormalities must be understood

2.0 Surgical Anatomy of the Breast and Axilla

- ❖ Muscles and fascia of the thoracic wall and axillary region
- ❖ Blood supply to the breast, overlying skin and nipple-areola complex as well as the vascular anatomy of the axilla
- ❖ Neural anatomy of the breast, thoracic wall, axillary area and upper arm
- ❖ Lymphatic drainage patterns to the ipsilateral axilla, sub- and supraclavicular nodal basins, internal mammary nodal basin and contralateral axilla
- ❖ Relevant surgical and vascular anatomy of common flaps used in breast reconstructive surgery
- ❖ Candidates must be aware of anatomic variants and variants induced by treatments (such as the impact on vascular perfusion following radiotherapy, previous surgery and surgical scars) and how these may be managed clinically

3.0 Clinical Assessment of Breast Conditions

3.1. History

- ❖ Age of menarche, pregnancies, lactation, menopause, hormonal treatments



- ❖ Family history (how to assess pedigrees, document and assess breast cancer and BRCA gene risk)
- ❖ Previous breast conditions and procedures
- ❖ Co-morbidities, medications, frailty
- ❖ Lifestyle risk factors for breast disease (e.g. smoking and periductal mastitis, obesity, alcohol and breast cancer)
- ❖ Symptoms of benign or malignant breast diseases or conditions
- ❖ Symptoms suggestive of nodal or distant metastases

3.2. Clinical examination

- ❖ Ability to perform an adequate examination of the breasts, axillary and other regional nodal basins.
- ❖ Understanding of the common signs and examination findings suggesting a range of breast pathologies and how these should be further investigated.
- ❖ Understanding the other clinical findings which may be linked to breast pathologies (evidence of metastatic disease, development of secondary sex characteristics (or lack thereof), physical signs that may link to gynaecomastia in the male (testicular abnormalities, hepatic dysfunction, obesity)
- ❖ How to examine and assess a woman with breast augmentation, cosmetic or reconstructive breast surgery.

4.0. Breast (and related) Imaging techniques

4.1. Mammography

- ❖ Age appropriate indications for mammography
- ❖ Sensitivity and specificity and factors influencing these
- ❖ Difference between analogue, digital, tomosynthesis and contrast enhanced techniques.
- ❖ Different views (craniocaudal and mediolateral oblique) and the role of compression views.
- ❖ Understanding of how to interpret standard mammographic abnormalities and the imaging features typical of benign or malignant pathology.
- ❖ Mammographic limitations in certain groups such as young females, females with dense breasts, lobular cancer and the presence of implants.
- ❖ Eklund technique (Eklund GW et al. Improved imaging of the augmented breast. AJR Am J Roentgenol. 1988;151 (3): 469-73) to optimise mammography in the presence of implants.



- ❖ Role of mammography in screening programmes
- ❖ Role of mammography in stereotactic biopsies and localisation techniques
- ❖ BI-RADS classification of malignancy (BIRADS M1-5) and breast density (BIRADS class A-D)

4.2. Breast ultrasound

- ❖ Age appropriate Indications
- ❖ Intraoperative localisation techniques
- ❖ Sensitivity and specificity, factors influencing sensitivity and specificity
- ❖ Ultrasound guided breast biopsies, how performed, indications and contraindications
- ❖ Understanding how to interpret standard ultrasound abnormalities and the imaging features typical of benign or malignant pathology.
- ❖ Role of Automated Breast Ultrasound (ABUS)
- ❖ Stavros' [Stavros AT et al. Radiology.1995 Jul;196(1):123-34] criteria for benign lesions

4.3. MRI

- ❖ How performed, indications and contraindications, sensitivity and specificity, factors influencing sensitivity and specificity in invasive cancer and in DCIS
- ❖ Role in surveillance of high risk women
- ❖ Role when contradictory findings in triple diagnosis
- ❖ Role in determining response in patients with neoadjuvant treatment
- ❖ Role in detecting contralateral cancer
- ❖ Role in the assessment of lobular cancer, multifocal cancer and dense breasts
- ❖ Role when planning breast conserving surgery
- ❖ The influence on second surgeries due to insufficient margins
- ❖ The limited influence of pre-op. MRI on local recurrence rates
- ❖ Management of lesions detected only on MRI (MRI localised biopsy)
- ❖ Role in management of the occult breast primary
- ❖ The benefits and risks of MRI: highly sensitive but risk of 'unnecessary' biopsies / mastectomies



- ❖ Role in assessment of operability in locally advanced or recurrent disease of the breast and axilla
- ❖ Use of MRI of areas outside the breast in the further evaluation of equivocal staging test results to diagnose liver, bone, CNS/spine metastases
- ❖ Candidates should be able to interpret simple MRI imaging (obvious malignancy, obvious nodal disease, implant rupture (intra and extra capsular rupture))

4.4. Staging CT

- ❖ Indications and contraindication for CT staging
- ❖ Able to interpret simple CT abnormalities (liver, lung or obvious bone metastases)
- ❖ Value of and indications and contraindications for the use of IV contrast
- ❖ Use of CT angiography in planning free flaps etc
- ❖ Indications for and value of PET CT

4.5 Isotope Bone Scan

- ❖ Understanding how isotope bone scan works
- ❖ Indications and contraindications for scanning
- ❖ Able to interpret simple abnormalities
- ❖ Follow on investigation in equivocal cases (e.g. CT scan or MRI of the bone, rarely, use of bone biopsy)

4.6 Dual Emission X Ray Absorptiometry (DEXA) Bone Density Scan

- ❖ Use in monitoring bone density in women on aromatase inhibitor (AI) therapy
- ❖ Indications for DEXA scanning
- ❖ Technical aspects of how this type of scan works and how it differs from an isotope bone scan
- ❖ Understanding interpretation of bone density reports and scoring
- ❖ Understanding of management of women with osteopenia and osteoporosis induced by ovarian function suppression, oophorectomy or in the presence of AI therapy

5.0 Percutaneous needle biopsies

- ❖ Fine needle aspiration cytology – how performed, indications and contraindications, sensitivity and specificity, factors influencing sensitivity and specificity



- ❖ Core needle biopsy- how performed, indications and contraindications, sensitivity and specificity, factors influencing sensitivity and specificity
- ❖ Vacuum assisted biopsy- how performed, indications and contraindications, sensitivity and specificity, factors influencing sensitivity and specificity

6.0 Benign breast diseases and conditions - Incidence, aetiology and risk factors and management. Ruling out cancer

6.1. Gynaecomastia

- ❖ Aetiology (pubertal, obesity, hormonal, alcohol and liver disease, therapeutic or recreational drug induced, genetic etc)
- ❖ Assessment of diagnosis and severity
- ❖ Management (reassurance, removal of underlying cause if possible, surgery for symmetry, surgery to reduce, liposuction, en bloc resection techniques, role of drug therapy)

6.2 Nipple discharge

- ❖ Aetiology and presentation
- ❖ Investigation and assessment (imaging)
- ❖ Role of microdochectomy or total duct excision

6.3 Fibrocystic change

6.4 Cyclical and non-cyclical mastalgia

6.5 Breast hypertrophy

6.6 Puerperal mastitis

6.7 Periductal mastitis

6.8 Breast fistula

6.9 Other rare forms of mastitis

- ❖ Granulomatous mastitis
- ❖ Mondor's disease
- ❖ Lymphocytic lobulitis
- ❖ Tuberculosis
- ❖ Plasma cell mastitis



6.10 Fibroadenoma

- ❖ Clinical and radiological features (e.g. Stavros' criteria), indications for biopsy.
- ❖ Natural history
- ❖ Management

6.11 Lactational adenoma

6.12 Adenoma of the nipple

6.13 Benign phyllodes tumour

6.14 Macrocysts (simple, complicated, and complex)

- ❖ Aetiology, incidence and presentation
- ❖ Management of simple cysts and risk factors for underlying sinister pathology

6.17 Papilloma

- ❖ Multiple papilloma: association with nipple bleeding and discharge, increased risk of malignancy.
- ❖ Single papilloma: symptoms and signs, management

7.0 Breast problems associated with Cosmetic Breast Implants and other medical implantable devices/materials

7.1 Breast Implants

- ❖ Implant types: silicone, saline, polyurethane, surface (smooth or textured), round or anatomic shape, expandable or fixed volume
- ❖ Capsule formation: presentation, rates with time, risk factors, classification (Baker), investigation, management
- ❖ Rupture: presentation, rates with time, variation by implant type, causes, classification (intracapsular, extracapsular), adverse effects, investigation, management
- ❖ Extrusion: presentation, rates with time, risk factors, management
- ❖ Malposition: Assessment, management strategies.
- ❖ Breast Implant Associated Anaplastic Large Cell Lymphoma (BI-ALCL): risk factors, incidence, presentation, diagnostic evaluation, management and prognosis



7.2 Acellular Dermal Matrices and implantable meshes

- ❖ Different types of material properties and handling characteristics
- ❖ Indications, contraindications
- ❖ Safety and approvals.
- ❖ Complications: rates and risk factors
- ❖ Technical aspects of use
- ❖ Placement (subpectoral sling versus prepectoral pocket)

8.0 Breast cancer: incidence, aetiology and risk factors

8.1 Incidence and mortality

- ❖ Rising incidence in the western world
- ❖ Impact of aging population
- ❖ Impact of screening
- ❖ Mortality trends and effect of earlier diagnosis, treatment impact

8.2 Breast cancer risk factors: non hereditary

- ❖ Age
- ❖ Ethnic Group
- ❖ Gender
- ❖ Alcohol
- ❖ Obesity
- ❖ Dietary factors
- ❖ Exogenous oestrogen use (HRT, Oral contraceptive, IVF, antioestrogens/SERMs and AIs)
- ❖ Sedentary lifestyle
- ❖ Mantle radiotherapy
- ❖ Proliferative, non-high risk lesions of the breast (fibroadenoma, sclerosing adenosis, intraductal papilloma etc)



- ❖ High risk lesions (lobular neoplasia in situ, radial scar (risk of concomitant cancer), atypical ductal hyperplasia, columnar cell hyperplasia)

8.3 Genetic predisposition: breast cancer risk and risk of other malignancies

- ❖ High risk hereditary breast cancer risk syndromes: BRCA1, BRCA 2, tp53 mutation (Li-Fraumeni syndrome), Cowden's syndrome, Peutz-Jegher's syndrome, Hereditary diffuse gastric cancer syndrome.
- ❖ Risk counselling and risk management strategies for the unaffected (non-cancer) gene carrier and cancer management strategies for the gene carriers already diagnosed with cancer.
- ❖ Indications for gene testing and pre-test counselling.
- ❖ Moderate risk, germ line mutations: Ataxia-telangiectasia mutated (ATM), CHEK-2 and awareness of rapid rise in number of more recently identified clinically important mutations.
- ❖ Weaker hereditary factors such as low penetrance genes and single nucleotide polymorphisms.
- ❖ Genetic consortia programmes to accrue large cohorts globally to refine risk prediction for these newer genetic factors.
- ❖ The rise of commercial polygene arrays to risk assess and the potential risks and benefits of their use.
- ❖ Variants of unknown significance and how to manage these individuals

8.4 Breast cancer risk estimation for healthy women with a family history

- ❖ Pedigree assessment
- ❖ Gail model
- ❖ Claus tables
- ❖ Tyrer- Cuzick (IBIS II) on line risk assessment tool
- ❖ BOADICCEA risk assessment tool

8.5 Management of high and moderate familial breast cancer risk women

- ❖ Surveillance with breast imaging: age appropriate strategies and evidence of efficacy (MRI, MMG, US)



- ❖ Risk reducing surgery: breast and ovary. Magnitude of risk reduction, impact on survival in bilateral non cancer cases and unilateral contralateral RRM in women with cancer, psychological impacts, techniques (skin or nipple sparing), risk of occult malignancy.
- ❖ Chemoprevention: SERMS (tamoxifen, raloxifene), aromatase inhibitors (exemestane and anastrozole), trial evidence of benefit, indications for and contraindications to, age of use, duration of use. Adverse events.



9.0 Breast Cancer Screening

- ❖ Theoretical underpinnings of all screening programmes (WHO Principles, 1968 updated in 2008)
- ❖ Quality requirements (EUSOMA)
- ❖ Compliance rates for effective screening
- ❖ Positive and negative influences of screening on breast cancer incidence, mortality, morbidity and survival rates
- ❖ Factors influencing sensitivity and specificity
- ❖ Validated screening tools (analogue and digital mammography, MRI)
- ❖ Newer screening modalities (ABUS, tomosynthesis)
- ❖ Targeted screening/surveillance in higher risk subgroups: familial risk, genomic risk, previous disease and treatment such as mantle radiotherapy
- ❖ False positive findings and over diagnosis and their influence on quality of life
- ❖ Surgical techniques relevant to screening (vacuum assisted biopsy, localisation techniques for surgery)
- ❖ Management of screen detected borderline and premalignant lesions (radial scar, DCIS, atypias etc).
- ❖ Screening age ranges and their justification

10.0 Breast cancer: biology, natural history and prognosis

10.1. Basic concepts in cancer biology

- ❖ Cell kinetics, proliferation, apoptosis and the balance between cell death and cell proliferation
- ❖ Angiogenesis and lymphangiogenesis
- ❖ Genome maintenance mechanisms to prevent cancer
- ❖ Intercellular and intermolecular adhesion mechanisms and signalling pathways
- ❖ Immunological mechanisms that either prevent or promote cancer growth and dissemination
- ❖ Potential effects of surgery and surgery-related events on cancer biology (e.g. angiogenesis)

10.2. Natural history, prognosis, prognostic and predictive factors



- ❖ Patterns and incidence rates of local, regional and distant dissemination
- ❖ Differences in dissemination patterns due to biological tumour subtypes
- ❖ Tumour and nodal stages (TNM Classification, version 8, January 2018)
- ❖ Tumour grade (Elston and Ellis classification)
- ❖ Ki-67 expression
- ❖ Histological (morphological) subtypes of invasive cancer
- ❖ Array based classification of Sorlie and Perou (luminal A, B, basal etc)
- ❖ Oestrogen and progesterone receptor expression (Allred, H score) and clinical relevance
- ❖ HER-2 (c-erb-b2) over-expression and clinical impact, Intermediate cases (2+) by HIC and HER-2 expression by FISH, CISH
- ❖ The role of “conventional” breast pathology (tumour diagnosis, prognosis, specimen analysis, node analysis, neoadjuvant response assessment)
- ❖ Intraoperative assessment techniques (frozen section, OSNA, imprint cytology for nodal staging, frozen section for margins)
- ❖ The role of DNA microarrays in both prognostic and predictive settings (costs, benefits and limitations)
- ❖ Differences and similarities in tumour biology between sporadic and hereditary breast cancer
- ❖ The influence of circulating tumour cells on prognosis and the new technique of ‘liquid biopsy’
- ❖ The risk of and risk factors for synchronous and metachronous breast cancer
- ❖ Prognostic estimation tools: Adjuvant! Online, Nottingham Prognostic Index, NHS PREDICT. Differences and applicability

10.3 Breast cancer: Staging

- ❖ Clinical staging of the primary tumour and the axilla and its accuracy
- ❖ Preoperative axillary staging by ultrasound (sensitivity and specificity)
- ❖ Surgical staging of the axilla - indications, methods, sensitivity, advantages, disadvantages
- ❖ CT- scan: how performed, the indications, sensitivity and specificity
- ❖ PET- scan: how performed, the indications, sensitivity and specificity
- ❖ Isotope bone- scan: how performed, indications, sensitivity and specificity



- ❖ Clinical and pathological TNM-classification (version 7) including post neoadjuvant designation
- ❖ Stage migration due to improved staging accuracy, (e.g. detecting micrometastases in sentinel lymph node biopsy)

10.4 Clinical significance and management of borderline/high risk lesions

- ❖ Atypical ductal hyperplasia, atypical lobular hyperplasia, classical lobular neoplasia in situ (cLCIS), pleomorphic lobular neoplasia in situ (pLCIS), columnar cell hyperplasia, papilloma, radial scar
- ❖ The prevalence of associated in situ or invasive cancer when risk lesions detected in core needle/vacuum assisted biopsy
- ❖ Breast cancer risk after excisional biopsy of these lesions
- ❖ Role of chemoprevention and enhanced screening in risk management
- ❖ Classification of DCIS (encysted papillary, low, intermediate and high grade, Paget's)
- ❖ Incidence and role of screening. Screen detected versus symptomatic disease characteristics and prognosis
- ❖ Treatment and prognosis of DCIS (see below in various treatment sections) including surgery, radiotherapy rates of recurrence and prognosis.
- ❖ DCIS prognostic/risk scores (Van Nuy's, Oncotype DCIS)

11.0 Conservation Surgery for Breast Cancer/DCIS

11.1 Localization of impalpable lesions (benign, borderline or malignant)

- ❖ Guide wire
- ❖ ROLL (radioguided occult lesion localization)
- ❖ RSL (radioguided seed localization)
- ❖ Guidance by intraoperative ultrasound
- ❖ Advantages and disadvantages of various localization methods
- ❖ The role of specimen radiography
- ❖ Role and value of variety of margin assessment devices and techniques

11.2 Conservative surgical treatment of (DCIS and invasive) disease within the breast

- ❖ Indications and contraindications for breast conservation



- ❖ The location, size and the multifocality/multicentricity of the tumour
- ❖ The size and the shape of the breast, including assessment of grade of ptosis
- ❖ The predicted aesthetic outcome after breast conservation
- ❖ The role of neoadjuvant systemic treatment in facilitating breast conservation, including indications and contraindications as well as predicting and evaluating the response
- ❖ Patient preference
- ❖ Is the patient willing to undergo and fit for radiotherapy?

11.3 Oncoplastic conservation surgery

- ❖ Volume displacement versus volume replacement: techniques and indications, risks.
- ❖ Level I and level II oncoplastic techniques in breast conservation. Aware of contraindication and indications for oncoplasty, different techniques by disease quadrant (atlas of technique by K Clough), risks of oncoplastic surgery
- ❖ Management of cavity (marking with clips), pathological documentation and specimen marking
- ❖ The need for contralateral surgery for symmetry: techniques, indications, contraindication, timing, impact of radiotherapy

11.4 Breast conservation- margins and local recurrences

- ❖ The influence of margin width on local recurrences
- ❖ The role of cavity shavings to ensure sufficient margins
- ❖ Risk of local recurrence and patient and tumour related risk factors for local recurrence after breast conservation
- ❖ The influence of breast radiotherapy on local recurrences
- ❖ Role of boost radiotherapy including impact on local recurrence rates, indications, cosmetic impacts.
- ❖ The influence of adjuvant systemic treatment on local recurrences
- ❖ Treatment of local recurrences after breast conservation including indications for re-do conservation surgery
- ❖ The influence of local recurrences on survival
- ❖ Nodal staging in patients with local recurrence after breast conservation and negative sentinel node biopsy

11.5 Methods to correct poor aesthetic outcome after breast conservation



- ❖ Free fat grafting
- ❖ Partial reconstruction (pedicle and perforator flaps)
- ❖ The aesthetic outcome after such procedures
- ❖ Oncological safety of these techniques

12.0 Mastectomy

12.1. Mastectomy indications and types

- ❖ Indications for mastectomy (absolute and relative)
- ❖ Immediate and delayed reconstruction- indications and contraindications.
- ❖ Nipple-areola complex sparing mastectomy, indications, contraindications. Risk of and risk factors for complications
- ❖ The risk of nipple involvement, the role of frozen section from central ducts
- ❖ Evidence from trials comparing mastectomy and breast conservation
- ❖ Psychological impacts of mastectomy
- ❖ Bilateral risk reducing mastectomy
- ❖ Contralateral risk reducing mastectomy (indications, outcomes)
- ❖ Surgical complications of mastectomy and how to manage them.

12.2 Local recurrence after mastectomy

- ❖ The risk of and risk factors for local recurrences
- ❖ The influence of radiotherapy on local recurrences
- ❖ Presentations of local recurrence
- ❖ The influence of adjuvant systemic treatment on local recurrences
- ❖ Treatment of local recurrences after mastectomy including reconstructive methods in extensive recurrences
- ❖ The influence of local recurrences on survival

12.3 Breast reconstruction

- ❖ Implant reconstructions – indications, contraindications, complications, costs.
- ❖ Long-term sequelae of implant reconstruction: need for revision surgery, capsule formation, extrusion, infection, leakage, rupture, BI-ALCL.



- ❖ Interactions and potential interactions of reconstructive surgery and oncology treatments (chemotherapy, radiotherapy, trastuzumab)
- ❖ Acellular dermal matrices and synthetic meshes—biology, indications, contraindications, complications, costs
- ❖ Pedicle and perforator flap reconstructions (latissimus dorsi, LICAP, TDAP etc)—their indications, contraindications, complications, costs
- ❖ Micro-vascular flaps – (DIEP, TRAM, SGAP, IGAP, TUG), their indications, contraindications, complications, costs.
- ❖ Factors influencing aesthetic outcome after breast reconstruction
- ❖ Oncological safety of immediate and delayed reconstruction
- ❖ Influence of reconstruction on quality of life
- ❖ Surgical complications of reconstructive surgery (short, medium and long term)

13.0 Axillary surgery

13.1 Sentinel node biopsy (SNB) in invasive cancer, DCIS and Paget's disease of the breast

- ❖ The sentinel node concept
- ❖ The indications and contraindications for SNB
- ❖ Sensitivity of SNB and factors influencing the sensitivity
- ❖ The role and outcome of SNB in patients with local recurrence and previous axillary surgery
- ❖ The advantages, disadvantages and outcome of SNB before neoadjuvant systemic treatment
- ❖ The advantages, disadvantages and outcome of SNB after neoadjuvant systemic treatment
- ❖ The role of SNB outside the axilla, like in the internal mammary nodal basin
- ❖ Radioisotope localization- advantages and disadvantages
- ❖ Other localisation methods (magnetic, indocyanine green)
- ❖ Blue dye - advantages and disadvantages
- ❖ The role of preoperative lymphoscintigraphy (conventional and SPECT)
- ❖ The role of and methods for intraoperative assessment of sentinel node metastases
- ❖ The histopathological methods in assessment of the sentinel node metastases



- ❖ Other methods (such as OSNA) in assessment of the sentinel node metastases
- ❖ Classification of tumour positive sentinel node findings
- ❖ Management of patients with positive sentinel nodes (observation, axillary radiotherapy, axillary lymph node dissection)
- ❖ The advantages and limitations of nomograms predicting further nodal involvement
- ❖ Morbidity after sole SNB, and after further treatment of axilla with axillary radiotherapy and axillary lymph node dissection
- ❖ Impact of isolated tumour cells, micro and macrometastases in prognosis and further axillary management

13.2 Axillary lymph node dissection (ALND) in invasive cancer and DCIS

- ❖ The indications and contraindications of ALND
- ❖ Anatomy of the axilla
- ❖ Advantages and morbidity of ALND in patients with axillary metastases (early, intermediate and late)
- ❖ Alternative to ALND in low volume/low risk axillary disease
- ❖ The role of preserving intercostobrachial nerves
- ❖ Berg levels of the extent of ALND
- ❖ Risk of lymphoedema, its classification and management

13.3 Regional recurrences after axillary surgery (SNB, ALND)

- ❖ The risk of and risk factors for regional recurrences
- ❖ The influence of radiotherapy on regional recurrences
- ❖ The influence of adjuvant systemic treatment on regional recurrences
- ❖ Treatment of regional recurrences after SNB and ALND
- ❖ The influence of regional recurrences on survival
- ❖ Assessment of operability (US/CT/MRI scan) and indicators for inoperability

13.4 Axillary metastases with unknown primary

- ❖ Differential diagnosis and how to distinguish between axillary metastases from breast cancer and other malignancies (for example melanoma)
- ❖ The role of imaging modalities, such as breast MRI



- ❖ The role of pathology
- ❖ The role of CT and PET-CT scans to rule out distant disease or other malignancy than breast cancer
- ❖ Treatment (surgery, radiotherapy, systemic)

14.0 Breast cancer in special groups

14.1 Breast cancer in young women

- ❖ Need for and indications for genetic counselling/testing
- ❖ Imaging limitations in younger women (poor mammographic sensitivity)
- ❖ Variation in tumour subtype, stage and biological behaviour
- ❖ Local, regional and systemic treatment and how these may need to be modified in younger women (e.g. use of RT boost)
- ❖ Local, regional and distant recurrence rates in younger women
- ❖ Survival variance with age
- ❖ Fertility, pregnancy and contraception during and after breast cancer
- ❖ Breast cancer in pregnancy and how to manage disease in all 3 trimesters
- ❖ Premature menopause due to breast cancer treatment and how to manage this
- ❖ BRCA associated cancers: presentation, type and management
- ❖ Psychological impact

14.2 Breast cancer in the elderly

- ❖ Tailoring local, regional and systemic treatments according to co-morbidities, frailty, cognitive impairment, polypharmacy and patient preference
- ❖ Local, regional and distant recurrence rates in older women
- ❖ Survival (overall and breast cancer specific) in older women
- ❖ Treatment morbidity in older age groups

14.3 Male breast cancer

- ❖ Risk factors for male breast cancer
- ❖ Incidence, age specific incidence and prognosis
- ❖ Need for genetic counselling/testing



- ❖ Surgical treatment and how this may differ in males
- ❖ Adjuvant treatment and how this may differ in males
- ❖ Local, regional and distant recurrence rates
- ❖ Survival
- ❖ Psychological impact

15.0 Adjuvant systemic therapies in breast cancer

15.1 Systemic chemotherapy

- ❖ Agents and regimens used in the adjuvant setting, including common side effects and contraindications (e.g. hair loss, myelosuppression, cardiac toxicity with some regimes)
- ❖ Indications and contraindications
- ❖ Internet based tools used to help in decision making (such as Adjuvant!online, PREDICT), advantages, disadvantages of each
- ❖ Multigene assays used to help for prognosis and decision making (such as OncotypeDX, Mammaprint, PAM-50, Endopredict etc.)
- ❖ Influence on local and regional recurrences and survival
- ❖ Cellular/molecular targets for chemotherapy, endocrine and targeted treatments, and their mechanisms
- ❖ Common side effects and their management
- ❖ Interaction with surgery, for example effect on wound healing, surgical delay before chemotherapy starts if surgical complications, risk of infections, risk of thrombosis
- ❖ Local and regional recurrences and survival after adjuvant systemic chemotherapy

15.2 Systemic hormonal therapy

- ❖ Agents used (tamoxifen, aromatase inhibitors), duration of use (5 years, 10 years), strategies of AIs use (upfront, switching, late extended)
- ❖ Indications and contraindications
- ❖ Tools used to help in decision making (such as Adjuvant!online, PREDICT),
- ❖ Influence on local and regional recurrences and survival
- ❖ Cellular/molecular targets for agents (the ER, aromatase enzymes)
- ❖ Common side effects and their management (acute and long term)



- ❖ Interaction with surgery, for example risk of thrombosis with tamoxifen
- ❖ Bone density monitoring protocols and management in women on AIs
- ❖ Use of ovarian suppression therapy to augment hormone blockage in certain subgroups: indications, evidence and adverse effects (e.g SOFT and TEXT trials).

15.3 Adjuvant Bisphosphonates

- ❖ Agents used, including route of administration and duration.
- ❖ Common side effects
- ❖ Evidence for benefit in the adjuvant setting
- ❖ Impact on survival and rates of metastatic recurrence

15.4 Adjuvant Her-2 targeted therapies.

- ❖ Mechanism of action and receptor pathway and interactions
- ❖ Biology of Her-2 positive breast cancer
- ❖ Regime, interval and duration of therapy
- ❖ Common adverse effects
- ❖ Evidence of benefit on survival and local, regional and distant recurrence rates.

16.0. Adjuvant Radiotherapy

16.1 Radiotherapy to the breast

- ❖ Indications and contraindications
- ❖ Influence on local and regional recurrences and survival
- ❖ Most common side effects and their management (early and late, including risk of second cancers and angiosarcoma)
- ❖ Partial breast radiotherapy: methods, indications, contraindications, advantages, disadvantages
- ❖ Interaction with surgery including the effect on wound healing, breast fibrosis and shrinkage, breast lymphoedema.
- ❖ Radiotherapy and breast reconstruction
- ❖ Acute and late side-effects and complications
- ❖ Indications for and impact of boost to the tumour bed.
- ❖ Use of marker clips to identify tumour bed for boost localisation



- ❖ Modern fractionation regimes

16.2 Radiotherapy to the axilla

- ❖ Indications and contraindications
- ❖ Adverse effects in the short and longer term
- ❖ Interaction with surgery (pedicle fibrosis for subsequent axillary based pedicle reconstruction), fibrosis
- ❖ Trial data comparing RT with surgery
- ❖ Lymphoedema rates

16.3 Radiotherapy to the chest wall

- ❖ Indications and contraindications
- ❖ Adverse effects in the short and longer term
- ❖ Interaction with reconstructive surgery
- ❖ Trial data comparing RT with no RT in terms of local recurrence rates and survival
- ❖ Lymphoedema rates

17.0 The role of the Multidisciplinary Team (MDT) meeting in breast cancer

- ❖ Multimodality treatment of breast cancer
- ❖ Ideal composition of the MDT
- ❖ Educational and training role of the MDT
- ❖ Audit and governance role of the MDT
- ❖ Costs of the MDT
- ❖ EUSOMA guidelines regarding multidisciplinary teams and meetings

18.0 Locally Advanced Breast cancer

- ❖ The definition of locally advanced breast cancer
- ❖ Primary systemic treatment in locally advanced breast cancer (endocrine, chemotherapy and targeted treatments)
- ❖ Management of neoadjuvant (baseline scans and monitoring response, MRI), use of marker clips
- ❖ Timing of axillary surgery



- ❖ Inflammatory breast cancer (diagnosis, prognosis, management)
- ❖ Surgery in patients with locally advanced breast cancer
- ❖ The role of radiotherapy in locally advanced breast cancer
- ❖ Response rates after primary chemotherapy (NAC) by tumour subtype
- ❖ Extent of surgery after partial or complete pathological response
- ❖ Pathological classification of response
- ❖ Local recurrence rates after conservation surgery post NAC
- ❖ Survival rates comparing primary chemotherapy (NAC) and adjuvant chemotherapy
- ❖ Use of primary chemotherapy (NAC) to facilitate conservation surgery in stages 1 and 2 breast cancer

19.0 Treatment of disseminated (stage IV) breast cancer

- ❖ Palliative surgical procedures in disseminated (stage IV) cancer, for example palliative mastectomy, treatment and prevention of pathological fractures, spinal cord stabilisation, recent research into liver resection in oligometastatic disease.
- ❖ Removal of primary tumour in disseminated breast cancer- influence on survival
- ❖ Removal of liver or pulmonary metastases- influence on survival
- ❖ The role palliative radiotherapy in disseminated breast cancer
- ❖ Palliative treatments to relieve symptoms like pain and nausea
- ❖ Social, psychological and spiritual support in patients with disseminated breast cancer
- ❖ Management of cerebral metastatic disease: steroids, stereotactic radiosurgery, gamma knife, surgery, whole brain RT, systemic therapies.

19.0 Psychosocial and follow-up care. 'Survivorship' issues

- ❖ The need of psychological or social support in women with newly diagnosed breast cancer and during the entire course of disease
- ❖ The role of follow-up care in breast cancer survivors: detecting recurrences, influence on survival
- ❖ Methods of follow-up and the frequency of follow-up
- ❖ Conservative and surgical management of lymphoedema
- ❖ Chronic pain and sensory disorders after breast cancer treatment



- ❖ Endocrine issues in breast cancer survivors, e.g. menopause symptoms and bone health
- ❖ Depression, anxiety and fear of recurrences
- ❖ Cognitive disorders
- ❖ Sexuality

20.0 Other breast malignancies- incidence, diagnosis and treatment modalities

- ❖ Malignant and borderline phyllodes tumour
- ❖ Sarcomas: primary and secondary (radiation induced)
- ❖ Metastases from other malignancies
- ❖ Lymphoma in the breast or axilla
- ❖ Breast Implant Associated Anaplastic Large Cell Lymphoma (BI-ALCL)

21.0 Research and Evidence based medicine

- ❖ The p-value and its relation to the sample size; the importance of power analysis and sample size calculation in trials
- ❖ The difference between statistical and clinical significance
- ❖ Intent-to-treat and per protocol analysis
- ❖ Protocol violation and how to avoid it
- ❖ Significance of completeness of follow-up, proportion of patients lost to follow-up
- ❖ Types of bias and how to avoid them
- ❖ Prospective and retrospective study setting
- ❖ study settings (randomized, prospective non-randomized, case- control, retrospective etc)
- ❖ Definitions of phase I, phase II, phase III and phase IV trials
- ❖ Definitions of absolute and relative risk reduction or advantage
- ❖ Definition of number need to treat and number need to harm analyses
- ❖ Understand the difference between survival and mortality
- ❖ Choosing relevant outcome measures: survival, and quality of life
- ❖ Relationship between response to (systemic) treatment and survival



- ❖ Stage migration and the relationship between more accurate staging (like breast MRI or parasternal sentinel node biopsy) and survival
- ❖ Levels of evidence and how these influence treatment recommendations

22.0 Quality assurance in diagnosis and treatment of breast diseases

- ❖ Quality measures for symptomatic and screening cases
- ❖ EUSOMA Guidelines regarding diagnosis and treatment of breast diseases, breast unit and training of breast specialists



KNOWLEDGE AND SKILLS

The speciality in Breast Surgery requires **Knowledge and Skills** in the following areas

A. Anaesthesia and perioperative care

- ❖ Evaluate patient's suitability for general anaesthesia in collaboration with the anaesthesiologist
- ❖ Evaluate patient's suitability for local or regional anaesthesia
- ❖ Administer safe and effective local anaesthesia
- ❖ Aware of the concept of prehabilitation to optimise outcomes (nutritional support, optimal control of chronic health conditions such as diabetes)
- ❖ Perioperative management of chronic conditions such as anticoagulation, diabetes, cardiorespiratory disease etc.
- ❖ Appropriate management of perioperative thromboprophylaxis
- ❖ Appropriate perioperative pain management
- ❖ Appropriate use of prophylactic antibiotics.
- ❖ Appropriate management of surgical sepsis and wounds

B. Postoperative complications

- ❖ Evaluate patient risk regarding postoperative complications and conduct preventive procedures
- ❖ Counsel patients regarding their individual risk of surgical complications
- ❖ Undertake an appropriate consenting process for surgery
- ❖ Conservative and surgical management of wound healing complications
- ❖ Able to manage implant related and pedicled flap related complications (sepsis, extrusion, capsule formation, malposition, acute and chronic seroma, flap ischaemia).

C. Surgical anatomy of the breast and the axilla

- ❖ Plan surgical treatment with excellent knowledge of surgical anatomy of the breast and axilla to minimize the risk of surgical complications: for example nerve damage or skin envelope necrosis
- ❖ Perform mastectomy avoiding skin envelope necrosis or leaving excess breast tissue behind



- ❖ Perform sentinel node biopsy minimize false negative findings without damage to the intercostobrachial nerves
- ❖ Perform axillary lymph node dissection without leaving residual disease without damage to long thoracic nerve, pectoral nerve and vessels, thoracodorsal nerve and vessels and axillary brachial plexus

D. Diagnostic work-up in breast diseases

1. History and clinical examination

- ❖ Assess history and understand its role in the management of benign and malignant breast diseases and conditions
- ❖ Evaluate clinical symptoms and signs and understand its role in the management of the management of benign and malignant breast diseases and conditions

2. Breast imaging and percutaneous needle biopsies

- ❖ Counsel patients regarding breast imaging methods and percutaneous needle biopsies: Indications, limitations and how these are performed
- ❖ Evaluate mammograms and breast MRIs
- ❖ perform fine needle aspiration cytology sampling and core needle biopsy and punch biopsy

E. Benign breast diseases and conditions

- ❖ Diagnose or exclude cancer or benign breast conditions based on the findings in triple diagnosis or on history and clinical examination only
- ❖ Counsel regarding the nature of these diseases and conditions and their management
- ❖ Conservative and surgical management of gynaecomastia
- ❖ Conservative and surgical management of puerperal mastitis, periductal mastitis and granulomatous mastitis
- ❖ Conservative and surgical management of breast cysts and nipple discharge
- ❖ Conservative and surgical management of benign breast tumours (fibroadenoma, benign phyllodes tumour, lactating adenoma, nipple adenoma, papilloma)
- ❖ Perform excisional biopsy of borderline/high risk lesions

F. Breast cancer: incidence, aetiology and risk factors

- ❖ Evaluate breast cancer risk in an individual woman
- ❖ Counsel for breast cancer risk and how to decrease the risk by lifestyle changes
- ❖ Counsel moderate and high risk women about management options



- ❖ Conduct risk reducing breast surgery, surveillance and chemoprevention according to patient preference
- ❖ Counsel high risk patients about their risk of other malignancies (like ovarian cancer)
- ❖ Counsel for risk and management of borderline and high risk lesions
- ❖ Conservative and surgical management of borderline and high risk lesions

G. Breast cancer : staging, biology, and prognosis

- ❖ Counsel for prognostic and predictive factors
- ❖ Counsel for preoperative and postoperative staging by imaging: indications, limitations and how these are performed
- ❖ Counsel for surgical staging of axilla: the advantages, the sensitivity, the methods, associated morbidity
- ❖ Plan and perform surgical staging and treatment of breast cancer according to stage and tumour predictive factors in the context of multidisciplinary treatment

H. Surgical treatment of invasive breast cancer, DCIS and the Paget's disease of the breast

1 Breast conservation

- ❖ Evaluate feasibility of breast conservation in individual patients, also after neoadjuvant treatment: risk of local recurrences, survival, aesthetic outcome, feasibility for radiotherapy
- ❖ Counsel for breast conservation: feasibility, possibility of second surgeries, aesthetic outcome, symmetry procedures, local recurrences, survival
- ❖ Perform wide local excision with sufficient margins, but without removing healthy tissue in excess- both for palpable and impalpable tumours
- ❖ Perform level I oncoplastic resections
- ❖ Understand when level II procedures may be appropriate and what techniques may be used and refer appropriately if do not undertake this type of surgery themselves.

2. Mastectomy and total breast reconstruction

- ❖ Evaluate feasibility of skin or nipple-areola complex sparing mastectomy and different reconstructive methods in individual patients
- ❖ Counsel for advantages and disadvantages of mastectomy over breast conservation
- ❖ Counselling for breast reconstruction: feasibility, methods and complications and expected aesthetic outcome



- ❖ Counselling for breast reconstruction: radiotherapy impact
- ❖ Perform non-skin paring, skin-sparing and nipple-areola complex sparing mastectomies

3. Axillary surgery

- ❖ Evaluate the need for and the method of axillary surgery
- ❖ Counsel for the aim and need of axillary staging
- ❖ Counsel for sentinel node biopsy: what means, how this is performed, the sensitivity, axillary recurrences after negative sentinel node biopsy, morbidity
- ❖ Counsel for: positive sentinel node: treatment options, their advantages and disadvantages
- ❖ Counsel for morbidity after axillary lymph node dissection
- ❖ Perform sentinel lymph node biopsy
- ❖ Perform axillary lymph node dissection

I Treatment of local and regional recurrences after breast cancer surgery

- ❖ Plan treatment
- ❖ Counsel: surgical treatment, radiotherapy, systemic therapy
- ❖ Perform surgery for local and regional recurrences. (Reconstructive methods after extensive surgery, like LD –flap for extensive local recurrence after mastectomy are not required)

J. Treatment of locally advanced and disseminated (stage IV) breast cancer

- ❖ Evaluate and plan treatment for locally advanced breast cancer evaluation
- ❖ Counsel patient with locally advanced breast cancer
- ❖ Counsel patient with disseminated breast cancer regarding the role of palliative surgery and the elective removal of the primary tumour (mastectomy, wide local excision)

K. Axillary metastases and occult primary tumour

- ❖ Distinguish between axillary metastases from breast cancer and other malignancies (for example melanoma)
- ❖ Counsel for treatment options

L. Breast cancer in young women

- ❖ Counsel for prognosis and treatment modalities
- ❖ Evaluate and counsel the need for genetic counselling



- ❖ Counsel for preserving fertility, pregnancy and contraception

M. Breast cancer in elderly

- ❖ Counsel for treatment modalities and prognosis
- ❖ Understand the potential challenges relating to treatment morbidity in older patients
- ❖ Aware of age specific data on outcomes of different/age and comorbidity adapted treatments (such as primary endocrine therapy, omission of chemotherapy/radiotherapy/trastuzumab etc.
- ❖ Tailor surgery according to co-morbidities, frailty and medications and in accordance with patient preference

N. Male breast cancer

- ❖ Counsel for treatment modalities and prognosis
- ❖ Evaluate and counsel the need for genetic counselling

O. Adjuvant and neoadjuvant treatment in breast cancer

- ❖ Counsel for indications and contraindications, influence on local and regional recurrences and survival
- ❖ Counsel for common side effects and their management

P. The role of Multidisciplinary Team meeting in breast cancer

- ❖ Work as an effective member of the MDT

Q. Breast cancer: Psychosocial issues and follow-up care

- ❖ Provide psychological or social support
- ❖ Explain the aims of and schedule for follow-up
- ❖ Explain conservative and surgical management of lymphoedema
- ❖ Explain, investigate and treat chronic postoperative pain
- ❖ Explain endocrine issues and sexuality in breast cancer survivors
- ❖ Explain and manage side effects of therapy
- ❖ Depression, anxiety and fear of recurrences: should be able to identify symptoms and refer for appropriate management

R Other breast malignancies

- ❖ Counsel for malignant and borderline phyllodes tumours



- ❖ Surgical treatment of malignant and borderline phyllodes tumours
- ❖ Awareness of rarer tumour types, including primary sarcoma, primary lymphoma of the breast and axilla, BI-ALCL, metastatic cancer in the breast, angiosarcoma (primary and radiotherapy induced).

S. Research and Evidence based medicine

- ❖ Skills to enable critical evaluation of clinical research articles
- ❖ Evaluate the level of evidence and the quality of the research
- ❖ Apply appropriate evidence from clinical studies and guidelines in clinical work



Recommended further reading. (Not an exhaustive list)

Breast Cancer Management for Surgeons. A European Multidisciplinary Textbook
Editors: Wyld, L., Markopoulos, C., Leidenius, M., Senkus-Konefka, E. (Eds.). 2018. Springer.
<http://www.springer.com/gb/book/9783319566719>

Note registrants for the exam are entitled to a discount on the purchase of this book if they apply a code when they order. The code will be supplied by the UEMS office.

How to Read a Paper: The Basics of Evidence-Based Medicine 5th Edition. Trisha Greenhalgh.
Wiley Blackwell, 2014

Oncoplastic breast reconstruction: Guidelines for Best Practice. The Associations of Breast Surgeons and British Association of Plastic and Reconstructive Surgeons, UK. Ransbury R and Willetts A (eds). 2012. <http://www.bapras.org.uk/docs/default-source/commissioning-and-policy/final-oncoplastic-guidelines---healthcare-professionals.pdf?sfvrsn=0>

TNM Classification of Malignant Tumours (8th edition). International Union Against Cancer. John Wiley and Sons 2018

Hallmarks of Cancer: The Next Generation. Douglas Hanahan and Robert A. Weinberg. Cell, 144, 646-674, 2011.

Partial Breast Reconstruction: Techniques in Oncoplastic Surgery 2017. Losken A and Hamdi M. Thieme.

Benign Breast Diseases: Radiology - Pathology - Risk Assessment 2016. Chinyama CN. Springer.

Global Curriculum in Research Literacy for the Surgical Oncologist. Are C, Yanala U, Malhotra G, Hall B, Smith L, Wyld L, Cummings C, Lecoq C, Audisio RA, Berman RS. EJSO and Annals of Surgical Oncology. 2017 (e pub)

Candidates are advised to be familiar with the St Galen consensus statements and to attend at least one academic breast meeting in the preceding 18 months for an update on new trials.