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Core curriculum of shoulder and elbow surgery: the proposal from the European Society for Surgery of the Shoulder and Elbow

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Background: Subspecialization in orthopedic surgery has become the standard approach due to the expanding body of medical knowledge. Shoulder and elbow surgery is a growing subspecialty, but it still faces challenges with undefined training standards, unclear competency levels, and a lack of delineated professional responsibilities. To address this, the European Society for Surgery of the Shoulder and Elbow-societe european chirurgie epaule et coude (ESSSE-SECEC) aims to create a core curriculum (CC) to standardize knowledge and skills within this field.

Methods: The ESSSE-SECEC Qualification Committee developed a CC through a task force established in 2022. The curriculum is divided into 2 major sections, shoulder and elbow, further categorized into 5 areas: Basic Science, Diagnosis, Pathology, Nonoperative Treatment, and Surgical Treatment. The content was developed, reviewed, and approved by leading experts within the Society.

Results: The CC contains 72 headings and 259 specific subjects, encompassing key areas of knowledge, practical skills, and behavioral attitudes necessary for competence in shoulder and elbow surgery, offering a detailed framework for the subspecialty.

Conclusion: The ESSSE-SECEC CC establishes a foundational standard for shoulder and elbow surgeons. It provides a clear framework for knowledge and competency, supporting the future development of training and assessment tools within the subspecialty. Additionally, it aims to solidify the subspecialty's identity and serve as a key tool for competency assessments within ESSSE-SECEC and beyond.

John Charnley introduced the concept of subspecialization to the field of orthopedic surgery in the 1960s. Since then, it has become the standard for training. This is important for both surgeons, who, due to an exponentially growing body of evidence,

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cannot maintain expertise in every aspect of their specialty, and patients, who benefit from the more comprehensive care provided by an advanced subspecialist compared to a general practitioner.[5,7] In fact, Emery et al in 2012, Horst et al in 2013, and Cannada et al in 2015 demonstrated that more than 90% of orthopedic surgeons pursue additional subspecialty training after residency, compared with approximately 60% in the 1990s.[2,3,5]

Shoulder and elbow surgery is an expanding subspecialty within orthopedic surgery, and in line with this trend, several strong fellowship programs have emerged. However, this increase in training opportunities has not been accompanied by a clear delineation of responsibilities and standards for shoulder and elbow surgeons. Concerns persist regarding the standard of knowledge and professional competence of surgeons, significant variation in training systems and assessments, and lack of verification that acceptable standards of competence have been achieved.[6,7]

European legislation plays a critical role in regulating Continuing Professional Development (CPD) to ensure the mobility of the medical workforce across member states, as outlined in Directive 2013/55/EU.[8] The directive mandates that Member States promote CPD to maintain professional competence and safe medical practices.[8] European Federation of Orthopaedics and Traumatology (EFORT), empowered by European authorities, has been entrusted with a significant responsibility to facilitate and oversee Continuing Medical Education and CPD within the field of orthopedics and traumatology.[8] Recognizing this, societe european chirurgie epaule et coude (SECEC) seeks to assume a similar role in advancing education and standards, specifically within the shoulder and elbow specialty across Europe.

As a Scientific Society, we aim to clarify the responsibilities and boundaries in shoulder and elbow surgery. Following the examples of other societies,[1] we strive to establish a core curriculum (CC) for shoulder and elbow surgery. This CC is intended to guide training for both trainees and trainers and to contribute to future guidelines for assessing competency from our Society as well as other international or national societies.

A CC of shoulder and elbow surgery is necessary to establish a foundational knowledge and skills base and define the minimal level of expertise expected. This will help to delineate the boundaries and responsibilities of shoulder and elbow surgeons.

In this study, on behalf of the European Society for Surgery of the Shoulder and Elbow (ESSSE-SECEC), we present the development process and creation of a CC for shoulder and elbow surgery.

Materials and methods

To develop the CC in shoulder and elbow surgery, the ESSSE-SECEC Qualification Committee formed a task force in 2022. This task force used the work of the Turkish Spine Society[1] as a model. The task force, consisting of 10 physicians specialized in shoulder and elbow surgery, divided the CC into 2 major parts: (1) shoulder and (2) elbow.

For each part, the broad base of knowledge and skills was divided into 5 modules:

- Basic Science
- Diagnosis
- Pathology
- Nonoperative Treatment
- Surgical Treatment

Each module was further divided into subject headings according to the EFORT proposal.

For each heading, the task force defined the fields of competency, classified as knowledge (theoretical understanding), skills (practical abilities), and attitudes (desired behavioral patterns). Each heading was assigned to a task force member for content development. These were compiled and analyzed by the task force before being reviewed by the ESSSE-SECEC Executive Committee. Following the incorporation of feedback, the CC was reviewed and approved by Dr. Gilles Walch.

Results

The shoulder module was divided into 36 headings: 5 for Basic Science, 4 for Diagnosis, 13 for Pathology, 5 for Nonoperative Treatment, and 9 for Surgical Treatment. These headings were further divided into 135 specific subjects: 16 for Basic Science, 15 for Diagnosis, 51 for Pathology, 15 for Nonoperative Treatment, and 38 for Surgical Treatment.

The elbow modules were divided into 36 headings: 5 for Basic Science, 4 for Diagnosis, 13 for Pathology, 5 for Nonoperative Treatment, and 9 for Surgical Treatment. These headings were further divided into 124 specific subjects: 14 for Basic Science, 15 for Diagnosis, 43 for Pathology, 15 for Nonoperative Treatment, and 37 for Surgical Treatment. The developed CC is attached in Appendices 2 and 3. An index is attached in Appendix 1.

Discussion

This CC aims to advance knowledge in the shoulder and elbow field and improve the skills of its practitioners. By providing guidance, the CC will ensure that future shoulder and elbow surgeons have a curriculum that guarantees a basis of safety and competency according to ESSSE-SECEC standards. We aim to promote the development of essential competencies and improve overall clinical performance in this specialty. Competencies encompass specific knowledge, skills, and attitudes necessary for surgeons to perform effectively and meet professional standards.

In alignment with European legislation, EFORT has been granted the authority to oversee Continuing Medical Education/CPD in orthopedics and traumatology.[8] SECEC aims to take on a similar role, focusing on establishing and upholding educational standards within the shoulder and elbow specialty. By actively contributing to the advancement of CPD, SECEC seeks to ensure that professionals remain at the forefront of medical knowledge and practices, ultimately enhancing patient outcomes in this field.

This article presents the ESSSE-SECEC CC for shoulder and elbow surgery along with the methodology used in its development. This CC was developed by a task force appointed by the ESSSE-SECEC Qualification Committee specifically for this purpose.

The CC was divided into 5 areas: Basic Science, Diagnosis, Pathology, Nonoperative Treatment, and Surgical Treatment, with subsequent divisions into 72 headings and 259 specific subjects. Levels of knowledge, skills, and attitudes were defined for each subject.

This CC is unique compared to those from other shoulder and elbow societies, such as the American Shoulder and Elbow Surgeons, and is based on the methodology of the British Orthopaedic Association,[4] which was later revised by the Turkish Spine Society when creating their CC in spinal surgery.[1] The foundation was based on the structure provided by EFORT.

Unlike other CCs,[5] we chose not to define entry and exit levels for knowledge, skills, and attitudes, as these can be arbitrary when evaluating competencies. If evaluation and grading are necessary, a separate tool, such as an examination, will be created for that purpose.

We acknowledge the limitations of this CC, as it represents the view of the task force appointed by the ESSSE-SECEC Qualification Committee. However, this committee included expert surgeons and

was open to extensive discussion. Additionally, it is challenging to thoroughly validate the methodology and the CC itself in the near future. Therefore, some adjustments may be needed during its application.

This ESSSE-SECEC proposal should be evaluated by an oversight task force created by ESSSE-SECEC for this purpose. Adaptations and changes can be made in the future if deemed necessary. This should be seen as the beginning of a dynamic process where future needs will guide re-evaluation and modifications.

With this CC, we aim to provide a foundational base and standard identity for shoulder and elbow surgeons, help define the necessary competencies for establishing shoulder and elbow surgery as a subspecialty in orthopedics, and serve as a tool for evaluating future applicants to the degree of shoulder and elbow surgeon recognized by ESSSE-SECEC.

Conclusion

The ESSSE-SECEC CC establishes a comprehensive and structured framework for shoulder and elbow surgery training, addressing the need for standardized competencies in this growing subspecialty. By outlining essential knowledge, skills, and attitudes, the curriculum supports both trainees and trainers, contributing to an effective and high-quality clinical practice. Although future refinements may be necessary, this curriculum serves as a foundational tool for the development of shoulder and elbow surgeons, reinforcing the identity of the subspecialty and ensuring adherence to high professional standards.

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Supplementary data

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OVERVIEW				
Anatomical Area	**Patient Group**	**Differentiated in Diagnosis**	**Pathology**	**Differentiated Non-operative Therapy**
• Shoulder • Elbow	• Pediatric • Adolescent • Adult • Geriatric	• Imaging methods • Specialist laboratory medicine • Puncture and biopsy • Investigation techniques	• Infection • Nerve pathology • Tumors • Sports injuries • Trauma • Developmental disorders • Inherent • Growth associated • Caused by medical interventions • Inflammatory • Systematic diseases • Caused by bone metabolism • Degenerative	• Physical therapy (manual therapy, ergo therapy, etc.) • Immobilization • Orthoses, prostheses, etc. • Pain relief therapy • Non-operative fracture treatment

Differentiated Operative Therapy	**Basic Science**
• Arthroscopy • Reconstructive procedures • Osteotomies • Osteosyntheses • Resections • Arthroplasty • Soft Tissues (Tendons/Nerves /Vessels) • Amputations • Arthrodesis	• Anatomy • Approaches • Biomechanics • Genetics • Embryology

SHOULDER BASIC SCIENCE				
Anatomy	**Biomechanics**	**Surgical approaches**	**Embryology/ Growth**	**Genetic**
• Functional anatomy of the glenohumeral joint • Functional anatomy of the rotator cuff and LHB • Functional anatomy of the subacromial space • Functional anatomy of the clavicle and AC & SC joint • Anatomy of the proximal humerus • Anatomy of the scapula	• Basic biomechanics • Shoulder kinematics • Glenohumeral stability	• Arthroscopic portals and approaches • Deltopectoral approach • Superolateral approach • Posterior approach • Combined approaches	• Glenohumeral embryology	• Clinical genetics

ELBOW BASIC SCIENCE			
Anatomy	**Biomechanics**	**Surgical approaches**	**Embryology/ Growth**
• Functional anatomy of the elbow joint • Functional anatomy of the elbow stabilizers • Functional anatomy of the forearm	• Basic biomechanics • Elbow kinematics • Elbow stability	• Arthroscopic portals and approaches • Lateral approach • Medial approach • Dorsal approach • Combined approaches • Ventral approach	• Elbow embryology

SHOULDER DIAGNOSTICS			
Imaging	**Laboratory medicine**	**Puncture and Biopsy**	**Investigation techniques**
• Sonographic • Nuclear medicine • Radiological • MRI/ MR Arthrography • CT/ CT Arthrography • DEXA • Scintigraphy	• Blood parameters • Blood cultures	• Histology • Synovia analysis • Microbiology	• Arthroscopy • Nanoscope • Open surgical exploration

ELBOW DIAGNOSTICS			
Imaging	**Laboratory medicine**	**Puncture and Biopsy**	**Investigation techniques**
• Sonographic • Nuclear medicine • Radiological • MRI/ MR Arthrography • CT/ CT Arthrography • DEXA	• Blood parameters • Blood cultures	• Histology • Synovia analysis • Microbiology	• Arthroscopy • Nanoscope • Open surgical exploration

SHOULDER PATHOLOGIES				
Infection	**Nerve Pathology**	**Tumors**	**Sports Injuries**	**Trauma**
• Primary/Secondary empyema • Prosthetic infection • Infection of osteosynthesis • Osteomyelitis	• Parsonage-Turner syndrome • Cervical spine pathology • Plexus brachialis lesion • Compression N. suprascapular • Axillary nerve damage	• Osteoid osteoma • Primary malignant tumors • Metastatic cancer • Benign soft tissue lesions • Enchondroma • Osteosarcoma • NOF	• Anterior instability • Posterior instability • SLAP lesions • Chondral lesion • PSGI • Biceps pathologies • AC joint injuries • Friedrich's disease • Weightlifters shoulder • Muscle/tendon injuries • SC joint injuries	• Proximal humerus fractures • Fractures dislocations • Glenoid fractures • Scapula fractures • Clavicle fractures
Developmental Disorders	**Inherent/ Growth associated**	**Caused by medical interventions**	**Inflammatory/ Systemic diseases/ Bone metabolism**	**Degenerative**
• Multidirectional instability • Erb palsy • Scapula alata • Scapula dyskinesia	• Dysplasia • Stiffness • Osteochondrosis dissecans	• Chondral lesion • Infection • Osteonecrosis • Non-unions	• Rheumatoid diseases • PVNS • Synovitis • Bursitis	• Osteoarthritis • Loose bodies • Stiffness • Chondromalacia

ELBOW PATHOLOGIES				
Infection	**Nerve Pathology**	**Tumors**	**Sports Injuries**	**Trauma**
• Primary/secondary empyema • Prosthetic infection • Infection of osteosynthesis	• Ulnar nerve syndrome • Snypping ulnaris syndrome • Radial tunnel syndrome • Pronator teres syndrome	• Osteoid osteoma • Primary malignant tumors • Metastatic cancer • Benign soft tissue lesions	• Ligamentous dislocation • Chronic valgus instability • Osteochondral lesion • Medial epicondylitis • Lateral epicondylitis	• Radial head fracture • Proximal ulna fractures • Distal humerus fractures • Isolated coronoid fracture / PMRI • Terrible triad • Monteggia • Essex-Lopresti
Developmental Disorders	**Inherent/ Growth associated**	**Caused by medical interventions**	**Inflammatory/ Systemic diseases/ Bone metabolism**	**Degenerative**
• Chronic radial head dislocation • Cubitus varus	• Dysplasia • Varus/valgus malalginement • Radioulnar synostosis • Osetochondrosis dissecans	• Condral lesions • Infection • Osteonecrosis	• Rheumatoid diseases • PVNS • Bursitis	• Osteoarthritis • Loose bodies • Stiffness

SHOULDER NON-OPERATIVE			
Physical Therapy	**Immobilization/ Orthoses, Prosthesis etc.**	**Pain Relief Therapy**	**Non-operative fracture treatment**
• Physiotherapy • Ergotherapy • Massage • Manual therapy • Lymph drainage	• Splints • Orthoses • Casts • Braces	• Systemic pain therapy (oral) • Systemic pain therapy (intravenous) • Injections • Pain catheters	• Immobilization • Physiotherapy

ELBOW NON-OPERATIVE			
Physical Therapy	**Immobilization/ Orthoses, Prosthesis etc.**	**Pain Relief Therapy**	**Non-operative fracture treatment**
• Physiotherapy • Ergotherapy • Massage • Manual therapy • Lymph drainage	• Splints • Orthoses • Casts • Braces	• Systemic pain therapy (oral) • Systemic pain therapy (intravenous) • Injections • Pain catheters	• Immobilization • Physiotherapy

SHOULDER OPERATIVE				
Arthroscopy	**Reconstructive procedures**	**Osteotomies**	**Osteosyntheses**	**Resections**
• Diagnostic arthroscopy • Ligament repair • Tendon repair • Removal of loose bodies • Cartilage treatment • Removal of osteophytes • Arthrolysis • Synovectomy • Fracture treatment	• Open fracture treatment • Open ligament repair • Open tendon repair • Open stabilization procedures • Open arthrolysis	• Corretive osteotomie prox. humerus • Corretive osteotomie dist. humerus • Corrective osteotomy glenoid	• Proximal humerus fractures • Glenoid fractures • Scapula fractures • Clavicle fractures • Dislocation fractures	• AC joint resection • SC joint resection • Humeral head resection
Endoprosthetics	**Soft Tissues (Tendons/Nerves/ Vessels)**	**Amputations**	**Arthrodesis**	
• Anatomic Total shoulder arthroplasty • Hemiarthroplasty • Reverse shoulder arthroplasty • Resurfacing arthroplasty • Partial resurfacing arthroplasty • Revision arthroplasty • Allograft Prosthetic Composite • Tumor prosthetics	• Ligament repair • Tendon Repair • Bankart repair • Capsular shift • Tendon transfer	• Arm amputation • Shoulder exarticulation • 4-Quarter Amputation	• Glenohumeral arthrodesis	

ELBOW OPERATIVE				
Arthroscopy	**Reconstructive procedures**	**Osteotomies**	**Osteosyntheses**	**Resections**
• Diagnostic arthroscopy • Ligament repair • Tendon repair • Removal of loose bodies • Cartilage treatment • Removal of osteophytes • Arthrolysis • Synovectomy • Fracture treatment	• Open fracture treatment • Open ligament repair • Open tendon repair • Open stabilization procedures • Open arthrolysis	• Corretive osteotomie humerus • Corretive osteotomie ulna • Corrective osteotomy radius	• Distal humerus fractures • Ulnar fractures • Radius fractures • Fractures dislocations • Complex elbow fractures	• Joint resection • Radial head resection
Endoprosthetics	**Soft Tissues (Tendons/Nerves/ Vessels)**	**Amputations**	**Arthrodesis**	
• Total elbow arthroplasty • Hemiarthroplasty • Radial head replacement • Interposition arthropöasty	• Direct ligament repair • Ligment reconstruction • Internal bracing • Direct tendon repair • Tendon transfer	• Forearm amputation • Elbow exarticulation • Distal humerus amputation	• Elbow arthrodesis	

BASIC LEARNING OBJECTIVES - SHOULDER				
	Knowledge	**Skill**	**Attitude**	**Key Words**
1. Basic Science				
1.1 Anatomy				
Functional anatomy of the glenohumeral joint	Describes the detailed anatomy and functional anatomy of the glenohumeral joint. Describes the localization, function and structure of the cartilage, capsule, ligaments and labrum. Special emphasis shall be laid on the neuro-vascular anatomy around the glenohumeral joint.	Expects the surgeon to understand the functional anatomy of the glenohumeral joint to treat conditions accordingly.	Appreciates the high relevance of profound understanding and knowledge of glenohumeral anatomy for proper diagnostics and nonoperative as well as operative treatment of different pathologies.	Shoulder joint Glenohumeral joint Functional anatomy
Functional anatomy of the rotator cuff (RC) and long head of biceps (LHB)	Describes the detailed anatomy and functional anatomy of the RC muscles and tendons as well as the muscle and tendon of the LHB. Describes the localization, function and structure of the RC and LHB.	Expects the surgeon to understand the functional anatomy of the RC & LHB to treat conditions accordingly.	Appreciates the high relevance of profound understanding and knowledge of RC & LHB anatomy for proper diagnostics and conservative as well as operative treatment of different pathologies.	Rotator cuff Long head of biceps Functional anatomy
Functional anatomy of the subacromial space	Describes the detailed anatomy and functional anatomy of the subacromial space with its structures. Describes the localization, function and structure of the subacromial space.	Expects the surgeon to understand the functional anatomy of the subacromial space to treat conditions accordingly.	Appreciates the high relevance of profound understanding and knowledge of the subacromial space anatomy for proper diagnostics and conservative as well as operative treatment of different pathologies.	Subacromial space Bursa

Functional anatomy of the clavicle and acromioclavicular (AC) & sternoclavicular (SC) joint	Describes the detailed anatomy and functional anatomy of the clavicle with its SC and AC joints. Describes the localization, function and structure of the clavicle, SC and AC joint.	Expects the surgeon to understand the functional anatomy of the clavicle, SC & AC joint to treat conditions accordingly.	Appreciates the high relevance of profound understanding and knowledge of the clavicle, SC and AC joint anatomy for proper diagnostics and conservative as well as operative treatment of different pathologies.	Subacromial Space Acromion Bursa Functional anatomy
Anatomy of the proximal humerus	Describes the detailed bony and functional anatomy of the proximal humerus. Describes the localization, function and structure of the proximal humerus.	Expects the surgeon to understand the functional anatomy of the proximal humerus to treat conditions accordingly.	Appreciates the high relevance of profound understanding and knowledge of the anatomy of the proximal humerus for proper diagnostics and conservative as well as operative treatment of different pathologies.	Proximal humerus Humeral head Tuberosities Anatomy
Anatomy of the scapula	Describes the detailed bony and functional anatomy of the scapula. Describes the localization, function and structure of the scapula.	Expects the surgeon to understand the functional anatomy of the scapula to treat conditions accordingly.	Appreciates the high relevance of profound understanding and knowledge of the anatomy of the scapula for proper diagnostics and conservative as well as operative treatment of different pathologies.	Scapula Glenoid Anatomy Structure
1.2 Biomechanics				
Basic biomechanics	Teaches basic biomechanics of the glenohumeral joint with all its surrounding structures as illustrated in 1.1.	Expects the surgeon to understand the basic biomechanics of the shoulder joint and its structures as illustrated in 1.1 and to transfer this	Appreciates the high relevance of profound understanding and knowledge of shoulder biomechanics for proper diagnostics and	Biomechanics shoulder Movement shoulder Testing shoulder

		knowledge into patient treatment.	treatment of shoulder pathologies.	
Shoulder kinematics	Teaches kinematics of the glenohumeral joint with all its surrounding structures as illustrated in 1.1.	Expects the surgeon to understand the kinematics of the shoulder joint and its structures as illustrated in 1.1 and to transfer this knowledge into patient treatment.	Appreciates the high relevance of profound understanding and knowledge of shoulder kinematics for proper diagnostics and treatment of shoulder pathologies.	Biomechanics shoulder Movement shoulder Testing shoulder
Glenohumeral stability	Teaches the biomechanical principles of glenohumeral stability.	Expects the surgeon to understand the principles of shoulder joint stability and to transfer this knowledge into patient treatment.	Appreciates the high relevance of profound understanding and knowledge of glenohumeral stability for proper diagnostics and treatment of shoulder pathologies.	Shoulder stability Glenohumeral stability Joint congruence
1.3 Surgical approaches				
Arthroscopic portals and approaches	Has detailed knowledge of the arthroscopic portals and approaches to the shoulder joint, in a step-by-step sequence, with special respect for the position and course of the major neuro-vascular structures at the shoulder. Teaches the surgeon the possibilities and limitations of the approaches.	Expects the surgeon to be able to apply basic and profound knowledge of arthroscopic portals and approaches to the treatment of shoulder pathologies.	Appreciates the high relevance of profound understanding and knowledge of shoulder surgical approaches for proper surgical treatment of shoulder pathologies.	Arthroscopy shoulder Arthroscopic approach shoulder Portal arthroscopy shoulder

Deltopectoral approach	Has detailed knowledge of the deltopectoral approach to the shoulder joint, in a step-by-step sequence, with special respect for the position and course of the major neuro-vascular structures at the shoulder. Teaches the surgeon the possibilities and limitations of the approach.	Expects the surgeon to be able to apply basic and profound knowledge of deltopectoral approaches to the treatment of shoulder pathologies.	Appreciates the high relevance of profound understanding and knowledge of shoulder surgical approaches for proper surgical treatment of shoulder pathologies.	Deltopectoral approach Cephalic vein Deltoid muscle Pectoralis muscle
Superolateral approach	Has detailed knowledge of the superolateral approach to the shoulder joint, in a step-by-step sequence, with special respect for the position and course of the major neuro-vascular structures at the shoulder. Teaches the surgeon the possibilities and limitations of the approach.	Expects the surgeon to be able to apply basic and profound knowledge of super-lateral approaches to the treatment of shoulder pathologies.	Appreciates the high relevance of profound understanding and knowledge of shoulder surgical approaches for proper surgical treatment of shoulder pathologies.	Open approach shoulder Transdeltoidal approach Superior-lateral approach shoulder
Posterior approaches	Has detailed knowledge of posterior approaches to the shoulder joint, in a step-by-step sequence, with special respect for the position and course of the major neuro-vascular structures at the shoulder. Teaches the surgeon the possibilities and limitations of the approaches.	Expects the surgeon to be able to apply basic and profound knowledge of posterior approaches to the treatment of shoulder pathologies.	Appreciates the high relevance of profound understanding and knowledge of shoulder surgical approaches for proper surgical treatment of shoulder pathologies.	Posterior approach shoulder Delta split Codman McWhorter

Combined approaches	Has detailed knowledge of combined approaches to the shoulder joint, in a step-by-step sequence, with special respect for the position and course of the major neuro-vascular structures at the shoulder. Teaches the surgeon the possibilities and limitations of the approach.	Expects the surgeon to be able to apply basic and profound knowledge of combined approaches to the treatment of shoulder pathologies.	Appreciates the high relevance of profound understanding and knowledge of shoulder surgical approaches for proper surgical treatment of shoulder pathologies.	Approaches shoulder Dissection shoulder Opening shoulder

1.4 Embryology/Growth				
Glenohumeral embryology	Teaches basic and detailed knowledge on glenohumeral embryology concerning shoulder pathologies.	Expects the surgeon to understand the principles of shoulder embryology and to transfer this knowledge into patient treatment.	Appreciates the high relevance of profound understanding and knowledge of embryology associated shoulder pathology	Embryology shoulder joint Natural history shoulder Glenohumeral embryology
1.5 Genetics				
Clinical genetics	Teaches basic and detailed knowledge on clinical genetics of shoulder pathologies.	Expects the surgeon to understand the principles of clinical genetics of shoulder pathologies and to transfer this knowledge into patient treatment.	Appreciates the high relevance of profound understanding and knowledge of clinical genetics of shoulder pathologies.	Genetics shoulder pathologies Gene defect shoulder
2. Diagnostics				
2.1 Imaging				
Sonography/ Ultrasound	Teaches basic and detailed knowledge of ultrasound and its application in the diagnostics and treatment of shoulder pathologies. Key structures: • Rotator cuff tendons and muscles • Long head of biceps • Subacromial space • Glenohumeral joint • AC joint • SC joint	Expects the surgeon to be able to display the mentioned key structures via ultrasound and to be able to differentiate physiologic and pathologic findings.	Appreciates the high relevance of profound understanding and knowledge of shoulder ultrasound investigations.	Ultrasound Anatomical landmarks Shoulder diagnostics
Nuclear medicine	Teaches basic and detailed knowledge basics of nuclear medicine and its application in the diagnostics and treatment of	Expects the surgeon to be able to understand the mentioned key structures and to be able to differentiate	Appreciates the high relevance of profound understanding and knowledge of nuclear medicine for diagnostics and	Bone Scintigraphy Tumors Shoulder Arthroplasty Implant Loosening

	shoulder pathologies.	physiologic and pathologic findings.	treatment of shoulder pathologies.	
MRI/ MR Arthrography	Teaches basic and detailed knowledge of MRI and MR arthrography and its application in the diagnostics and treatment of shoulder pathologies.	Expects the surgeon to be able to understand the mentioned key structures in MRI and to be able to differentiate physiologic and pathologic findings.	Appreciates the high relevance of profound understanding and knowledge of MRI and MR arthrography for diagnostics and treatment of shoulder pathologies.	MRI MR Arthrography Inflammation Rotator cuff
CT/ CT Arthrography	Teaches basic and detailed knowledge on the theoretical basics of CT and CT arthrography and its application in the diagnostics and treatment of shoulder pathologies.	Expects the surgeon to be able to understand the mentioned key structures in CT and to be able to differentiate physiologic and pathologic findings.	Appreciates the high relevance of profound understanding and knowledge of CT and CT arthrography for diagnostics and treatment of shoulder pathologies.	CT CT Arthrography Bone Fracture
DEXA	Teaches basic and detailed knowledge on the theoretical basics of bone density measurements and its application in the diagnostics and treatment of shoulder pathologies.	Expects the surgeon to be able to understand the mentioned bone structures by using DEXA and to be able to differentiate physiologic and pathologic findings.	Appreciates the high relevance of profound understanding and knowledge of bone density measurements for diagnostics and treatment of shoulder pathologies.	Bone mineral density Children and adolescents Dual-energy X-ray absorptiometry
Scintigraphy	Teaches basic and detailed knowledge basics of scintigraphy and its application in the diagnostics and treatment of shoulder pathologies.	Expects the surgeon to be able to understand the mentioned key structures and to be able to differentiate physiologic and pathologic findings.	Appreciates the high relevance of profound understanding and knowledge of nuclear scintigraphy for diagnostics and treatment of shoulder pathologies.	Bone Scintigraphy Tumors Shoulder Arthroplasty Implant Loosening

2.2 Laboratory Medicine				
Blood parameters	Teaches basic and detailed knowledge on the theoretical basics of blood parameters and its application in the diagnostics and treatment of shoulder pathologies. • CRP • WBC • PCT • IL-6 • Rheumatoid factors • Anti-CCP • ESR	Expects the surgeon to be able to understand the mentioned blood parameters and to be able to differentiate physiologic and pathologic findings.	Appreciates the high relevance of profound understanding and knowledge of blood parameters for diagnostics and treatment of elbow pathologies.	CRP Cytokine ESR Inflammatory marker Rheumatic disease WBC
Blood cultures	Lists the possibilities and value of blood cultures in the diagnosis of systemic infections accompanying shoulder pathologies.	Expects the surgeon to be able to understand the results of the mentioned blood cultures and to be able to differentiate physiologic and pathologic findings.	Appreciates the high relevance of profound understanding and knowledge of blood cultures for diagnostics and treatment of systemic infections accompanying shoulder pathologies.	Microbiology Resistance Organism Antibiotics Evasion
2.3 Puncture and biopsy				
Histology	Teaches the basic knowledge of histologic findings for the identification of shoulder pathologies in differentiating infectious and inflammatory diseases.	Expects the surgeon to be able to gather the relevant samples via open, mini-open and minimally invasive techniques while complying with necessary rules of hygiene and prevention of infection.	Appreciates the high relevance of profound understanding and knowledge of histology for diagnostics and treatment of systemic infections accompanying shoulder pathologies.	Histology Histopathology Synovium Sectioning
Synovia analysis	Teaches the basic knowledge of the use of synovia analysis for the identification of	Expects the surgeon to be able to gather the relevant samples via open, mini-	Appreciates the high relevance of synovia analysis for diagnostics and treatment of	Synovium Analysis Inflammation Rheumatic disease

	shoulder pathologies, in differentiating infectious and inflammatory diseases.	open and minimally invasive techniques while complying with necessary rules of hygiene and prevention of infection.	infectious and inflammatory shoulder pathologies.	
Microbiology	Lists the possibilities and limitations of the essential diagnostic tools of microbiology in pathologies around the shoulder joint.	Expects the surgeon to be able to gather the relevant samples via open, mini-open and minimally invasive techniques while complying with necessary rules of hygiene and prevention of infection.	Appreciates the high relevance of microbiology for diagnosis of pathogens and antibiotic resistance in the treatment of infectious shoulder pathologies.	Microbiology Resistance Organism Antibiotics
2.4 Investigation Techniques				
Arthroscopy	Teaches the possibilities and limitations of arthroscopy as a minimally invasive diagnostic tool for shoulder pathologies. The surgeon is taught how to respect the critical role of sterility and hygiene when applying arthroscopy to the shoulder joint.	Expects the surgeon to be able to perform diagnostic shoulder arthroscopy while respecting the complex anatomy of the shoulder joint and its surrounding neuro-vascular structures.	Appreciates the relevance of diagnostic arthroscopy and the appropriate treatment for shoulder pathologies.	Shoulder Arthroscopy Diagnosis Visualization Hygiene
Nanoscope	Teaches the possibilities and limitations of the nanoscope as a minimally invasive diagnostic tool for shoulder pathologies. The surgeon is taught how to respect the critical role of sterility and hygiene when	Expects the surgeon to be able to perform diagnostic shoulder exploration by using a nanoscope while respecting the complex anatomy of the shoulder joint and its surrounding neuro-vascular structures.	Appreciates the diagnostic relevance of the nanoscope for shoulder pathologies.	Shoulder Nanoscope Diagnosis Visualization Hygiene

	applying arthroscopy to the shoulder joint.			
Open surgical exploration	Teaches the possibilities and limitations of open surgical exploration as a diagnostic tool for shoulder pathologies. The surgeon is taught how to respect the critical role of sterility and hygiene when applying arthroscopy to the shoulder joint.	Expects the surgeon to be able to perform open diagnostic shoulder exploration while respecting the complex anatomy of the shoulder joint and its surrounding neuro-vascular structures.	Appreciates the relevance of open diagnostic surgical exploration and the appropriate treatment for shoulder pathologies.	Shoulder Open surgical exploration Diagnosis Visualization Hygiene
3. Shoulder Pathologies				
3.1 Infections				
Primary/Secondary Empyema	Teaches the epidemiology, etiology and pathobiomechanics of the primary/secondary empyema. Lists the diagnostic algorithms of clinical and imaging investigations assessing infections (primary and secondary). Lists the exams and culture analysis needed for identification of shoulder infection. Knows the indications for non-operative and operative treatment according to the available literature.	Expects the surgeon to be able to treat the empyema in the early phase and afterwards. Expects the trainee to perform arthroscopic and open surgical approaches and procedures like articular debridement, capsular release, synovialectomy and other soft tissue procedures.	Appreciates the relevance of primary and secondary empyema, the necessity for proper diagnostics and therefore adequate indications for treatment.	Infection shoulder Glenohumeral infection Empyema shoulder Pus shoulder

Prosthetic Infection	Teaches the epidemiology, etiology and pathobiomechanics of infections around the prosthesis. Lists the diagnostic algorithms of clinical, laboratory and imaging investigations assessing periprosthetic infections (acute and chronic). Lists the exams and culture analysis needed to identify the pathogen microorganism of the infection. Knows the indications and the time for operative treatment, the steps for the surgical procedure, and the devices available (spacer, cement, implants) according to the available literature.	Expects the surgeon to be able to treat periprosthetic infections in the early phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise non-operative treatment - if indicated. Expects the trainee to perform surgical approaches and procedures like Debridement, Antibiotics, and Implant Retention (DAIR), capsular release, synovialectomy, implant removal, and 1 or 2-stage revisions.	Appreciates the relevance of periprosthetic infection, the necessity for proper diagnostics and therewith adequate indications for treatment.	Periprosthetic infection shoulder PPI Revision shoulder arthroplasty Infected shoulder replacement
Infection of Osteosynthesis	Teaches the epidemiology, etiology and pathobiomechanics of the infection around osteosynthesis. Lists the diagnostic algorithms of clinical laboratory and imaging investigations assessing infections around osteosynthesis (acute and chronic). Lists the exams, and culture	Expects the surgeon to be able to treat the infection around an osteosynthesis and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment in those cases where the indication exists. Expects the trainee to perform open surgical	Appreciates the relevance of infections around the synthesis, the necessity for proper diagnostics and therefore adequate indications for treatment.	Infection osteosynthesis Infection plate shoulder Shoulder fracture infection Infected nail shoulder

	analysis needed to identify the pathogen microorganism of the infection. Knows the indications and the time for operative treatment, the steps for the surgical procedure, the devices available, negative pressure wound therapy and implant change/ removal according to the available literature.	approaches and procedures of tissue debridement, synovialectomy, implant removal etc.		
Osteomyelitis	Teaches the epidemiology, etiology and pathobiomechanics of osteomyelitis. Lists the diagnostic algorithms of clinical laboratory and imaging investigations assessing infections (acute and chronic). Lists the exams, and culture analysis needed to identify the pathogen microorganism of the osteomyelitis. Knows the indications and the time for operative treatment, the steps for the surgical procedure, the devices available, and negative pressure wound therapy according to the available literature.	Expects the surgeon to be able to treat the infection in the bone and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment in those cases where the indication exists. Expects the trainee to perform open surgical approaches and procedures of tissue debridement, synovialectomy and other soft and bone tissue procedures.	Appreciates the relevance of infection in bone osteomyelitis, the necessity for proper diagnostics and therefore adequate indications for treatment.	Osteomyelitis shoulder joint Osteomyelitis humerus Osteomyelitis scapula

3.2 Nerve Pathologies				
Parsonage Turner Syndrome	Explains the relevant background of Parsonage Turner syndrome, looking into etiology and pathophysiology, including possible etiologic triggers (autoimmune, biomechanical, inflammatory) and risk factors (infections, immunizations, stress, drugs, iatrogenic). Familiar with the typical clinical course of this syndrome. Comfortable with the differential diagnosis (cervical spine, rotator cuff, nerve entrapment syndromes) and associated conditions. Knowledge of the various relevant complementary studies needed for diagnosis, including imaging studies and neurophysiologic exams.	Expects the surgeon to be comfortable with the physical exam of the patient with this pathology, including the neurologic exam of the affected extremity. Surgeons should be familiar with the treatment course, including pain management and physical therapy, and know when to select patients without improvements that may benefit from surgical treatment, including neurolysis/neurorr haphy/nerve graft or tendon/muscle transfers.	Recognizes the importance of this syndrome in the differential diagnosis of neurological deficits of the upper limb. Understands the importance of the conservative treatment.	Parsonage Turner Syndrome Nerve compression Idiopathic brachial plexus neuropathy
Cervical Spine Pathology	The trainee is able to distinguish between spine and shoulder pathology and to identify the pathologies included in the differential diagnosis of these two anatomical regions. Teaches its correct	Trainee to be comfortable with the physical exam of the patient with cervical spine pathology, including the neurologic exam, as well as cervical and shoulder objective evaluation.	Appreciates the importance of excluding cervical pathology in the patient with shoulder complains. Comfortable with protocols for correct diagnosis and orientation of these pathologies.	Compression Diagnosis Cervical Spine pathology Nerve pathology Nucleus pulposus prolapse Disc herniation

	diagnosis, including physical examination, complementary exams and treatment possibilities.	Surgeon should be able to identify and apply diagnosis and conservative treatment protocols for patients with cervical spine pathology.		
Plexus brachialis lesion	Lists the possible causes (obstetric, traumatic, inflammatory, idiopathic, transient) for brachial plexus injuries, and is able to identify the different involvement patterns. Teaches its correct diagnosis and treatment possibilities and how to differentiate it from other nerve syndromes.	Should be familiar with nerve recovering physiology and timing, and conservative treatment protocols.	Understands the relevance of brachial plexus injuries and thorough diagnostic and therapeutic protocols for the correct approach to these lesions.	Decompression Pronator teres syndrome Nerve compression Nerve pathology Plexus lesion Erb palsy
Compression suprascapular nerve	Lists the multitude of causes for suprascapular nerve compression and differentiates it according to the location of compression. Explains the important clinical findings in these syndromes and knows the associated pathology. Comfortable with the diagnosis and treatment protocols.	Expects the surgeon to be able to perform decompression of the suprascapular nerve at the spinoglenoid or suprascapular notch. Able to treat concomitant shoulder pathology.	Recognizes these syndromes and respective causes, as well as their importance in patients with neurologic lesions around the shoulder girdle. Understand the importance of thorough diagnostic and therapeutic protocols for the correct diagnosis and treatment of suprascapular nerve compression.	Suprascapular nerve Spinoglenoide notch Suprascapular notch Nervus suprascapularis

Axillary Nerve Damage	Being able to clinically diagnosis an axillary nerve injury and choose the appropriate complementary studies. Understand and differentiate the possible causes of axillary nerve damage, including idiopathic, inflammatory, traumatic, compressive and iatrogenic. Being able to determine the need for conservative vs surgical treatment and being familiar with the therapeutic protocols for the correct diagnosis and treatment of these lesions.	Surgeon should be familiar with nerve recovering physiology and conservative treatment when appropriate. Expects the surgeon to be able to perform release of the quadrangular space or neurolysis or neurorrhaphy of the axillary nerve if needed.	Appreciates the relevance of axillary nerve lesions, and of thorough surgical techniques to avoid some of these injuries.	Quadrangular space syndrome Axillary nerve injury Brachial plexus Nerve injury
3.3 Tumors				
Osteoid osteoma	Teaches the etiology and epidemiology of this rare benign tumor. Lists the diagnostic modalities to differentiate it from other lesions and other causes of non-traumatic pain.	Expects the surgeon to be able to perform minimally invasive and open approaches to get access to the sites of the lesions and how to remove them while preserving intact bone.	Appreciates the relevance of osteoid osteoma of the shoulder, the necessity for thorough diagnostics and careful surgical techniques for treatment.	Osteoid osteoma Shoulder Osteoblastic tumor Neoplasia
Primary malignant Tumors	Lists the rare primary malignant bone tumors of the shoulder, and their diagnostic and treatment algorithms.	Expects the surgeon to be able to perform surgical approaches to get access to the sites of the lesions to either perform a diagnostic biopsy or to remove the lesions while preserving intact bone and soft tissues.	Appreciates the relevance of primary malignant tumors of the shoulder, the necessity for thorough diagnostics and careful surgical techniques for treatment, while adhering to established treatment algorithms.	Malignant bone tumour shoulder Tumor shoulder

Metastatic cancer	Lists the possible primary malignancies that may cause metastatic disease to the shoulder area and teaches their diagnostic and treatment algorithms.	Expects the surgeon to be able to perform surgical approaches to get access to the sites of the lesions to either perform a diagnostic biopsy or to remove the lesions while preserving intact bone and soft tissues.	Appreciates the relevance of metastatic cancer of the shoulder, the necessity for thorough diagnostics and careful surgical techniques for treatment, while adhering to established treatment algorithms.	Metastasis shoulder Carcinoma Malignant tumor Shoulder joint
Benign Soft Tissue Lesions	Lists the possible benign soft tissue lesions that may be encountered on the shoulder and teaches their diagnostic and treatment algorithms.	Expects the surgeon to be able to perform surgical approaches to - if indicated - get access to the sites of the lesions to either perform a diagnostic biopsy or to remove the lesions while preserving intact bone and soft tissues.	Appreciates the relevance of benign soft tissue lesions of the shoulder, the necessity for thorough diagnostics and careful surgical techniques for treatment, while adhering to established treatment algorithms.	Benign lesion Shoulder tumor Soft tissue tumour
Enchondroma	Teaches the etiology and epidemiology of this benign shoulder tumor. Lists the diagnostic modalities to differentiate it from other lesions.	Expects the surgeon to be able to perform minimally invasive and open approaches to get access to the sites of the lesions and how to remove them while preserving intact bone.	Appreciates the relevance of enchondroma of the shoulder, the necessity for thorough diagnostics and careful surgical techniques for treatment.	Enchondroma shoulder Multiple enchondromatosis Chondrosarcoma
Osteosarcoma	Teaches the etiology and epidemiology of this rare malignant shoulder tumor. Lists the diagnostic and treatment algorithms.	Expects the surgeon to be able to perform surgical approaches to get access to the sites of the lesion to either perform a diagnostic biopsy or to remove the lesions while preserving intact bone and soft tissues.	Appreciates the relevance of osteosarcoma of the shoulder, the necessity for thorough diagnostics and careful surgical techniques for treatment, while adhering to established treatment algorithms.	Osteosarcoma shoulder Malignant bone tumour shoulder

NOF	Teaches the etiology and epidemiology of this benign shoulder tumor. Lists the diagnostic modalities to differentiate it from other lesions.	Expects the surgeon to be able to perform minimally invasive and open approaches to get access to the sites of the lesions and how to remove them while preserving intact bone.	Appreciates the relevance of non-ossifying fibroma (NOF) of the shoulder, the necessity for thorough diagnostics and careful surgical techniques for treatment.	Bening shoulder tumor Non-ossifying fibroma (NOF) Neurofibromatosis
3.4 Sports Injuries				
Anterior Dislocation - First Episode	Teaches the epidemiology, etiology and pathobiomechanics of the first episode of anterior shoulder dislocation. Lists the diagnostic algorithms of clinical and imaging investigations assessing the first episode of dislocation both before and after reduction. Knows the indications for conservative and operative treatment after the first episode of dislocation according to the available literature.	Expects the surgeon to be able to reduce anterior shoulder dislocations in the acute setting. Expects the surgeon to be able to supervise conservative treatment following the reduction of the first episode - if indicated. Expects the surgeon to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to address the instability of the shoulder following the first episode of dislocation - if indicated.	Appreciates the relevance of shoulder instability after the first episode of anterior shoulder dislocation, the necessity for proper diagnostics and therefore adequate indications for treatment.	Shoulder dislocation Anterior dislocation Luxation shoulder joint Glenohumeral dislocation Shoulder instability
Anterior Dislocation - Recurrent Episodes	Teaches the epidemiology, etiology and pathobiomechanics of recurrent episodes of anterior shoulder dislocation. Lists the diagnostic algorithms of clinical and imaging investigations assessing recurrent episodes of dislocation. Evaluates both	Expects the surgeon to be able to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat recurrent anterior shoulder dislocation - these include soft tissue procedures to the glenoid, bony stabilization	Appreciates the relevance of shoulder instability after recurrent episodes of anterior shoulder dislocation, the necessity for proper diagnostics and therewith adequate indications for treatment.	Recurrent anterior shoulder dislocation Shoulder instability Multiple dislocations shoulder

	glenoid and humeral soft tissue injuries, evaluates and quantifies glenoid and humeral bone loss, distinguishes between unipolar and bipolar injuries, distinguishes between on-track and off-track instability. Knows the indications for conservative and operative treatment after the recurrent episodes of dislocation, according to the available literature. Acknowledges the importance of humeral and glenoid injuries in the decision and risk of failure for each surgical procedure	surgeries to the glenoid (Latarjet and free bone grafts transfers), humeral head reconstruction and remplissage procedures to the humerus. Expects the surgeon to be able to perform arthroscopic and open surgical approaches to revise previous surgeries performed to treat recurrent anterior shoulder dislocation that have failed.		
Anterior Dislocation - Locked Dislocation	Teaches the epidemiology, etiology and pathobiomechanics of locked anterior shoulder dislocation Lists the diagnostic algorithms of clinical and imaging investigations assessing locked anterior dislocation. Knows the indications for conservative and operative treatment after diagnosis of a locked dislocation, according to the available literature. Acknowledges the importance of humeral and glenoid injuries in the decision and risk of	Expects the surgeon to be able to perform surgical approaches and procedures to the shoulder joint to treat locked anterior shoulder dislocation - these include soft tissue procedures to the glenoid or humerus, bony stabilization surgeries to the glenoid, humeral head reconstruction and shoulder arthroplasty.	Appreciates the relevance of locked anterior shoulder dislocation, the necessity for proper diagnostics and therefore adequate indications for treatment.	Locked anterior shoulder dislocation Locked shoulder Dislocation shoulder Missed dislocation shoulder

	failure for each surgical procedure			
Posterior Dislocation - First Episode	Teaches the epidemiology, etiology and pathobiomechanics of the first episode of posterior shoulder dislocation. Lists the diagnostic algorithms of clinical and imaging investigations assessing the first episode of dislocation both before and after reduction. Knows the indications for conservative and operative treatment after the first episode of dislocation according to the available literature.	Expects the surgeon to be able to reduce posterior shoulder dislocations in the acute setting. Expects the surgeon to be able to supervise conservative treatment following the reduction of the first episode - if indicated. Expects the surgeon to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to address the instability of the shoulder following the first episode of dislocation - if indicated.	Appreciates the relevance of shoulder instability after the first episode of anterior shoulder dislocation, the necessity for proper diagnostics and therefore adequate indications for treatment.	Shoulder dislocation Posterior dislocation Luxation shoulder joint Glenohumeral dislocation Shoulder instability
Posterior Dislocation - Recurrent Episodes	Teaches the epidemiology, etiology and pathobiomechanics of recurrent episodes of anterior shoulder dislocation. Lists the diagnostic algorithms of clinical and imaging investigations assessing recurrent episodes of dislocation. Evaluates both glenoid and humeral soft tissue injuries,	Expects the surgeon to be able to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat recurrent anterior shoulder dislocation - these include soft tissue procedures to the glenoid, bony stabilization surgeries to the glenoid (Latarjet and	Appreciates the relevance of shoulder instability after recurrent episodes of anterior shoulder dislocation, the necessity for proper diagnostics and therewith adequate indications for treatment.	Recurrent posterior shoulder dislocation Shoulder instability Multiple dislocations shoulder

	evaluates and quantifies glenoid and humeral bone loss, distinguishes between unipolar and bipolar injuries, distinguishes between on-track and off-track instability. Knows the indications for conservative and operative treatment after the recurrent episodes of dislocation, according to the available literature. Acknowledges the importance of humeral and glenoid injuries in the decision and risk of failure for each surgical procedure	free bone grafts transfers), humeral head reconstruction and remplissage procedures to the humerus. Expects the surgeon to be able to perform arthroscopic and open surgical approaches to revise previous surgeries performed to treat recurrent anterior shoulder dislocation that have failed.		
Posterior Dislocation - Locked Dislocation	Teaches the epidemiology, etiology and pathobiomechanics of locked anterior shoulder dislocation Lists the diagnostic algorithms of clinical and imaging investigations assessing locked anterior dislocation. Knows the indications for conservative and operative treatment after diagnosis of a locked dislocation, according to the available literature. Acknowledges the importance of humeral and glenoid injuries in the decision and risk of failure for each surgical procedure.	Expects the surgeon to be able to perform surgical approaches and procedures to the shoulder joint to treat locked anterior shoulder dislocation - these include soft tissue procedures to the glenoid or humerus, bony stabilization surgeries to the glenoid, humeral head reconstruction and shoulder arthroplasty.	Appreciates the relevance of locked anterior shoulder dislocation, the necessity for proper diagnostics and therefore adequate indications for treatment.	Locked posterior shoulder dislocation Locked shoulder Dislocation shoulder Missed dislocation shoulder

SLAP lesion	Teaches the epidemiology of superior labrum anterior to posterior lesions and explains the pathobiomechanics. Teaches classifications such as the one by Snyder et al. (Type I - IV). Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to perform arthroscopy to the shoulder joint, to treat the pathology of the labrum in particular of the superior portion that is part of the bicipital anchor perform refixation of these structures in the acute setting in young patients as well as tenotomy or tenodesis of the long head of biceps in the chronic setting and depending on the age and activity of the patient.	Appreciates the relevance of shoulder dysfunction affected by the SLAP lesion, the necessity for proper diagnostics and therefore adequate indications for treatment.	SLAP lesion Labrum lesion SLAP tear Overhead Snyder classification
Antero - and antero-inferior labrum lesion	Teaches the epidemiology of anterior- and anteroinferior labrum lesions and explains the pathobiomechanics. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat recurrent anterior shoulder dislocation - these include soft tissue procedures to the glenoid, bony stabilization surgeries to the glenoid (Latarjet and free bone grafts transfers), humeral head reconstruction and remplissage procedures to the humerus. Expects the surgeon to be able to perform arthroscopic and open surgical approaches to revise previous surgeries performed to treat recurrent anterior	Appreciates the relevance of anterior and antero-inferior labrum lesions and the necessity for proper diagnostics and there with adequate indications for treatment.	Labrum lesion Labral tear Shoulder instability Shoulder dislocation

		shoulder dislocation that have failed.		
Postero- and posteroinferior labrum lesion	Teaches the epidemiology of anterior- and anteroinferior labrum lesions and explains the pathobiomechanics. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat recurrent posterior shoulder dislocation - these include soft tissue procedures to the glenoid, bony stabilization surgeries to the glenoid (free bone grafts transfers), humeral head reconstruction and reverse-remplissage procedures to the humerus. Expects the surgeon to be able to perform arthroscopic and open surgical approaches to revise previous surgeries performed to treat recurrent posterior shoulder dislocation that have failed.	Appreciates the relevance of posterior and postero-inferior labrum lesions and the necessity for proper diagnostics and there with adequate indications for treatment.	Labrum lesion Labral tear Shoulder instability Shoulder dislocation

Chondromalacia humeral head	Defines the pathology with its multiple pathogenesis and epidemiologies. Lists the currently available classification systems such as the classifications according to: • Kellgren and Lawrence • Samilson and Pietro • Gerber • Guyet and Allain. Teaches the treatment algorithms for osteochondral lesions and cartilage wear on the humeral head. Presents the common indications, based on the present literature.	Expects the surgeon to be able to treat chondral lesions conservatively with physiotherapy and injections. Expects the surgeon to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat chondral lesions - these include debridement, micro fracturing, chondrocyte transplantation and other procedures.	Appreciates the relevance of osteochondral lesions of the humeral head and the necessity for proper diagnostics and there with adequate indications for treatment.	Chondromalacia shoulder CAM procedure Osteoarthritis shoulder Cartilage damage
Chondromalacia glenoid	Defines the pathology with its multiple pathogenesis and epidemiologies. Lists the currently available classification systems such as the classifications according to: • Kellgren and Lawrence • Samilson and Pietro • Gerber • Guyet and Allain. Teaches the treatment algorithms for osteochondral lesions and cartilage wear on the glenoid. Presents the common indications,	Expects the surgeon to be able to treat chondral lesions conservatively with physiotherapy and injections. Expects the surgeon to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat chondral lesions - these include debridement, microfracture, chondrocyte transplantation and other procedures.	Appreciates the relevance of osteochondral lesions of the glenoid and the necessity for proper diagnostics and there with adequate indications for treatment.	Chondromalacia shoulder CAM procedure Osteoarthritis shoulder Cartilage damage

	based on the present literature.			
Posterosuperior Glenoid Impingement (PSGI)	Describes the natural course. Defines the etiology (traumatic-atraumatic) Defines the symptomatology and significance. Defines the typical radiologic findings Lists conservative treatment indications. Lists surgical treatment indications. Lists possible complications and results of treatment.	Expects the surgeon to be competent in examination under anaesthesia and diagnostic arthroscopy. Recognise anatomical variations. Expects the surgeon to perform posterior labral repair and other techniques like glenoplasty or rotator cuff repair - if indicated.	Appreciates the importance and challenges of diagnosis of PSGI condition. Appreciate anatomical variations in radiological imaging and arthroscopy. Appreciate surgical anatomy relevant to open techniques.	Inlet Impingement Internal Impingement Labrum lesion Impingement
Rupture of the long head of biceps (LHB)	Teaches the epidemiology of LHB ruptures and explains the pathobiomechanics of it. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for non-operative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat ruptures of the LHB in the acute phase and afterwards. Expects the trainee to be able to supervise non-operative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to the joint to address the pathology (tenodesis, removal of intraarticular LHB stump).	Appreciates the relevance of LHB ruptures, the necessity for proper diagnostics and therewith adequate indications for treatment.	Biceps rupture Popeye sign LHB rupture Rupture long head biceps

Pulley lesions	Teaches the epidemiology of Pulley lesions and explains the pathobiomechanics of it. Teaches classifications such as the one by Habermeryer et al. (type I - IV). Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat Pulley lesions in the acute phase and afterwards. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to the joint to address the pathology (tenotomy vs. tenodesis).	Appreciates the relevance of Pulley-lesions, the necessity for proper diagnostics and therewith adequate indications for treatment.	Pulley lesion CH ligament Hidden lesion Long head biceps
Tendinitis of the long head of biceps (LHB)	Teaches the epidemiology of LHB tendinitis and explains the pathobiomechanics of it. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat LHB tendinitis in the acute phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise non-operative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to the AC-joint to address the pathology (tenotomy vs. tenodesis).	Appreciates the relevance of LHB tendinitis, the necessity for proper diagnostics and therefore adequate indications for treatment.	Sentinel sign Hourglass biceps Long head of biceps Biceps pathology Tendinitis

AC-Joint dislocation	Teaches the epidemiology of AC-joint dislocations and explains the pathobiomechanics of it. Teaches the classification according to Rockwood grade I - VI. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat AC joint dislocations in the acute phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to the AC-joint to address the pathology.	Appreciates the relevance of AC-joint dislocations, the necessity for proper diagnostics and therefore adequate indications for treatment.	AC dislocation Rockwood classification AC joint separation
AC-Joint arthritis	Teaches the epidemiology of AC-joint arthritis and explains the pathobiomechanics of it. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat AC joint arthritis in the acute phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated (e.g. injections, physiotherapy). Expects the trainee to perform arthroscopic and open surgical approaches and procedures like AC-joint resection according to Mumford or a co-plaining to address the pathology.	Appreciates the relevance of AC-joint arthritis, the necessity for proper diagnostics and therewith adequate indications for treatment.	AC joint arthritis AC pain Osteophytes Mumford

Friedrich's disease	Teaches the epidemiology of the aseptic osteonecrosis of the lateral clavicle and explains its pathomechanism. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat the osteonecrosis of the lateral clavicle in the acute phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise non-operative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to address the pathology.	Appreciates the relevance of the aseptic osteonecrosis of the lateral clavicle, the necessity for proper diagnostics and therefore adequate indications for treatment.	Necrosis AC joint AC joint Aseptic osteonecrosis
Weightlifters shoulder	Teaches the epidemiology of AC-joint lesions and explains the pathobiomechanics of a weightlifter's shoulder. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat a weightlifter's shoulder in the acute phase and afterwards. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to the AC-joint to address the pathology.	Appreciates the relevance of weightlifters' shoulder, the necessity for proper diagnostics and therefore adequate indications for treatment.	AC joint pain Painful shoulder Weightlifting shoulder

Muscle/ Tendon injuries	Teaches epidemiology, etiology and pathobiomechanics of different kinds of muscle- and tendon injuries like rotator cuff tears, ruptures at the myotendinous junction, muscle fibre injuries etc. Lists the diagnostic algorithms of clinical and imaging investigations that are necessary for the treatment algorithm. Teaches the indications for conservative and operative treatment according to the condition, recent scientific knowledge and the available literature.	Expects the surgeon to be able to treat acute muscle-tendon injuries in the acute phase and afterwards. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to address the muscle-/ tendon injury - if indicated.	Appreciates the relevance of muscle-/ and tendon injuries of the shoulder, the necessity for proper diagnostics and therewith adequate indications for treatment.	Muscle injury Tendon injury Rotator cuff tear Muscle edema Tendon trauma Muscle trauma
Sternoclavicular joint Dislocation	Teaches the epidemiology of ligamentous sternoclavicular joint dislocation and explains the pathobiomechanics. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for non-operative and operative treatment, according to the available literature.	Expects the surgeon to be able to perform surgical approaches to the sternoclavicular joint joint, its ligamentous stabilizers to - if indicated - perform refixation of these structures in the acute setting, or perform augmentation and repair in the chronic setting.	Appreciates the relevance of sternoclavicular joint instability after sternoclavicular joint dislocation, the necessity for proper diagnostics and therefore adequate indications for treatment.	Dislocation Sternoclavicular joint Refixation Physiotherapy Overhead
Osteochondral Lesion SC-joint	Defines the pathology with its pathogenesis and epidemiology. Lists the currently available classification systems and treatment algorithms for	Expects the surgeon to be able to perform surgical approaches to the sternoclavicular joint to - if indicated - perform osteochondral debridement or	Appreciates the relevance of osteochondral lesions of the sternoclavicular joint the necessity for proper diagnostics and there with adequate indications for treatment.	Osteochondral lesions Osteochondritis dissecans Sternoclavicular joint Arthritis

	osteochondral lesions. Presents the common indications, based on the present literature.	cartilage repair strategies.		
Intraarticular Disc lesion	Defines the pathology with its pathogenesis and epidemiology. Lists the currently available classification systems and shows their limitations. Offers recommendations for treatment algorithms. Presents the common indications for conservative/operative treatment, based on the present literature.	Expects the surgeon to be able to perform minimally invasive, arthroscopic and open surgical approaches to the sternoclavicular joint to - if indicated - perform repositioning, fixation and replacement	Appreciates the relevance of intraarticular disc lesion and its implications on sternoclavicular joint biomechanics, the necessity for proper diagnostics and therewith adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation or replacement.	Fracture fixation Open reduction internal fixation Intraarticular disc Lesion Anatomy

3.5 Trauma				
Proximal Humerus Fractures	Teaches the epidemiology of proximal humerus fractures and explains the pathobiomechanics of it. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment including osteosynthesis (arthroscopic fixation, K-wires, nailing, plating) and arthroplasty (hemi and reverse shoulder arthroplasty) according to the available literature. Teaches the different classifications of proximal humerus fractures with the according treatment algorithm (classification of Neer, AO, Hertel and others).	Expects the surgeon to be able to treat proximal humerus fractures in the acute phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to address the pathology.	Appreciates the relevance of proximal humerus fractures, the necessity for proper diagnostics and there with adequate indications for treatment.	Proximal humerus fracture ORIF Surgery fracture Conservative treatment humerus PHF
Fracture dislocations of the Proximal Humerus	Teaches the epidemiology of dislocation fractures of the proximal humerus and/ or glenoid and explains the pathobiomechanics of it. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment	Expects the surgeon to be able to treat dislocation fractures of the proximal humerus in the acute phase and afterwards operatively. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to address the pathology.	Appreciates the relevance of dislocation fractures of the proximal humerus, the necessity for proper diagnostics and there with adequate indications for treatment.	ORIF Reverse Arthroplasty Proximal Humeral Plating Proximal Humeral Nailing

	including osteosynthesis (arthroscopic fixation, fixation with screws, nailing, plating) and arthroplasty (hemiarthroplasty and reverse shoulder arthroplasty) according to the available literature. Teaches the different classifications of proximal humerus fractures with the according treatment algorithm (classification of Neer, AO, Hertel and others).			
Glenoid Fractures	Teaches the epidemiology of glenoid fractures and explains the pathobiomechanics of it. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment including osteosynthesis (arthroscopic fixation, fixation with screws, plating) and arthroplasty (reverse shoulder arthroplasty with bone grafting of the glenoid - if indicated) according to the available literature. Teaches the Ideberg classification with the according	Expects the surgeon to be able to treat glenoid fractures in the acute phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to address the pathology.	Appreciates the relevance of glenoid fractures, the necessity for proper diagnostics and there with adequate indications for treatment.	Glenoid fractures Conservative treatment Arthroscopy Fixation glenoid Open surgery

	treatment algorithm.			
Scapula Fractures	Teaches the epidemiology of scapula fractures and explains the pathobiomechanics of it. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment including osteosynthesis (arthroscopic fixation, fixation with screws, plating) according to the available literature. Teaches the Ideberg classification with the according treatment algorithm.	Expects the surgeon to be able to treat scapula fractures in the acute phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures to address the pathology.	Appreciates the relevance of scapula fractures, the necessity for proper diagnostics and there with adequate indications for treatment.	Scapula fractures Nonoperative Treatment Arthroscopy Glenoid Fixation Open Surgery
Clavicle Fractures	Teaches the epidemiology of clavicle fractures and explains the pathobiomechanics of it. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment including osteosynthesis	Expects the surgeon to be able to treat clavicle fractures in the acute phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment following the acute treatment - if indicated. Expects the trainee to perform	Appreciates the relevance of clavicle fractures, the necessity for proper diagnostics and there with adequate indications for treatment.	Clavicle fractures Nonoperative Treatment Plating Intramedullary Nails Clavicle ORIF Open surgery

	(arthroscopic fixation, fixation with tight-rope, fixation with screws/ nails, plating) according to the available literature. Teaches the different classifications (Robinson, Allman, AO, Neer & Rockwood, Jaeger and others) with the according treatment algorithm.	arthroscopic and open surgical approaches and procedures to address the pathology.		
3.6 Developmental Disorders				
Multidirectional Instability	Teaches the aetiology of multidirectional instability including issues of collagen disorder, repetitive microtrauma and muscle patterning including Stanmore triangle. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to perform conservative treatment as well as minimally invasive, arthroscopic and open surgical approaches to the unstable glenohumeral joint regarding labral repair, capsular repair & capsular repair. Awareness of revision and salvage procedures.	Appreciates the relevance of multidirectional instability, the necessity for proper diagnostics and there with adequate indications for treatment.	Shoulder instability Hyperlax shoulder Unstable shoulder
Erb Palsy	Teaches the epidemiology of Erb's palsy and risk factors e.g. obstetrical shoulder dystocia, avoidance, early identification and treatment. Understand the anatomy of the brachial plexus and relevant lesion of C5/6 and resultant deficit. Understand relevant imaging.	Expects the surgeon to appreciate the importance of qualified prolonged physiotherapy. Ability to perform an informative examination under anaesthesia & diagnostic arthroscopy. Ability to perform appropriate labral repair, and capsular repair/plication. Appreciates revision	Appreciates the relevance of Erb palsy, the necessity for proper diagnostics and there with adequate indications for treatment.	Plexus injury Upper limb injury Nerve damage

	Understand indications for interventions including nerve transfer, subscapularis lengthening and latissimus transfer. Understand long-term sequelae and treatment of secondary degenerative conditions.	procedures/salvage procedures.		
Scapula alata	Understands common forms of scapular winging and causes. Understands common causes of medial winging (serratus weakness due to long thoracic nerve palsy) and lateral winging (due to spinal accessory nerve palsy) and other causes of more global peri - scapular weakness due to more generalised muscular dystrophy such as fascioscapulohumeral dystrophy (FSHD). Understands relevant investigations including electrophysiological testing, genetic testing and specialized neurological testing. Understands non-operative and operative intervention including neurolysis, tendon transfer and scapulothoracic arthrodesis.	Expects the surgeon to be able to supervise prolonged physiotherapy. Ability to refer the patient appropriately for neurolysis if indicated. Knowledge of tendon transfer options and scapulothoracic arthrodesis.	Appreciates the relevance of Scapula alata, the necessity for proper diagnostics and there with adequate indications for treatment.	Winging scapula Serratus anterior Palsy Shoulder Blade

Scapula dyskinesia	Teaches the epidemiology of scapular dyskinesia and explains the pathomechanics. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature. Understands the differences between primary and secondary scapular dyskinesia.	Expects the surgeon to be able to perform minimally invasive, arthroscopic and open surgical approaches to resolve issues causing scapular dyskinesia such as rotator cuff lesions or stiffness. In rare cases have awareness of solutions to primary scapular dyskinesia refractory to non-operative treatment such as scapulothoracic arthroscopy	Appreciates the relevance of scapula dyskinesia, the necessity for proper diagnostics and there with adequate indications for treatment.	Kibler classification Dyskinesia shoulder Dysbalance shoulder Scapulothoracic Abnormal Motion (STAM)
3.7 Inherent/ Growth associated				
Dysplasia of the glenoid	Teaches the epidemiology of glenoid dysplasia and explains the pathomechanics and Classification as the one by Walch et al.. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat the dysplastic glenoid in the early phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures like corrective osteotomies, capsular shifts and other soft tissue procedures as well as shoulder replacement surgery to address the pathology.	Appreciates the relevance of glenoid dysplasia, the necessity for proper diagnostics and therefore adequate indications for treatment.	Dysplastic glenoid Type C glenoid Bone loss glenoid

Dysplasia of the proximal humerus	Teaches the epidemiology of humeral dysplasia and explains the pathomechanics. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat the dysplastic proximal humerus in the early phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures like corrective osteotomies, capsular shifts and other soft tissue procedures as well as shoulder replacement surgery to address the pathology.	Appreciates the relevance of humeral dysplasia, the necessity for proper diagnostics and therefore adequate indications for treatment.	Dysplastic humeral head Bone loss proximal humerus Deformity proximal humerus
Adhesive capsulitis/ Frozen shoulder	Teaches the epidemiology of adhesive capsulitis and explains the pathomechanics as well as possible risk factors. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat adhesive capsulitis in the early phase and afterwards conservatively. Expects the trainee to be able to supervise conservative treatment like intraarticular or oral steroid medication - if indicated. Expects the trainee to perform arthroscopic procedures like arthrolysis to address the pathology.	Appreciates the relevance of adhesive capsulitis, the necessity for proper diagnostics and therefore adequate indications for treatment.	Capsulitis Shoulder Stiffness Frozen Shoulder Nonoperative Steroid Treatment

Osteochondrosis dissecans glenoid (OD)	Teaches the epidemiology of and explains the pathomechanics of OD and possible risk factors. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat OD in the early phase and afterwards conservatively. Expects the trainee to be able to supervise conservative treatment like intraarticular or oral cortisone medication - if indicated. Expects the trainee to perform arthroscopic procedures like arthrolysis to address the pathology.	Appreciates the relevance of OD, the necessity for proper diagnostics and therefore adequate indications for treatment.	Joint mouse Chondral lesion Cartilage defect Arthroscopy Loose body
Osteochondrosis dissecans proximal humerus (OD)	Teaches the epidemiology of and explains the pathomechanics of OD and possible risk factors. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for conservative and operative treatment, according to the available literature.	Expects the surgeon to be able to treat OD in the early phase and afterwards conservatively. Expects the trainee to be able to supervise conservative treatment like intraarticular or oral cortisone medication - if indicated. Expects the trainee to perform arthroscopic procedures like arthrolysis to address the pathology.	Appreciates the relevance of OD, the necessity for proper diagnostics and therefore adequate indications for treatment.	Joint mouse Chondral lesion Cartilage defect Arthroscopy Loose body
3.8 Caused by medical interventions				
Chondral lesion	Lists medical interventions that may damage the cartilage and may cause chondrolysis, diagnostic work-up to exclude other	Expects the surgeon to be able to recognize possible causes of cartilage damage due to medical intervention, avoid	Appreciates the relevance of cartilage damage and the necessity for proper intraoperative manipulation and	Osteoarthritis shoulder Loose bodies Osteophytes Surgery

	pathologies, precautions, and treatment options.	them, and treat cartilage damage with joint preservation and cartilage restoration procedures or open surgical approaches.	skills to avoid them, diagnostics and therewith indications for treatment.	
Infection	Teaches the epidemiology, and etiology of postoperative infections and possible causes. Lists the diagnostic algorithms of clinical, laboratory and imaging investigations assessing postoperative infections (acute and chronic). Lists the exams, and culture analysis needed to identify the pathogen microorganism of the infection. Knows the indications and the time for operative treatment, the steps for the surgical procedure and the devices available (spacer, cement, prosthesis) according to the available literature.	Expects the surgeon to be able to treat the postoperative infection in the early phase and afterwards conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment - if indicated. Expects the trainee to perform arthroscopic and open surgical approaches and procedures articular debridement, capsular release, synovectomy and other soft tissue procedures.	Appreciates the relevance of post-op infection, the necessity for proper diagnostics and therefore adequate indications for treatment.	CRP Surgery Antibiotics Bacteria
Osteonecrosis	Lists medical interventions that may cause osteonecrosis, clinical evaluation and diagnosis, classifications and treatment options.	Expects the surgeon to be able to avoid medical interventions that may cause osteonecrosis, and perform surgical approaches for the treatment of osteonecrosis.	Appreciates the relevance of osteonecrosis, the necessity for proper diagnostics and therefore adequate indications for treatment.	Avascular necrosis Cruess classification Humeral Head Collapse Shoulder Arthroplasty

Non-Unions	Lists possible causes of fracture-non-union after conservative or operative treatment. Lists possible risk factors. Lists the diagnostic algorithms of clinical and imaging investigations. Recognizes septic non-union, precautions, and treatment options.	Expects the surgeon to be able to predict factors that may lead to non-union or septic non-union, and to be able to treat non-union.	Appreciates the relevance of non-union, the necessity for proper diagnostics and therewith adequate indications for treatment.	Pseudarthrosis Non-healing Revision surgery Infection
3.9 Inflammatory/ Systemic diseases/ bone metabolism				
Rheumatoid diseases (RA)	Teaches the diagnostic criteria for RA as well as the pathomechanism of the disease. Explains the pharmacologic treatment of RA. Explains how the shoulder joint may be involved in this condition with its characteristics and the prognosis. Lists the indications of surgical and nonsurgical treatment.	Expects the trainee to be able to treat rheumatoid arthritic conditions of the shoulder and surrounding structures conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment - if indicated. Expects the trainee to perform arthroscopic and open procedures to address the pathology.	Appreciates the relevance of RA, the necessity for proper diagnostics and therefore adequate indications for treatment.	Rheumatoid arthritis Rheumatoid shoulder Shoulder arthroplasty Synovialitis Joint destruction
Pigmented villonodular synovitis (PVNS)	Teaches the diagnostic criteria for PVNS as well as the pathomechanism of the disease. Explains how the shoulder joint may be involved in this condition with its characteristics and the prognosis. Lists the indications of surgical and	Expects the trainee to be able to treat PVNS of the shoulder conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment - if indicated. Expects the trainee to perform arthroscopic and	Appreciates the relevance of PVNS, the necessity for proper diagnostics and therefore adequate indications for treatment.	Shoulder tumor PVNS Synovialitis Joint destruction

	nonsurgical treatment.	open procedures to address the pathology.		
Synovitis	Teaches the diagnostic criteria for synovitis as well as the pathomechanism of the disease. Explains how the shoulder joint may be involved in this condition with its characteristics and the prognosis. Lists the indications of surgical and nonsurgical treatment.	Expects the trainee to be able to treat synovitis of the shoulder conservatively as well as operatively. Expects the trainee to be able to supervise non-operative treatment - if indicated. Expects the trainee to perform arthroscopic and open procedures to address the pathology.	Appreciates the relevance of synovitis, the necessity for proper diagnostics and therefore adequate indications for treatment.	Synovitis Joint inflammation Joint destruction
Bursitis	Teaches the diagnostic criteria for bursitis as well as the pathomechanism of the disease. Explains how the shoulder joint may be involved in this condition with its characteristics and the prognosis. Lists the indications of surgical and nonsurgical treatment.	Expects the trainee to be able to treat bursitis of the shoulder conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment - if indicated. Expects the trainee to perform arthroscopic and open procedures to address the pathology.	Appreciates the relevance of bursitis, the necessity for proper diagnostics and therefore adequate indications for treatment.	Subacromial space Shoulder pain Subacromial injection
3.10 Degenerative				

Osteoarthritis	Defines the pathology with its multiple pathogenesis and epidemiologies. Lists the currently available classification systems such as the classifications according to: • Kellgren and Lawrence • Samilson and Pietro • Gerber • Guyet and Allain. Teaches the treatment algorithms for osteoarthritis of the shoulder joint. Presents the common indications, based on the present literature.	Expects the surgeon to be able to treat osteoarthritis of the shoulder joint conservatively with physiotherapy, injections and others. Expects the surgeon to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat the condition - these include arthroscopic CAM procedures up to shoulder replacement surgery.	Appreciates the relevance of osteoarthritis of the shoulder joint and the necessity for proper diagnostics and there with adequate indications for treatment.	OA shoulder Arthroplasty shoulder joint Kellgrence and Lawrence Painful shoulder Limited ROM
Loose bodies	Teaches the diagnostic criteria for loose bodies as well as the pathomechanism of the disease. Explains how the shoulder joint may be involved in this condition with its characteristics and the prognosis. Lists the indications of surgical and nonsurgical treatment.	Expects the trainee to be able to treat loose bodies of the shoulder conservatively as well as operatively. Expects the trainee to be able to supervise conservative treatment - if indicated. Expects the trainee to perform arthroscopic and open procedures to address the pathology.	Appreciates the relevance of loose bodies, the necessity for proper diagnostics and therewith adequate indications for treatment.	Osteoarthritis shoulder Arthroscopy Cartilage wear
Stiffness	Teaches the diagnostic criteria for shoulder stiffness based on degenerative conditions as well as the pathomechanism of the disease. Explains	Expects the trainee to be able to treat degenerative stiffness of the shoulder conservatively as well as operatively. Expects the trainee to be able to	Appreciates the relevance of degenerative stiffness, the necessity for proper diagnostics and therewith adequate indications for treatment.	Painful shoulder Frozen shoulder Adhesive capsulitis

	how the shoulder joint may be involved in this condition with its characteristics and the prognosis. Lists the indications of surgical and nonsurgical treatment.	supervise conservative treatment - if indicated. Expects the trainee to perform arthroscopic and open procedures to address the pathology.		
Chondromalacia humeral head	Defines the pathology with its multiple pathogenesis and epidemiologies. Lists the currently available classification systems such as the classifications according to: • Kellgren and Lawrence • Samilson and Pietro • Gerber • Guyet and Allain. Teaches the treatment algorithms for chondromalacia of the humeral head. Presents the common indications, based on the present literature.	Expects the surgeon to be able to treat chondral lesions conservatively with Physiotherapy and Injections. Expects the surgeon to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat chondral lesions - these include debridement, microfracture, chondrocyte transplantation and other procedures like AMIC.	Appreciates the relevance of osteochondral lesions of the humeral head and the necessity for proper diagnostics and there with adequate indications for treatment.	Loose bodies Osteoarthritis CAM Procedure Shoulder arthroscopy Shoulder arthroplasty
Chondromalacia glenoid	Defines the pathology with its multiple pathogenesis and epidemiologies. Lists the currently available classification systems such as the classifications according to: • Kellgren and Lawrence • Samilson and Pietro • Gerber • Guyet and Allain.	Expects the surgeon to be able to treat chondral lesions conservatively with Physiotherapy and Injections. Expects the surgeon to perform arthroscopic and open surgical approaches and procedures to the shoulder joint to treat chondral lesions - these include debridement,	Appreciates the relevance of osteochondral lesions of the humeral head and the necessity for proper diagnostics and there with adequate indications for treatment.	Loose bodies Osteoarthritis CAM Procedure Shoulder arthroscopy Shoulder arthroplasty

	Teaches the treatment algorithms for chondromalacia on the glenoid. Presents the common indications, based on the present literature.	microfracture, chondrocyte transplantation and other procedures like AMIC.		
4. Shoulder Non-Operative				
4.1 Physical Therapy				
Physiotherapy	Teaches the trainee the principles of physiotherapy for the different shoulder conditions including the effect on the different soft tissues (tendons and ligaments, muscles), bones and neuro-vascular structures. The trainee should be aware of the different indications and techniques of physiotherapy.	Expects the trainee to be able to refer patients to physiotherapy - if indicated.	Appreciates the relevance of the potential positive impact of physiotherapy on different shoulder pathologies.	Physiotherapy shoulder joint Shoulder Mobilisation Shoulder Stretching
Ergotherapy	Teaches the trainee the principles of ergotherapy for the different shoulder conditions including the effect on the different soft tissues (tendons and ligaments, muscles), bones and neuro-vascular structures. The trainee should be aware of the different indications and techniques of ergotherapy.	Expects the trainee to be able to refer patients to ergotherapy - if indicated.	Appreciates the relevance of the potential positive impact of ergotherapy on different shoulder pathologies.	Ergotherapy shoulder Shoulder training Upper limb rehab
Massage	Teaches the trainee the principles of massage for the different shoulder conditions including the effect on the different soft tissues (tendons and	Expects the trainee to be able to refer patients to massage - if indicated.	Appreciates the relevance of the potential positive impact of massage on different shoulder pathologies.	Massage shoulder joint Shoulder Mobilization Muscle relaxation

	ligaments, muscles), bones and neuro-vascular structures. The trainee should be aware of the different indications and techniques of massage.			
Manual therapy	Teaches the trainee the principles of manual therapy for the different shoulder conditions including the effect on the different soft tissues (tendons and ligaments, muscles), bones and neuro-vascular structures. The trainee should be aware of the different indications and techniques of manual therapy.	Expects the trainee to be able to refer patients to manual therapy - if indicated.	Appreciates the relevance of the potential positive impact of manual therapy on different shoulder pathologies.	Manual therapy shoulder Shoulder training Upper limb rehab
Lymph drainage	Teaches the trainee the principles of lymph drainage for the different shoulder conditions including the effect on the different soft tissues (tendons and ligaments, muscles), bones and neuro-vascular structures. The trainee should be aware of the different indications and techniques of lymph drainage.	Expects the trainee to be able to refer patients to lymph drainage - if indicated.	Appreciates the relevance of the potential positive impact of lymph drainage on different shoulder pathologies.	Lymph drainage shoulder Swelling upper limp Venous insufficiency
4.2 Physical Immobilisation/ Orthoses, Prosthesis etc.				
Splints	Teaches the surgeon the principles behind the correct use of splints for immobilisation and assisted mobilization techniques. The surgeon should be aware of different protocols, length of	Expects the surgeon to be able to perform a correct placement of shoulder splints understanding the importance of adequate padding to avoid pressure sores.	Is aware of the relevance of splints in the acute and chronic treatment of shoulder pathologies.	Splinting upper limb Conservative treatment Additional post-op procedure

	therapy and possible complications.			
Orthoses	Teaches the surgeon the principles behind the correct use of orthoses for immobilisation and assisted mobilization. The surgeon should be aware of different protocols, length of therapy and possible complications.	Expects the surgeon to be able to perform a correct placement of shoulder orthoses understanding the importance of adequate padding to avoid pressure sores.	Is aware of the relevance of orthoses in the acute and chronic treatment of shoulder pathologies.	Orthoses upper limb Conservative treatment Additional post-op procedure
Casts	Teaches the surgeon the principles behind the correct use of casts for immobilisation. The surgeon should be aware of different protocols, length of therapy and possible complications.	Expects the surgeon to be able to perform a correct placement of shoulder casts understanding the importance of adequate padding to avoid pressure sores.	Is aware of the relevance of casts in the acute and chronic treatment of shoulder pathologies.	Casts upper limb Conservative treatment Additional post-op procedure
Braces	Teaches the surgeon the principles behind the correct use of braces for immobilisation. The surgeon should be aware of different protocols, length of therapy and possible complications.	Expects the surgeon to be able to perform a correct placement of shoulder braces understanding the importance of adequate padding to avoid pressure sores.	Is aware of the relevance of braces in the acute and chronic treatment of shoulder pathologies.	Braces upper limb Conservative treatment Additional post-op procedure
4.3 Pain Relief Therapy				
Systemic pain therapy (oral)	Teaches the surgeon about the different available oral pain medications. Surgeon should be aware of the analgesic ladder to support different degrees of pain level according to WHO standards. The surgeon should understand the basics of pharmacology,	Expects the surgeon to adequately treat shoulder pain for different conditions with or without surgery.	Is aware of the high relevance of oral systemic pain therapy in the acute and chronic treatment of shoulder pathologies.	Pain killer Pain medication Morphine NSAR Cortisone WHO scheme

	interactions and side effects of different pain medications including but not limited to non-opioid analgesics (aspirin, acetaminophen, NSAIDs -selective and non-selective), weak opioids, strong opioids and the use of adjuvants with opioid therapy.			
Systemic pain therapy (intravenous)	Teaches the surgeon about the different available intravenous pain medications. Surgeon should be aware of the analgesic ladder to support different degrees of pain level according to WHO standards. The surgeon should understand the basics of pharmacology, interactions and side effects of different pain medications including but not limited to non-opioid analgesics (aspirin, acetaminophen, NSAIDs -selective and non-selective), weak opioids, strong opioids and the use of adjuvants with opioid therapy.	Expects the surgeon to adequately treat shoulder pain for different conditions with or without surgery.	Is aware of the high relevance of intravenous systemic pain therapy in the acute and chronic treatment of shoulder pathologies.	Pain killer Pain medication Morphine NSAR Steroids WHO scheme
Injections	Teaches the surgeon the principles behind injections. This should include understanding the pharmaceutical knowledge of the injected products medication, the	Expects the surgeon to be able to perform a safe injection around the shoulder, emphasizing the use of a sterile technique and understanding the	Is aware of the high relevance of injections in the acute and chronic treatment of shoulder pathologies.	Shoulder injection subacromial Shoulder injection capsule Shoulder injection subacromial

	indications, contraindications and management of possible adverse reactions and complications. Surgeon should be aware of the specific techniques for injection including the importance of appropriate sterility techniques and the use of adjuvant imaging techniques.	availability of imaging techniques to increase the precision of the injection.		
Pain catheters	Teaches the surgeon the principles behind the safe use of pain catheters, including care of catheters, the different medications used and existing pain protocols. The surgeon should be knowledgeable about the possible complications of catheter therapy.	Expects the surgeon to be able to safely use pain catheters for pain management.	Is aware of the high relevance of pain catheters in the acute and chronic treatment of shoulder pathologies.	Interscalene catheter Pain therapy Post-op pain management
4.4 Non-Operative Fracture Treatment				
Immobilization	Teaches the surgeon the principles behind immobilisation techniques. The surgeon needs to understand the possible complications and how to avoid and detect them.	Expects the surgeon to be able to adequately immobilize a shoulder joint understanding the importance of adequate padding to avoid pressure sores.	Is aware of the high relevance of immobilization in the acute and chronic treatment of shoulder pathologies.	Postoperative therapy Splinting, bracing, orthoses
Physiotherapy	Teaches the trainee the principles of physiotherapy for conservative treatment of shoulder fractures. The trainee should be aware of the different indications	Expects the trainee to be able to refer patients to physiotherapy.	Appreciates the relevance of the potential positive impact of physiotherapy on conservative fracture treatment of the shoulder.	Physiotherapy shoulder joint Mobilisation shoulder Stretching shoulder

	and techniques of physiotherapy.			
5. Shoulder Operative				
5.1 Arthroscopy				
Diagnostic arthroscopy	Teaches the indications for Diagnostic arthroscopy and explains the principles of doing it Lists the anatomical landmarks, the position of the patient, standard portals, and normal steps to evaluate the anatomical structures recognizing the normal or the pathologic one	Expects the surgeon to be able to perform the arthroscopically evaluation of all the structures in the subacromial space and the intraarticular area.	Appreciates the normal anatomy and structures, the anatomical variants and the pathologic	Arthroscopy shoulder Diagnosis shoulder Arthroscopic treatment shoulder
Ligament repair	Teaches the indications for ligament repair and explain the principles. List the normal structures and the pathologic anatomy of the shoulder ligaments and the techniques to repair them	Expects the surgeon to be able to perform the most common techniques to repair the ligaments arthroscopically. Patient positioning, portals and techniques to repair the capsulolabral lesions	Appreciates the labrum tears, the ligament lesions of the anteroinferior glenohumeral ligament, and how to repair them	Repair of ligamentous structures Direct ligament repair Indirect ligament repair
Tendon repair	Teaches the indications for rotator cuff tears and explains the different types of them. List the normal and pathologic anatomy of the shoulder tendons and the techniques to repair the tendons arthroscopically	Expects the surgeon to be able to perform the technique to repair anatomically or partially the tendon tears arthroscopically. Patient positioning, portals and techniques to repair the cuff tears	Appreciates the cuff tears, all the different types of tears degenerative, traumatic, how and when to treat them	Rotator cuff repair Suture anchors Sutures Repair techniques

Removal of loose bodies	Teaches the indications for loose bodies removal. List the cause and the type of loose bodies	Expects the surgeon to be able to perform the removal of all the loose bodies arthroscopically	Appreciates the normal arthroscopically anatomy of the shoulder, The intraarticular space, the inferior recess and the subscapularis recess where the loose bodies frequently are	Arthroscopy Open surgery Arthritis
Cartilage treatment	Teaches the indications for treatment of chondral lesions of the glenoid and the humeral head and explain them related to the ICRS classification. List the techniques to treat them.	Expects the surgeon to be able to perform the basic treatments of the chondral lesions	Appreciates the normal arthroscopically anatomy of the shoulder, The evaluation of the integrity of the joint surface and the normal cartilage	CAM procedure AMIC Minced cartilage
Removal of osteophytes	Teaches the indications for removal of the osteophytes in osteoarthritis.	Expects the surgeon to be able to perform the resection of the osteophytes arthroscopically	Appreciates the osteophytes inferiorly to the humeral head and the degree of osteoarthritis	CAM procedure Arthroscopy Arthritis
Arthrolysis	Teaches the indications for arthrolysis in case of stiffness of the joint, case of capsulitis / frozen shoulder, and posttraumatic stiffness/ arthrofibrosis.	Expects the surgeon to be able to perform the circumferential arthrolysis resection of the capsule, starting from the rotator cuff interval.	Appreciates the capsulitis, arthrofibrosis,	Arthroscopy Open surgery Inflammation Stiffness
Synovectomy	Teaches the indications for synovectomy, knowledge of the most important pathology that involves the synovia	Expects the surgeon to be able to perform the synovectomy arthroscopically assisted, using standard portals or accessories portals to reach all the areas of the joint and perform a complete synovectomy	Appreciates the different types of synovia, normal and pathological	Arthroscopy Open surgery Synovialectomy

Fracture treatment	Teaches the indications for treating the intraarticular fractures of the glenoid, and of the humeral head. Teaches the indication also of extraarticular fractures like Greater tuberosity avulsion,	Expects the surgeon to be able to perform the reduction and fixation of the most common fractures of the anteroinferior posteroinferior of the glenoid, and the fractures involving the greater tuberosity	Appreciates the different types of glenoid fractures and classifications. The different types of fractures of the tuberosities	Open surgery Arthroscopy Conservative treatment Nail Plate Arthroplasty
5.2 Reconstructive Procedures				
Open fracture treatment	Teaches the candidate the possibilities and limitations of open fracture treatment. Teaches the different techniques that can be used to fix fractures - pinning, screw fixation, plate and screw fixation, osteosuturing	Expects the surgeon to be able to perform the commonly available open surgical approaches to the shoulder joint, that are necessary for adequate open fracture repair.	Is aware of the high relevance of adequate open fracture treatment for patients' quality of life and its high impact on socioeconomic costs.	Shoulder fracture Osteosynthesis shoulder Shoulder replacement
Open ligament repair	Teaches the candidate the possibilities and limitations of open ligament repair. Teaches the different techniques that can be used for ligament repair: transosseus fixation, ligament-to-ligament repair, and anchor treatment. Knowledge of the location of the ligaments around the shoulder joint.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the shoulder joint, that are necessary for adequate open ligament repair.	Is aware of the high relevance of adequate open ligament repair for patients' quality of life and its high impact on socioeconomic costs.	Open reconstruction shoulder Open ligament surgery Ligament repair
Open tendon repair	Teaches the candidate the possibilities and limitations of open tendon repair or partial repair. Teaches the different techniques that can be used for tendon repair: transosseus	Expects the surgeon to be able to perform the commonly available open surgical approaches to the shoulder joint, that are necessary for adequate open tendon repair.	Is aware of the high relevance of adequate open tendon repair for patients' quality of life and its high impact on socioeconomic costs.	Open reconstruction tendon Open rotator cuff repair Rotator cuff

	fixation, tendon-to-bone fixation, tendon-to-tendon repair, and anchor treatment. Knowledge of the location of the tendons around the shoulder joint.			
Open stabilization procedures	Teaches the candidate the possibilities and limitations of open stabilization procedures. Teaches the different approaches (anterior and posterior) and procedures that can be used for tendon repair: e.g. soft-tissue reconstruction (Bankart-repair, capsular shift, remplissage) and bone reconstruction (Latarjet, iliac crest, allografts).	Expects the surgeon to be able to perform the commonly available open surgical approaches and procedures to address instability of the shoulder joint.	Is aware of the high relevance of adequate open stabilization procedures for patients' quality of life and its high impact on socioeconomic costs.	Open Bankart repair Open capsule shift Latarjet Bone block
Open arthrolysis	Teaches the candidate the possibilities and limitations of open arthrolysis procedures. Teaches the different techniques and approaches (anterior-posterior).	Expects the candidate to be able to perform the commonly available open surgical approaches and techniques to the shoulder joint, that are necessary for adequate open joint arthrolysis.	Is aware of the high relevance of adequate open joint release for patients' quality of life and its high impact on socioeconomic costs.	Open capsulectomy Capsule release Capsule incision
5.3 Osteotomies				
Corrective Osteotomy prox. humerus	Teaches the surgeon the possibilities and limitations of corrective osteotomies of the proximal humerus. Teaches the surgeon how to make a pre-op planning (with or without 3D measurements) different techniques	Expects the surgeon to be able to perform the commonly available open surgical approaches to the shoulder joint, that are necessary for adequate corrective humerus osteotomies.	Is aware of the potentially high relevance of adequate corrective osteotomy of the proximal humerus for patients' quality of life.	Rotational osteotomy Open wedge osteotomy Closing wedge osteotomy

	(open wedge, closing wedge) (with or without a 3D guide), approaches and fixation techniques.			
Corrective Osteotomy dist. humerus	Teaches the surgeon the possibilities and limitations of corrective osteotomies of the distal humerus. Teaches the surgeon how to make a pre-op planning (with or without 3D measurements) different techniques (open wedge, closing wedge) (with or without a 3D guide), approaches and fixation techniques.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the shoulder joint, that are necessary for adequate corrective humerus osteotomies.	Is aware of the potentially high relevance of adequate corrective osteotomy of the distal humerus for patients' quality of life.	Rotational osteotomy Open wedge osteotomy Closing wedge osteotomy
Corrective osteotomy glenoid	Teaches the surgeon the possibilities and limitations of corrective osteotomies of the glenoid. Teaches the surgeon how to make a pre-op planning (with or without 3D measurements) different techniques (open wedge, closing wedge) (with or without a 3D guide), approaches and fixation techniques.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the shoulder joint, that are necessary for adequate corrective glenoid osteotomies.	Is aware of the potentially high relevance of adequate corrective osteotomy of the glenoid for patients' quality of life.	Corrective anterior osteotomy glenoid Corrective posterior osteotomy glenoid Open wedge osteotomy Closing wedge osteotomy
5.4 Osteosyntheses				

Proximal humerus fractures	Teaches the surgeon the possibilities and limitations of osteosynthesis of proximal humerus fractures. The surgeon is taught the different techniques (plate and screw fixation, screw fixation, nail fixation, sutures fixation or k-wires depending on the type of fracture. The surgeon is taught the step-by-step approach how to reconstruct the intra-articular fragments in case of intra-articular fractures. The surgeon is taught the advantages and disadvantages of different surgical approaches (deltopectoral, deltoid split, MIPO, posterior approach).	Expects the surgeon to be able to perform the commonly available open surgical approaches to the proximal humerus, that are necessary for adequate fracture repair.	Is aware of the high relevance of adequate proximal humerus fractures repair for patients' quality of life and its high impact on socioeconomic costs.	Osteosyntheses Proximal Humerus Fractures Plate Nail Arthroplasty Approach Fixation
Glenoid fractures	Teaches the surgeon the possibilities and limitations of osteosynthesis of glenoid fractures. The surgeon is taught the different techniques (plate and screw fixation or screws fixation). The surgeon is taught the step-by-step approach how to reconstruct the intra-articular fragments in case of intra-articular fractures. The surgeon is taught the advantages and disadvantages of different surgical	Expects the surgeon to be able to perform the commonly available open surgical approaches to the glenoid, that are necessary for adequate dislocation fracture repair.	Is aware of the high relevance of adequate glenoid fractures repair for patients' quality of life and its high impact on socioeconomic costs.	Osteosyntheses Glenoid Fractures Indication Plate Arthroplasty Approach Fixation

	approaches (deltopectoral and posterior approach).			
Scapula fractures	Teaches the surgeon the possibilities and limitations of osteosynthesis of scapula fractures. The surgeon is taught the different techniques (plate and screw fixation, plate contouring and plate position) depending on the type of fracture. The surgeon is taught the advantages and disadvantages of different surgical approaches (Judet, Modified Judet, posterior approach).	Expects the surgeon to be able to perform the commonly available open surgical approaches to the scapula joint, that are necessary for adequate fracture repair.	Is aware of the high relevance of adequate scapula fractures repair for patients' quality of life and its high impact on socioeconomic costs.	Osteosyntheses Scapula Fractures Indication Approach Fixation
Clavicle fractures	Teaches the surgeon the possibilities and limitations of osteosynthesis of clavicle fractures. The surgeon is taught the different techniques (plate and screw fixation, tension band, intramedullary nails or suture fixation) and their different indications.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the clavicle, that are necessary for adequate fracture repair.	Is aware of the high relevance of adequate clavicle fractures repair for patients' quality of life and its high impact on socioeconomic costs.	Osteosyntheses Clavicle Fractures Indication Plate Intramedullary pin Approach Fixation
Dislocation fractures	Teaches the surgeon the possibilities and limitations of osteosynthesis of dislocation fractures. Teaches the surgeon closed and open reduction techniques for the dislocation. Teaches	Expects the surgeon to be able to perform the commonly available open surgical approaches to the shoulder joint, that are necessary for adequate dislocation fracture repair.	Is aware of the high relevance of adequate dislocation fracture repair for patients' quality of life and its high impact on socioeconomic costs.	Osteosyntheses Dislocation Fractures Plate Nail Arthroplasty Approach Fixation

	the surgeon a step-by-step approach to stabilize the glenohumeral joint with different osteosynthesis techniques.			
5.5 Resections				
AC-Joint resection	Teaches the candidate the indications and contra-indications for AC joint resection. Teaches pre-operative assessment both clinical and radiological. Teaches the candidate open surgical and arthroscopic techniques. Teaches post-operative treatment. Teaches complications related to the procedure	Expects the surgeon to be able to perform adequate pre-operative assessment and planning. Be competent in open and arthroscopic techniques. Be aware of complications and prevention of same.	Appreciates the relevance of AC joint resection the necessity for proper diagnostics, adequate assessment and the importance of careful surgical technique and rehabilitation.	Mumford AC resection Arthroscopy AC joint Open AC resection
SC-Joint resection	Teaches the candidate the indications and contra-indications for SC joint resection. Teaches pre-operative assessment both clinical and radiological. Teaches the candidate open surgical technique and the importance of adjacent vascular structures. Teaches post-operative treatment. Teaches complications related to the procedure	Expects the surgeon to be able to perform adequate pre-operative assessment and planning. Be aware of surgical technique. Be aware of complications and prevention of same.	Appreciates the relevance of SC joint resection the necessity for proper diagnostics, adequate assessment and the importance of careful surgical technique and rehabilitation.	SC resection Open AC resection

Humeral Head resection	Teaches the candidate the indications and contra-indications for humeral head resection. Teaches pre-operative assessment both clinical and radiological. Teaches the candidate open surgical techniques. Teaches post-operative treatment. Teaches complications related to the procedure	Expects the surgeon to be able to perform adequate pre-operative assessment and planning. Be aware of surgical technique. Be aware of complications and prevention of same.	Appreciates the relevance of humeral head resection the necessity for proper diagnostics, adequate assessment and the importance of careful surgical technique and rehabilitation.	Necrosis Infection Replacement Girdle stone Sine-sine situation
Proximal Humerus resection	Teaches the candidate the indications and contra-indications for proximal humerus resection. Teaches pre-operative assessment both clinical and radiological. Teaches the candidate open surgical techniques. Teaches post-operative treatment. Teaches complications related to the procedure	Expects the surgeon to be able to perform adequate pre-operative assessment and planning. Be aware of surgical technique. Be aware of complications and prevention of same.	Appreciates the relevance of proximal humerus resection. The necessity for proper diagnostics, adequate assessment and the importance of careful surgical technique and rehabilitation.	Necrosis Infection Replacement Girdlestone Resection arthroplasty

5.6 Endoprosthetics				
Anatomic Total shoulder arthroplasty	Understands the history of the development of the design of anatomical TSR. Understands material properties of components including stem, humeral head bearing surfaces, and glenoid component. Understand concepts and the effect of design on biomechanics including humeral head size, offset, and version. Be proficient in preoperative assessment including necessary radiological assessment and preoperative planning.	Expects the surgeon to be able to understand the indications and limitations of Anatomical TSA. Understand limitations and contraindications. Perform adequate shoulder examination with particular reference to range of motion. Interpreted advanced imaging and use operative planning software. Execute appropriate surgical approach and select appropriate components. Execute careful soft tissue management. Supervise appropriate rehabilitation and follow-up.	Appreciates the indications and contraindications for ATSA. Appreciates the importance of preoperative planning and component selection. Appreciates common complications and their management	Shoulder replacement shoulder arthroplasty Glenoid Anatomic
Hemiarthroplasty	Understands the history of the development of the design of hemiarthroplasty. Understands material properties of components including stem, humeral head bearing surfaces, and soft tissue balancing. Understand concepts and the effect of design on biomechanics including humeral head size, offset, and version. Be proficient in preoperative assessment	Expects the surgeon to be able to understand the indications and limitations of hemiarthroplasty. Understand limitations and contraindications. Perform adequate shoulder examination with particular reference to range of motion. Interpreted advanced imaging and use operative planning software. Execute appropriate surgical approach and select appropriate components.	Appreciates the indications and contraindications for Hemiarthroplasty. Appreciates the importance of preoperative planning and component selection. Appreciates common complications and their management	Humeral head replacement Resurfacing Hemiarthroplasty

	including necessary radiological assessment and preoperative planning. Be aware of potential Contraindications.	Execute careful soft tissue management. Supervise appropriate rehabilitation and follow-up;		
Reverse shoulder arthroplasty	Understands the history of the development of the design of reverse TSR. Understands material properties of components including stem, humeral head bearing surfaces, and glenoid component. Understand biomechanical differences between commercially available implant systems. Understand concepts including lateralisation, deltoid wrap, and scapular notching. Understand the risks and benefits of different implant philosophies. Be proficient in preoperative assessment including necessary radiological assessment and preoperative planning	Expects the surgeon to be able to understand the indications and limitations of Reverse TSA. Understand limitations and contraindications. Perform adequate shoulder examination with particular reference to range of motion. Interpreted advanced imaging and use operative planning software. Execute appropriate surgical approach and select appropriate components. Execute careful soft tissue management. Supervise appropriate rehabilitation and follow-up;	Appreciates the indications and contraindications for RTSA. Appreciates the importance of preoperative planning and component selection. Appreciates common complications and their management	Grammont Reverse arthroplasty Reverse replacement

Resurfacing arthroplasty	Understands the history of the development of the design of anatomical TSR. Understands material properties of components including stem, humeral head bearing surfaces, and glenoid component. Understand concepts and the effect of design on biomechanics including humeral head size, offset, and version. Be proficient in preoperative assessment including necessary radiological assessment and preoperative planning	Expects the surgeon to be able to understand the indications and limitations of resurfacing. Understand limitations and contraindications. Perform adequate shoulder examination with particular reference to range of motion. Interpreted advanced imaging and use operative planning software. Execute appropriate surgical approach and select appropriate components. Execute careful soft tissue management. Supervise appropriate rehabilitation and follow up;	Appreciates the indications and contraindications for Resurfacing arthroplasty. Appreciates the importance of preoperative planning and component selection. Appreciates common complications and their management	Humeral surface replacement Arthroplasty Resurfacing
Partial resurfacing arthroplasty	Understands the history of the development of the design of partial resurfacing TSR. Understands material properties of components including stem, humeral head bearing surfaces, and glenoid component. Understand concepts and the effect of design on biomechanics including humeral head size, offset, and version. Be proficient in preoperative assessment including necessary	Expects the surgeon to be able to understand the indications and limitations of partial surface arthroplasty. Understand limitations and contraindications. Perform adequate shoulder examination with particular reference to range of motion. Interpreted advanced imaging and use operative planning software. Execute appropriate surgical approach and select appropriate components. Execute careful soft	Appreciates the indications and contraindications for Partial Resurfacing Arthroplasty. Appreciates the importance of preoperative planning and component selection. Appreciates common complications and their management	Hemi-resurfacing Partial head replacement Surface replacement

	radiological assessment and preoperative planning	tissue management. Supervise appropriate rehabilitation and follow-up;		
Revision arthroplasty	Understands the history of the development of the design of Revision Shoulder arthroplasty. Understand modes of failure on both glenoid and humeral components. Understand the classification and challenges of types of glenoid bone defects. Understand the classification and challenges of types of humeral loosening. Understand issues in terms of implant removal i.e. humeral osteotomies and other techniques. Understand both biological and prosthetic replacement of bone defects. Understand the complication profile associated with various revision options	Expects the surgeon to be able to understand the indications and limitations of Revision TSA. Understand limitations and contraindications. Perform adequate shoulder examination with particular reference to range of motion. Interpret advanced imaging and use operative planning software. Anticipate requirement for advanced instrumentation, necessary prosthetic equipment and possible use of biological material. Execute workup for infection. Execute appropriate surgical approach and select appropriate components. Execute careful soft tissue management. Supervise appropriate rehabilitation and follow-up;	Appreciates the indications and contraindications for Revision Total Shoulder Replacement. Appreciates all components of preoperative planning. Appreciates the importance of preoperative planning and component selection. Appreciates common complications and their management	Revision shoulder arthroplasty Revision surgery Infection Loosening Periprosthetic fracture

Allograft Prosthetic Composite	Understands biological and biomechanical concepts of Allograft Prosthetic Composite. Understands material properties of components including stem, humeral head bearing surfaces, glenoid component. Understand the concept of the composite of allograft and prosthesis and the consequences of non-union /bone resorption and soft tissue failure.	Expects the surgeon to be able to understand the indications and limitations of Allograft Prosthetic Composite. Understand limitations and contraindications. Perform adequate shoulder examination with particular reference to range of motion. Interpret advanced imaging and use operative planning software. Execute appropriate surgical approach and select appropriate components. Execute careful soft tissue management. Supervise appropriate rehabilitation and follow-up;	Appreciates the indications and contraindications for Allograft Prosthetic Composite. Appreciates the importance of preoperative planning and component selection. Appreciates common complications and their management	APC Transplantation bone humerus Revision arthroplasty Bone loss humerus
Tumor prosthetics	Understands the design and biomechanics of tumour prosthesis including modularity, biomaterials and fixation techniques. Be proficient in preoperative assessment including necessary radiological assessment and preoperative planning.	Expects the surgeon to be able to understand the indications and limitations of Tumour prosthesis. Understand limitations and contraindications. Perform adequate shoulder examination with particular reference to range of motion. interpret advanced imaging and use operative planning software. Execute appropriate surgical approach and select appropriate components. Execute careful soft tissue management.	Appreciates the indications and contraindications for Tumour prosthesis. Appreciates importance of preoperative planning and component selection. Appreciates common complications and their management.	Replacement proximal humerus Replacement scapula Mega prosthesis

		Supervise appropriate rehabilitation and follow up.		
5.7 Soft Tissues (Tendons/ Nerves/ Vessels etc..)				
Ligament repair	Teaches the candidate the possibilities and limitations of ligament repair. The candidate is taught when there is an indication for ligament repair or when conservative treatment should be proposed. The candidate is taught on the anatomical landmarks of the attachment of the ligaments and the rehabilitation program after ligament repair.	Expects the candidate to be able to perform the commonly available surgical approaches to the shoulder joint, that are necessary for stable ligament repair and to be capable of various techniques for ligament fixation.	Is aware of the high relevance of ligament repair for patients' quality of life and its potentially high impact on socioeconomic costs.	Reconstruction shoulder Ligament surgery Ligament repair
Tendon Repair	Teaches the candidate the possibilities and limitations of tendon repair. The candidate is taught when there is an indication for tendon repair or when conservative treatment should be proposed. The candidate is taught on the anatomical landmarks of the attachment of the ligaments and the rehabilitation program after ligament repair.	Expects the candidate to be able to perform the commonly available surgical approaches to the shoulder joint, that are necessary for stable tendon repair and to be capable of various techniques for tendon fixation.	Is aware of the high relevance of tendon repair for patients' quality of life and its potentially high impact on socioeconomic costs.	Reconstruction tendon Rotator cuff repair Rotator cuff

Bankart repair	Teaches the candidate the possibilities and limitations of a Bankart repair. The candidate is taught when there is an indication for this operation or when conservative treatment should be proposed. The candidate is taught on the anatomical landmarks of the attachment of the labrum and its associated lesions and the rehabilitation program after the repair.	Expects the candidate to be able to perform the commonly available surgical approaches to the shoulder joint, that are necessary for doing a Bankart repair. The candidate should be capable of various techniques how to perform a Bankart repair (arthroscopic, open, with anchors, etc.).	Is aware of the high relevance of Bankart repairs for patients' quality of life and its potentially high impact on socioeconomic costs.	Bankart Repair Bankart lesion Labrum repair
Capsular shift	Teaches the candidate the possibilities and limitations of capsular shifts. The candidate is taught when there is an indication for this operation or when conservative treatment should be proposed. The candidate is taught on the anatomy of the capsule and its associated lesions and the rehabilitation program after the operation.	Expects the candidate to be able to perform the commonly available surgical approaches to the shoulder joint, that are necessary for doing a capsular shift. The candidate should be capable of various techniques how to perform a capsular shift (arthroscopic, open, etc.).	Is aware of the high relevance of capsular shifts for patients' quality of life and its potentially high impact on socioeconomic costs.	T-shift Shoulder instability Capsular shift Capsule reconstruction
Tendon transfer	Teaches the candidate the possibilities and limitations of tendon transfers. The candidate is taught when there is an indication for this operation or when conservative treatment should be	Expects the candidate to be able to perform the commonly available surgical approaches to the shoulder joint, that are necessary for doing tendon transfers. The candidate should be capable of	Is aware of the high relevance of tendon transfers on the shoulder for patients' quality of life and its potentially high impact on socioeconomic costs.	Latissimus dorsi transfer Lower trapezius transfer Pectoralis major transfer

	proposed. The candidate is taught which muscles and tendons may be useful for a transfer in different conditions. The candidate should be aware of the rehabilitation program after the operation.	the various muscles and tendons that can be used for a transfer and which techniques may be applicable (arthroscopic, open, etc.).		

5.8 Amputations				
Arm amputation	Teaches the candidates about the possibilities of arm amputations. The candidate is taught the rare indications for this invasive and definitive procedure. Also, the candidate is taught to share help and support for patients during the aftercare, especially focusing on neurogenic pain as well as psychological help for the mental consequences of the loss of limb. The candidate must know about prosthetic options (traditional and modern as well as experimental) to offer the patient options for the future.	Expects the candidate to know the key anatomical structures and to be able to dissect them safely. Also expects the candidate to be able to ligate major vessels of the upper extremity and to handle nerves during amputation surgery.	Appreciates the high relevance of profound understanding and knowledge of arm amputations.	Amputation upper limp Salvage surgery Exarticulation
Shoulder exarticulation	Teaches the candidate the possibilities of shoulder exarticulations. The candidate is taught about the rare indications for this invasive and definitive procedure. Also, the candidate is taught to share help and support for patients during the aftercare, especially focusing on neurogenic pain as well as psychological help for the mental consequences of the loss of limb. The candidate must know about	Expects the candidate to know the key anatomical structures and to be able to dissect them safely. Also expects the candidate to be able to ligate major vessels of the upper extremity and to handle nerves during amputation surgery.	Appreciates the high relevance of profound understanding and knowledge of shoulder exarticulations.	Amputation upper limp Salvage surgery Exarticulation

	prosthetic options (traditional and modern as well as experimental) to offer the patient options for the future.			
4-Quarter Amputation	Teaches the candidate the possibilities of 4-quarter-amputations. The candidate is taught about the rare indications for this invasive and definitive procedure. Also, the candidate is taught to share help and support for patients during the aftercare, especially focusing on neurogenic pain as well as psychological help for the mental consequences of the loss of limb. The candidate has to know about prosthetic options (traditional and modern as well as experimental) to offer the patient options for the future.	Expects the candidate to know the key anatomical structures and to be able to dissect them safely. Also expects the candidate to be able to ligate major vessels of the upper extremity and to handle nerves during amputation surgery.	Appreciates the high relevance of profound understanding and knowledge of shoulder exarticulations.	Amputation upper limp Salvage surgery Exarticulation
5.9 Arthrodesis				
Glenohumeral arthrodesis	Teaches the candidate the possibilities and limitations of shoulder arthrodesis. The candidate is taught on the correct position of fixation. The candidate is taught the use of	Expects the candidate to know the key anatomical structures around the shoulder and to be able to dissect them safely. Also expects the candidate to be able to perform stable osteosynthetic	Is aware of the significant implications of glenohumeral arthrodesis on the quality of life of the patient and is aware of the rarity of the indications for glenohumeral arthrodesis.	Arthrodesis Glenohumeral Function Impairment Indication Fusion

	internal and external fixation	techniques, to gain stable fusion of the joint.		

BASIC LEARNING OBJECTIVES - ELBOW				
	Knowledge	**Skill**	**Attitude**	**Key Words**
1. Basic Science				
1.1 Basic Science				
Anatomy	Teaches basic and detailed anatomy of the elbow and its surrounding structures. Particular emphasis shall be laid on the neuro-anatomy around the elbow (Radial, ulnar and median nerves).	Expects the surgeon to be able to apply basic and profound anatomical knowledge to the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of elbow anatomy for proper diagnostics and non-operative as well as operative treatment of elbow pathologies.	Elbow Anatomy Structure
Biomechanics	Teaches basic and detailed biomechanics of the elbow. Particular emphasis shall be laid on instability patterns: • Posterolateral rotatory instability • Posteromedial instability • Varus / valgus instability • Longitudinal instability of the forearm	Expects the surgeon to be able to apply basic and profound biomechanical knowledge to the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of elbow biomechanics for proper diagnostics and treatment of elbow pathologies.	Elbow Biomechanics Function Structure
Surgical approaches	Teaches basic and detailed knowledge on the available approaches to the elbow joint, which can be separated into medial, lateral, dorsal and ventral approaches. The approaches are learned with particular respect for the position and course of the	Expects the surgeon to be able to apply basic and profound knowledge of surgical approaches to the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of elbow surgical approaches for proper surgical treatment of elbow pathologies.	Elbow Surgery Dissection Approach

	major neuro-vascular structures at the elbow. • Medial approaches (Hotchkiss, Sulcus-splitting) • Lateral approaches (Kocher, EDC-split, Kaplan) • Dorsal approaches (Triceps-preserving, Triceps-off, Triceps-peel) • Ventral approaches			
Embryology/ Growth	Teaches basic and detailed knowledge on the epidemiology of elbow pathologies.	Expects the surgeon to be able to apply basic and profound knowledge of epidemiology to the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of elbow pathology epidemiologics.	Elbow Epidemiology Patients Cases
2. Diagnostics				
2.1 Imaging				
Sonography / Ultrasound	Teaches basic and detailed knowledge on the theoretical basics of ultrasound and its application in the diagnostics and treatment of elbow pathologies. Key structures: • Radial head • Olecranon fossa • Ulno-humeral joint gap • Medial and lateral joint gap • Medial and lateral ligament complex • Ulnar nerve	Expects the surgeon to be able to display the mentioned key structures via ultrasound and to be able to differentiate physiologic and pathologic findings.	Appreciates the high relevance of profound understanding and knowledge of elbow ultrasound investigations.	Ultrasound Anatomical landmarks Elbow diagnostics

	• Radial nerve • Median nerve • Brachial artery			
Nuclear medicine / Scintigraphy	Teaches basic and detailed knowledge on the theoretical basics of nuclear medicine and its application in the diagnostics and treatment of elbow pathologies.	Expects the surgeon to be able to apply basic and profound knowledge of Nuclear medicine onto the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of nuclear medicine for diagnostics and treatment of elbow pathologies.	Bone Scintigraphy Osteochondritis Dissecans Lateral Epicondylitis Total Elbow Arthroplasty Septic Loosening
MRI/ MR Arthrography	Teaches basic and detailed knowledge on the theoretical basics of MRI and MR Arthrography and its application in the diagnostics and treatment of elbow pathologies.	Expects the surgeon to be able to apply basic and profound knowledge of MRI Imaging onto the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of MRI and MR Arthrography for diagnostics and treatment of elbow pathologies.	MRI MR Arthrography Inflammation Soft Tissues
CT/ CT Arthrography	Teaches basic and detailed knowledge on the theoretical basics of CT and CT Arthrography and its application in the diagnostics and treatment of elbow pathologies.	Expects the surgeon to be able to apply basic and profound knowledge of CT Imaging onto the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of CT and CT Arthrography for diagnostics and treatment of elbow pathologies.	CT CT Arthrography Bone Fracture
DEXA	Teaches basic and detailed knowledge on the theoretical basics of Bone Density Measurements and its application in the diagnostics and treatment of elbow pathologies.	Expects the surgeon to be able to apply basic and profound knowledge of Bone Density Measurements onto the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of Bone Density Measurements for diagnostics and treatment of elbow pathologies.	Bone mineral density children and adolescents dual-energy X-ray absorptiometry elbow

2.2 Laboratory				
Blood parameters	Teaches basic and detailed knowledge on the theoretical basics of Blood Parameters and their application in the diagnostics and treatment of elbow pathologies. • CRP • WBC • PCT • IL-6 • Rheumatoid factors • Anti-CCP • ESR	Expects the surgeon to be able to apply basic and profound knowledge of blood diagnostics onto the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of Blood Parameters for diagnostics and treatment of elbow pathologies.	CRP Cytokine ESR Inflammatory marker Rheumatic disease WBC
Blood cultures	Lists the possibilities and value of Blood Cultures in the diagnosis of systemic infections accompanying elbow pathologies.	Expects the surgeon to be able to apply basic and profound knowledge of microbiological blood diagnostics onto the treatment of elbow pathologies.	Appreciates the high relevance of profound understanding and knowledge of Blood Cultures for diagnostics and treatment of systemic infections accompanying elbow pathologies.	Microbiology Resistance Organism Antibiotics Evasion
2.3 Puncture and Biopsy				
Histology	Teaches the basic knowledge of the use of histology for the identification of elbow pathologies, in differentiating infectious and inflammatory diseases.	Expects the surgeon to be able to gather the relevant samples via open, mini-open and minimally-invasive techniques while complying with necessary rules of hygiene and infecundity.	Appreciates the high relevance of profound understanding and knowledge of histology for diagnostics and treatment of systemic infections accompanying elbow pathologies.	Histology Histopathology Synovium Sectioning

Synovial analysis	Teaches the basic knowledge of the use of synovia analysis for the identification of elbow pathologies, in differentiating infectious and inflammatory diseases.	Expects the surgeon to be able to gather the relevant samples via open, mini-open and minimally-invasive techniques while complying with necessary rules of hygiene and infecundity.	Appreciates the high relevance of synovia analysis for diagnostics and treatment of infectious and inflammatory elbow pathologies.	Arthrocentesis Synovium Analysis Inflammation Rheumatic disease
Microbiology	Lists the possibilities and limitations of the essential diagnostic tool of microbiology when dealing with pathologies around the elbow.	Expects the surgeon to be able to gather the relevant samples via open, mini-open and minimally-invasive techniques while complying with necessary rules of hygiene and infecundity.	Appreciates the high relevance of microbiology for the diagnosis of pathogens and antibiotic resistance in the treatment of infectious elbow pathologies.	Microbiology Resistance Organism Antibiotics
2.4 Investigation Techniques				
Arthroscopy	Teaches the surgeon the possibilities and limitations of arthroscopy in the diagnosis of elbow pathologies. The surgeon is taught how to respect the critical role of sterility and hygiene when applying arthroscopy to the elbow joint.	Expects the surgeon to be able to perform diagnostic elbow arthroscopy safely while respecting the complex anatomy of the elbow joint and its surrounding neurovascular structures.	Appreciates the relevance of diagnostic arthroscopy for diagnosis of elbow pathologies, guiding the according treatment.	Elbow Arthroscopy Diagnosis Visualization Hygiene
Nanoscope	Teaches the surgeon the possibilities and limitations of nano arthroscopy in the diagnosis of elbow pathologies. The surgeon is taught	Expects the surgeon to be able to perform diagnostic elbow nano arthroscopy safely while respecting the complex anatomy of the elbow joint	Appreciates the relevance of diagnostic Nano arthroscopy for diagnosis of elbow pathologies, guiding the	Elbow Nanoscope Nano Arthroscopy Diagnosis Visualization Hygiene

	how to respect the critical role of sterility and hygiene when applying Nano arthroscopy to the elbow joint.	and its surrounding neurovascular structures.	according treatment.	
Open surgical exploration	Teaches the possibilities and limitations of open surgical exploration as a diagnostic tool for elbow pathologies. The surgeon is taught how to respect the critical role of sterility and hygiene when applying arthroscopy to the shoulder joint.	Expects the surgeon to be able to perform open diagnostic elbow exploration while respecting the complex anatomy of the shoulder joint and its surrounding neurovascular structures.	Appreciates the relevance of open diagnostic surgical exploration and the appropriate treatment for elbow pathologies.	Elbow Open surgical exploration Diagnosis Visualization Hygiene
3. Elbow Pathologies				
3.1 Infections				
Primary/Secondary Empyema	Lists the causes for empyema of the elbow joint and differentiates in primary and secondary causes. Teaches the available techniques for correct diagnosis and efficient treatment of such infectious pathologies.	Expects the surgeon to be able to perform minimally-invasive procedures or to do open surgical approaches to the elbow joint to evacuate empyema, rinsing the joint sufficiently, debriding it and to take samples for diagnostic measures.	Appreciates the relevance of the correct diagnosis and treatment of primary and secondary empyema of the elbow.	Septic arthritis Elbow empyema Osteomyelitis Elbow Infection

Peri-prosthetic Infection	Teaches the profound knowledge of this potentially devastating complication of prosthetic replacement around the elbow. Lists the different causes, risks and predispositions for peri-prosthetic joint infections. Gives insight into common rei-prosthetic infection treatment protocols. Differentiates in the different underlying prostheses: • Total Elbow Arthroplasty (TEA) • Hemi Arthroplasty (HA) • Radial Head Arthroplasty (RHA) • Capitulum Replacement Arthroplasyt (CRA)	Expects the surgeon to be able to perform revision maneuvers to explant prostheses while preserving bone stock, evacuate empyema, rinsing the joint sufficiently, debriding it and to take samples for diagnostic measures.	Appreciates the relevance of thorough revision techniques and therapeutic protocols for the correct diagnosis and treatment of peri-prosthetic infections around the elbow.	Elbow infection periprosthetic joint infection total elbow arthroplasty
Infection of Osteosynthesis	Teaches the profound knowledge of this potentially devastating complication of osteosynthetic reconstruction around the elbow. Lists the different causes, risks and predispositions for peri-osteosynthetic joint infections.	Expects the surgeon to be able to perform revision maneuvers of elbow osteosynthesis, to know the different implants, to be able to explant these implants while preserving bone stock, evacuate empyema, rinsing	Appreciates the relevance of thorough revision techniques and therapeutic protocols for the correct diagnosis and treatment of peri-osteosynthetic infections around the elbow.	Infection after fracture fixation Implant-related infection Infected non-union Complications Biofilm Antibiotic therapy

	Clarifies on how to diagnose infected pseudarthrosis.	the joint sufficiently, debriding it and to take samples for diagnostic measures.		
3.2 Nerve Pathologies				
Ulnar Nerve Syndrome	Lists the multitude of causes for ulnar nerve syndrome. Differentiates in primary and secondary causes, as well as iatrogenic causes of ulnar nerve pathologies.	Expects the surgeon to be able to perform neurolysis of the ulnar nerve. Expects the surgeon to be able to perform revision maneuvers of the ulnar nerve and to be able to perform transposition techniques. Demands the surgeon to be able to perform thorough coagulation of blood vessels at the medial intermuscular septum.	Appreciates the relevance of ulnar nerve syndrome and thorough surgical techniques and therapeutic protocols for the correct diagnosis and treatment of ulnar nerve syndrome at the elbow.	Ulnar nerve Ulnar tunnel syndrome Compressive neuropathy

Snapping Ulnaris Syndrome	Teaches the background of snapping ulnaris syndrome, by looking into its etiology. Differentiates in constitutional causes and explains the role of the triceps muscle in that context.	Expects the surgeon to be able to perform neurolysis of the ulnar nerve. Expects the surgeon to be able to perform revision maneuvers of the ulnar nerve and to be able to perform transposition techniques. Demands the surgeon to be able to perform thorough coagulation of blood vessels at the medial intermuscular septum. Expects the surgeon to be able to perform partial resection of the medial head of the triceps.	Appreciates the relevance of snapping ulnaris syndrome and of thorough surgical techniques and therapeutic protocols for the correct diagnosis and treatment of snapping ulnaris syndrome.	Cubital tunnel cubitus varus operative technique snapping triceps syndrome ulnar neuritis
Radial Tunnel Syndrome / Supinator Syndrome	Lists the causes of radial tunnel syndrome/supinator syndrome. Teaches its correct diagnosis and treatment possibilities.	Expects the surgeon to be able to perform neurolysis of the radial nerve. Expects the surgeon to be able to perform revision maneuvers of the radial nerve. Demands the surgeon to be able to dissect Frohe´s arcade.	Appreciates the relevance of ulnar nerve syndrome and thorough surgical techniques and therapeutic protocols for the correct diagnosis and treatment of ulnar nerve syndrome at the elbow.	Compression Diagnosis Radial Tunnel Syndrome Treatment Nerve pathology
Pronator Teres Syndrome	Lists the causes of pronator teres syndrome. Teaches its correct diagnosis and treatment possibilities and how to differentiate it	Expects the surgeon to be able to perform neurolysis of the median nerve. Expects the surgeon to be able to perform revision	Appreciates the relevance of pronator teres syndrome and thorough surgical techniques and therapeutic protocols for the correct diagnosis	decompression pronator teres syndrome nerve compression nerve pathology

	from other median nerve syndromes.	maneuvers of the median nerve. Demands the surgeon to be able to dissect the pronator muscle.	and treatment of pronator teres syndrome.	
3.3 Tumors				
Benign Bone Tumors / Osteoid osteoma	Teaches the etiology and epidemiology of this very rare benign tumor. Lists the diagnostic modalities to differentiate it from other lesions and other causes of non-traumatic pain.	Expects the surgeon to be able to perform minimally invasive and open approaches to get access to the sites of the lesions and how to remove them while preserving intact bone.	Appreciates the relevance of osteoid osteoma at the elbow, the necessity for thorough diagnostics and careful surgical techniques for treatment.	osteoid osteoma elbow osteoblastic tumor neoplasia
Primary Malignant Tumors	Lists the rare primary malignant bone tumors at the elbow, and their diagnostic and treatment algorithms.	Expects the surgeon to be able to perform surgical approaches to get access to the sites of the lesions to either perform a diagnostic biopsy or to remove the lesions while preserving intact bone and soft tissues.	Appreciates the relevance of primary malignant tumors at the elbow, the necessity for thorough diagnostics and careful surgical techniques for treatment, while adhering to established treatment algorithms.	benign bone tumour elbow malignant
Metastatic Cancer	Lists the possible primary malignancies that may cause metastatic disease to the elbow rare and teaches their diagnostic and treatment algorithms.	Expects the surgeon to be able to perform surgical approaches to get access to the sites of the lesions to either perform a diagnostic biopsy or to remove the lesions while preserving intact bone and soft tissues.	Appreciates the relevance of metastatic cancer at the elbow, the necessity for thorough diagnostics and careful surgical techniques for treatment, while adhering to established treatment algorithms.	Metastasis carcinoma malignant tumor elbow

Benign Soft Tissue Lesions	Lists the possible benign soft tissue lesions that may be encountered at the elbow rare and teaches their diagnostic and treatment algorithms.	Expects the surgeon to be able to perform surgical approaches to - if indicated - get access to the sites of the lesions to either perform a diagnostic biopsy or to remove the lesions while preserving intact bone and soft tissues.	Appreciates the relevance of benign soft tissue lesions at the elbow, the necessity for thorough diagnostics and careful surgical techniques for treatment, while adhering to established treatment algorithms.	benign elbow soft tissue tumors
3.4 Sports Injuries				
Ligamentous Dislocation	Teaches the epidemiology of ligamentous elbow dislocation and explains the pathobiomechanics. Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for non-operative and operative treatment, according to the available literature.	Expects the surgeon to be able to perform surgical approaches to the elbow joint, its ligamentous stabilizers and the muscle origins to - if indicated - perform refixation of these structures in the acute setting or perform augmentation and repair in the chronic setting.	Appreciates the relevance of elbow instability after elbow dislocation, the necessity for proper diagnostics and, therefore adequate indications for treatment.	dislocation elbow epidemiology indications refixation physiotherapy overhead
Chronic Valgus Instability	Teaches the epidemiology of chronic valgus instability. Displays the etiology: • Trauma • Attrition/overuse Lists the diagnostic algorithms of clinical and imaging investigations, as well as the indications for non-operative and operative treatment, according to the available literature.	Expects the surgeon to be able to perform surgical approaches to the elbow joint, its ligamentous stabilizers and the muscle origins to - if indicated - perform ligament reconstruction in the chronic setting.	Appreciates the relevance of chronic valgus instability of the elbow, the necessity for proper diagnostics and therefore adequate indications for treatment.	Elbow Athletes Ligaments Joint instability Reconstructive surgery

Osteochondral Lesion	Defines the pathology with its pathogenesis and epidemiology. Lists the currently available classification systems and treatment algorithms for osteochondral lesions. Presents the common indications, based on the present literature.	Expects the surgeon to be able to perform surgical minimally-invasive, arthroscopic and open approaches to the elbow joint to - if indicated - perform osteochondral debridement or cartilage repair strategies.	Appreciates the relevance of osteochondral lesions of the elbow, the necessity for proper diagnostics and therefore adequate indications for treatment.	osteochondral lesions osteochondritis dissecans elbow arthritis
Medial Epicondylitis/ Medial Elbow Pain	Defines the pathology with its pathogenesis and epidemiology. Lists the currently available classification systems and treatment algorithms for medial epicondylitis. Presents the common indications for non-operative/operative treatment, based on the present literature.	Expects the surgeon to be able to perform surgical minimally-invasive, arthroscopic and open approaches to the elbow joint to - if indicated - perform tendon debridement and refixation strategies.	Appreciates the relevance of medial epicondylitis of the elbow, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly diagnosing epicondylitis and differentiating it from other causes of medial elbow pain.	lateral elbow pain lateral epicondylitis tendinitis golfer´s elbow
Lateral Epicondylitis/ Lateral Elbow Pain	Defines the pathology with its pathogenesis and epidemiology. Lists the currently available classification systems and treatment algorithms for lateral epicondylitis. Presents the common indications for non-operative/operative treatment, based on the present literature.	Expects the surgeon to be able to perform surgical minimally-invasive, arthroscopic and open approaches to the elbow joint to - if indicated - perform tendon debridement and refixation strategies.	Appreciates the relevance of medial epicondylitis of the elbow, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly diagnosing epicondylitis and differentiating it from other causes of lateral elbow pain.	lateral elbow pain lateral epicondylitis tendinitis tennis elbow

3.5 Trauma				
Radial Head Fracture	Defines the pathology with its pathogenesis and epidemiology. Lists the currently available classification systems and shows their limitations. Offers recommendations for treatment algorithms. Presents the common indications for non-operative/operative treatment, based on the present literature.	Expects the surgeon to be able to perform minimally invasive, arthroscopic and open surgical approaches to the elbow joint to - if indicated - perform repositioning, fixation and replacement of the radial head.	Appreciates the relevance of radial head fractures and their implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation or replacement.	Internal Fixation Radial Head Medial Collateral Ligament Radial Head Fracture
Proximal Ulna Fractures	Defines the pathology with its pathogenesis and epidemiology. Lists the currently available classification systems and shows their limitations. Offers recommendations for treatment algorithms. Presents the common indications for non-operative/operative treatment, based on the present literature.	Expects the surgeon to be able to perform open approaches to the elbow joint to - if indicated - perform reduction and fixation.	Appreciates the relevance of olecranon fractures and its implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation.	coronoid process elbow stability Monteggia fracture Monteggia-like lesion olecranon proximal ulna fracture radial head
Distal humerus fractures	Defines the pathology with its pathogenesis and epidemiology. Lists the currently available classification systems and shows their limitations. Offers recommendations for treatment	Expects the surgeon to be able to perform minimally invasive, arthroscopic and open surgical approaches to the elbow joint to - if indicated - perform repositioning, fixation and	Appreciates the relevance of distal humerus fractures and its implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special	Distal humerus fracture Fracture fixation Open reduction internal fixation Total elbow arthroplasty Anatomy Elbow

	algorithms. Presents the common indications for non-operative/operative treatment, based on the present literature. Discusses the indications of nerve transposition. Teaches the high complication risks of elbow replacement surgery.	replacement of the distal humerus.	challenges in correctly choosing the method of fixation or replacement.	
Isolated Coronoid Fracture / PMRI	Defines the pathology with its implications on elbow biomechanics and lists its epidemiology. Displays the available classification systems and reports their limitations. Emphasizes the relevance of concomitant ligament injuries.	Expects the surgeon to be able to perform minimally-invasive, arthroscopic and open surgical approaches to the elbow joint to - if indicated - perform repositioning and fixation of the coronoid, as well as to perform refixation and reconstruction of the collateral ligaments.	Appreciates the relevance of coronoid fractures and its implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation and reconstruction.	Isolated coronoid fracture lateral collateral ligament magnetic resonance imaging fracture ligaments
Terrible Triad	Defines the pathology with its relevance for elbow biomechanics. Underlines the difference in the fracture patterns of the coronoid regarding PMRI. Teaches the accompanying ligamentous injuries and the specific complications, like stiffness and heterotopic ossifications.	Expects the surgeon to be able to perform minimally-invasive, arthroscopic and open surgical approaches to the elbow joint to - if indicated - perform repositioning and fixation of the coronoid and the radial head, as well as to perform refixation and reconstruction of the collateral ligaments. Also, the surgeon must be able to deal with the ulnar nerve, which is to be	Appreciates the relevance of terrible triad injuries and its implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation and reconstruction.	Radial Head Coronoid Dislocation Elbow Stiffness Heterotopic Ossification

		protected during the procedure.		
Monteggia	Defines the pathology with its relevance for elbow biomechanics. Displays its epidemiology. Teaches the current classification system. Teaches the accompanying ligamentous injuries and the specific complications, like stiffness, joint malalignement and heterotopic ossifications.	Expects the surgeon to be able to perform minimally-invasive,and open surgical approaches to the elbow joint to - if indicated - perform repositioning and fixation of the olecranon and the radial head, as well as to perform refixation and reconstruction of the collateral ligaments. Also, the surgeon must be able to deal with the ulnar nerve, which is to be protected during the procedure.	Appreciates the relevance of monteggia triad injuries and its implications on elbow biomechanics, the necessity for proper diagnostics and therewith adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation and reconstruction.	dislocation fracture pediatric radial head prosthesis Monteggia forearm
Essex-Lopresti	Defines this rare Pathology and discusses ist complex biomechanics. Teaches the genesis of the three distinct pathologic components and the pathomechanics of longitudinal forearm instability. Teaches the epidemiology of this rare lesion and the diagnostic principles and how not to miss them on initial presentation.	Expects the surgeon to be able to perform open surgical approaches to the elbow joint to - if indicated - perform repositioning and fixation of the radial head or replacement surgery, as well as to perform refixation and reconstruction of the collateral ligaments, of the interosseous membrane and to stabilize the DRUJ.	Appreciates the high relevance of Essex-Lopresti injuries and its implications on elbow biomechanics, the necessity for proper diagnostics and therewith adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation and reconstruction.	Essex-Lopresti Forearm Instability Elbow Joint Radial Head Interosseous Membrane

		Also, the surgeon must be able to deal with chronic longitudinal forearm instability and how to restore that with reconstruction of the interosseous membrane.		
3.6 Developmental disorders				
Chronic Radial Head Dislocation	Teaches the etiology and epidemiology of this pathology. Differentiate between congenital dislocation and developmental dislocation. Lists the diagnostic modalities to differentiate it from acute traumatic lesions.	Expects the surgeon to be able to perform surgical planning for an osteotomy and perform open surgical approaches to the elbow joint to perform the osteotomy and fixation. Also, the surgeon must be able to deal with the radial nerve, which is to be protected during the procedure.	Appreciates the relevance of Radial Head Dislocation and its implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation and osteotomy techniques.	Radial Head Dislocation Elbow Stiffness Heterotopic Ossification
Cubitus Varus	Teaches the etiology and epidemiology of this pathology. Offers recommendations for treatment algorithms.	Expects the surgeon to be able to perform surgical planning for an osteotomy and perform open surgical approaches to the elbow joint to perform the osteotomy and fixation. Also, the surgeon must be able to deal with the ulnar nerve, which is to be protected during the procedure.	Appreciates the relevance of cubitus varus and its implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation and osteotomy techniques.	Angulation Deviation Elbow Stiffness Pain Trauma

3.7 Inherent/growth associated				
Dysplasia	Describes the causes of growth-associated dysplasia of the distal humerus Defines the symptomatology and significance. Defines the typical radiologic findings Lists surgical treatment indications and timing Lists possible complications and results of treatment.	Not every surgeon needs to be able to treat such complex pathologies surgically. However, he must be able to diagnose the pathology correctly. Also, he should be able to refer the patient to a centre specialized in the treatment of such pathologies.	Appreciates the relevance of varus/valgus malalignment and its implications on elbow biomechanics, the necessity for proper diagnostics and therewith adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of correction and osteotomy techniques.	Elbow Deviation Function Pain
Varus/ Valgus malalginement	Describes the causes of growth associated cubitus varus (fe after supracondylar fracture) of valgus (fe after lateral condyle fracture) Describe the normal variation in valgus alignment. Defines the symptomatology and significance. Defines the typical radiologic findings Lists surgical treatment indications and timing Lists possible complications and results of treatment.	Expects the surgeon to be able to perform a surgical planning for an osteotomy	Appreciates the relevance of varus/valgus malalignment and its implications on elbow biomechanics, the necessity for proper diagnostics and therewith adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation and osteotomy techniques.	Angulation Deviation Elbow Stiffness Pain Trauma

Radio-ulnar synostosis	Distinct between osteochondrosis of the capitellum (Panner's disease) and osteochondritis dissecans. Evaluate technical investigation to define the severity of the lesion. Offers recommendations for treatment algorithms.	Expects the surgeon to be able to perform a surgical planning for an osteotomy	Appreciates the relevance of radioulnar synostosis and its implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of fixation and osteotomy techniques.	Radial Head Dislocation Elbow Fracture Healing Stiffness Heterotopic Ossification
Osteochondrosis dissecans	Distinct between osteochondrosis of the capitellum (Panner's disease) and osteochondritis dissecans. Evaluate technical investigation to define the severity of the lesion. Offers recommendations for treatment algorithms.	Expects the surgeon to be able to perform surgical planning for arthroscopy or open treatment (debridement, fixation, grafting)	Appreciates the relevance of osteochondritis dissecans and its implications on elbow biomechanics, the necessity for proper diagnostics and therefore adequate indications for treatment. Is aware of the special challenges in correctly choosing the method of debridement or grafting	Cartilage Elbow Pain Overload Perfusion Necrosis
3.8 Caused by medical interventions				
Chondral lesions	Teach the different causes of iatrogenic cartilage damage (punction, a'scopic treatment, open treatment). Define the symptomatology and significance. Defines the typical radiologic findings Lists non-operative treatment indications. Lists surgical	Expects the surgeon to be able to perform arthroscopy or open treatment (debridement, osteocapsular arthroplasty, elbow arthroplasty)	Appreciates the high relevance of cartilage injuries for joint integrity and adequate functionality.	Cartilage Elbow Pain Overload Perfusion Necrosis Chondral lesions

	treatment indications. Lists possible complications and results of treatment.			
Infection	Teach the different causes of iatrogenic infection (punction, a'scopic treatment, open treatment). Define the symptomatology and significance. Defines the typical radiologic findings Lists non-operative treatment indications. Lists surgical treatment indications. Lists possible complications and results of treatment.	Expects the surgeon to be able to perform surgical planning for an a'scopy or open treatment (debridement, synovectomy)	Appreciates the catastrophic consequences of joint infection for joint integrity and functionality.	Swelling Effusion Bacteria Redness
Osteonecrosis	Teach the different causes of osteonecrosis (medication like corticosteroids). Define the symptomatology and significance. Defines the typical radiologic findings Lists non-operative treatment indications. Lists surgical treatment indications. Lists possible complications and results of treatment.	Expects the surgeon to be able to perform arthroscopy or open treatment (debridement, osteocapsular arthroplasty, elbow arthroplasty)	Appreciates the potentially severe consequences of osteonecrosis of the elbow, leading to secondary arthritis, stiffness and pain.	Perfusion Pain Bone loss Bone
3.9 Inflammatory/ Systemic diseases/ Bone metabolism				
Rheumatoid diseases	Lists the diagnostic criteria for RA. Diagnoses RA. Explains the pharmacologic treatment of RA. Explains the elbow involvement in RA,	Refers the patient to a rheumatologist when necessary. Performs surgical treatment as indicated	Become aware of the significance of giving disease-related information to the patient and relatives.	Chronic inflammatory pain Biologicals Treatment

	its characteristics and the prognosis. Lists the indications of surgical and nonsurgical treatment.			
PVNS	Diagnoses PVNS (nodular - diffuse) Explains the elbow involvement in PVNS, its characteristics and the prognosis. Lists the indications of surgical treatment and the risks of recurrence	Expects the surgeon to be able to perform minimally-invasive, arthroscopic and open surgical approaches to the elbow joint to - if indicated - perform synovectomy.	Become aware of the significance of giving disease-related information to the patient and relatives, specifically on the recurrence rate of the disease.	Swelling Joint Pain Chronic Malignoma
Olecranon Bursitis	Teaches the etiology and epidemiology of this pathology. Differentiate between septic and non-septic bursitis. Evaluate etiology (traumatic - non-traumatic). Lists the indications of non-surgical and surgical treatment and the risks of recurrence.	Expects the surgeon to be able to perform a correct punction of the bursa, drainage of pus and resection of the bursa in a non-septic condition	Is aware of the correct indications for when to perform punction, acute and delayed resection of the olecranon bursa, and when to treat it non-operatively.	Bursa Swelling Pain Inflammatory traumatic
3.10 Degenerative				
Osteoarthritis	Describes the natural course. Defines the etiology (traumatic-atraumatic) Defines the symptomatology and significance. Defines the typical radiologic findings Lists non-operative treatment indications. Lists surgical treatment indications. Lists possible complications and results of treatment.	Is able to perform the standard surgical treatment alternatives for joint osteoarthritis, like arthroscopic debridement, resection arthroplasty and arthroplasty.	Is aware of the high relevance of osteoarthritis for patients' quality of life and its high impact on socioeconomic costs.	Degeneration posttraumatic Pain Crepitus Cartilage

Loose bodies	Describes the natural course. Defines the etiology (traumatic-atraumatic) Defines the symptomatology and significance. Defines the typical radiologic findings Lists non-operative treatment indications. Lists surgical treatment indications. Lists possible complications and results of treatment.	Is able to perform the common surgical treatment options for loose bodies, like open and arthroscopic loose body removal.	Is aware of possible effects of loose bodies on joint function and quality of life.	Locking Pain Effusion Removal Treatment
Stiffness	Defines the etiology (traumatic-atraumatic) (extrinsic - intrinsic causes) Defines the symptomatology and significance. Lists non-operative treatment indications. Lists surgical treatment indications. Lists possible complications and results of treatment.	Is able to perform the common surgical treatment options for elbow stiffness, like open and arthroscopic surgery and is able to perform neuro-vascula release procedures.	Is aware of the severe effects of elbow stiffness on joint functionality and quality of life and knows about the possible improvements that can be gained by non-operative and surgical treatment	Quality of Life Chronic Pain Functionality
4. Elbow Non-operative				
4.1 Physical Therapy				
Physiotherapy	Teaches the surgeon the principles behind physiotherapy for the different elbow conditions including the effect on the different tissues around the elbow, including bone, muscle, tendon, ligaments, and neurological	Is able to convey the common concepts of physiotherapy in the treatment of elbow pathologies.	Is aware of the immense positive impact that physiotherapy can have in the treatment of elbow pathologies.	Non-operative Treatment Motion Intervention

	structures. The surgeon should be knowledgeable about the different indications and techniques.			
Ergotherapy	Teaches the surgeon the principles behind ergo therapy including the promotion of self-care and promotion of the use of the upper limb in the activities of daily living	Is able to convey the common concepts of Ergotherapy in the treatment of elbow pathologies.	Is aware of the immense positive impact that ergotherapy can have in the treatment of elbow pathologies.	Non-operative Treatment Motion Intervention
Massage	Teaches the surgeon the principles behind massage techniques. The surgeon is taught the basic massage techniques for the safe mobilization of tissue and should be knowledgeable about the indications for its use.	Is able to convey the common concepts of Massage Therapy in the treatment of elbow pathologies.	Is aware of the immense positive impact that massage can have in the treatment of elbow pathologies.	Non-operative Treatment Motion Intervention
Manual therapy	Teaches the surgeon the principles behind manual therapy techniques. The surgeon should be knowledgeable on the effect of hand movements and skilled passive movement of the joint and the indications for its use.	Is able to convey the common concepts of Manual Therapy in the treatment of elbow pathologies.	Is aware of the immense positive impact that manual therapy can have in the treatment of elbow pathologies.	Non-operative Treatment Mobilization Intervention
Lymphatic drainage	Teaches the surgeon the principles behind lymph drainage techniques. The surgeon should be knowledgeable about the different application	Is able to convey the common concepts of Lymphatic drainage in the treatment of elbow pathologies.	Is aware of the immense positive impact that lymph drainage can have in the treatment of elbow pathologies.	Non-operative Treatment Swelling Mobilization Intervention

	techniques and understand the possible complications and how to avoid and detect them.			
4.2 Immobilization/ Orthoses, Prosthesis etc.				
Splints	Teaches the surgeon the principles behind the correct use of splints for immobilization and assisted mobilization techniques. The patient should understand the principles behind the use of, but not limited, to dynamic splinting and static progressive splinting. The surgeon should be knowledgeable about the different protocols, the length of therapy and how to detect and treat possible complications.	Expects the surgeon to be able to perform a correct placement of elbow casting, understanding the importance of adequate padding to avoid pressure sores	Is aware of the high relevance of splints in the acute and chronic treatment of elbow pathologies.	Stabilization Treatment Healing Protection
Orthoses	Teaches the surgeon the principles behind orthotic treatment. The surgeon should be knowledgeable of the appropriate indications, correct use and identification of complications	Expects the surgeon to be able to perform a correct placement of orthoses, understanding the importance of adequate padding to avoid pressure sores	Is aware of the high relevance of splints in the acute and chronic treatment of elbow pathologies.	Stabilization Treatment Healing Protection
Casts	Teaches the surgeon the principles behind casting techniques. The surgeon is taught the technique to apply plaster of paris correctly and alternatives like	Expects the surgeon to be able to perform a correct placement of elbow casting understanding the importance of adequate padding to avoid pressure sores	Is aware of the high relevance of splints in the acute and chronic treatment of elbow pathologies.	Stabilization Treatment Healing Protection

	fiberglass. The surgeon should be knowledgeable of the appropriate indications, correct use and identification of complications			
Braces	Teaches the surgeon the principles behind bracing techniques. The surgeon should be knowledgeable of the appropriate indications, correct use and identification of complications	Expects the surgeon to be able to perform the correct placement of elbow braces understanding the importance of adequate padding to avoid pressure sores	Is aware of the high relevance of braces in the acute and chronic treatment of elbow pathologies.	Stabilization Treatment Healing Protection
4.3 Pain Relief Therapy				
Systemic pain therapy (oral)	Teaches the surgeon on the different available oral pain medications and should be knowledgeable on the analgesic ladder to support various degrees of pain level. The surgeon should understand the basics of pharmacology, interactions and side effects of the different pain medications including but not limited to non-opioid analgesics (aspirin, acetaminophen, NSAIDs -selective and non-selective), weak opioids, strong opioids and the use of adjuvants with opioid therapy and how to switch up and down the analgesia ladder.	Expects the surgeon to be able to design an appropriate initial pain treatment plan and adequately manage residual pain	Is aware of the high relevance of systemic pain therapy in the acute and chronic treatment of elbow pathologies.	Medication Pills Pain Treatment Alleviation

Systemic pain therapy (intravenous)	Teaches the surgeon on the different available intravenous pain medications and should be knowledgeable on the different intravenous pain medications including but not limited to multimodal pain medication treatment. The surgeon should understand the basics of pharmacology, interactions and side effects of the different intravenous pain medications, including but not limited to non-opioid analgesics (acetaminophen, NSAIDs -selective and non-selective), weak opioids, potent opioids and the use of adjuvants with opioid therapy and how to switch up and down the analgesia ladder.	Expects the surgeon to be able to design an appropriate initial pain treatment plan and adequately manage residual pain	Is aware of the high relevance of systemic pain therapy in the acute and chronic treatment of elbow pathologies.	Medication Line Pain Treatment Alleviation
Injections	Teaches the surgeon the principles behind injections. This should include understanding the pharmaceutical knowledge of the injected products including the indications, contraindications and management of possible adverse reactions and complications. They	Expects the surgeon to be able to perform a safe injection around the elbow, emphasizing the use of a sterile technique and understanding the availability of imaging techniques to increase the precision of the injection	Is aware of the high relevance of injections in the acute and chronic treatment of elbow pathologies.	Medication Puncture Pain Treatment Alleviation

	should be knowledgeable on the specific techniques for injection including the importance of appropriate sterility techniques and the use of adjuvant imaging techniques.			
Pain catheters	Teaches the surgeon the principles behind the safe use of pain catheters, including care of catheters, the different medications used and existing pain protocols. The surgeon should be knowledgeable about the possible complications of catheter therapy.	Is able to convey the common concepts of Pain Catheters in the treatment of elbow pathologies.	Is aware of the high relevance of pain catheters in the acute and chronic treatment of elbow pathologies.	Medication Catheter Pain Treatment Alleviation
4.4 Non-operative fracture treatment				
Immobilization	Teaches the surgeon the principles behind immobilization techniques. The surgeon is taught the technique to apply plaster of paris correctly and alternative materials. The surgeon must understand the possible complications and how to avoid and detect them.	Expects the surgeon to be able to perform a correct placement of elbow casting, understanding the importance of adequate padding to avoid pressure sores	Is aware of the high relevance of immobilization in the acute and chronic treatment of elbow pathologies.	Pain Healing Stabilization Rest
Physiotherapy	Teaches the surgeon the principles of physiotherapy for the treatment of elbow fractures. The surgeon is taught the basics of the different treatment	Is able to convey the common concepts of Physiotherapy in the treatment of elbow pathologies.	Is aware of the immense positive impact that physiotherapy can have in the treatment of elbow pathologies.	Non-operative Treatment Motion Intervention

	modalities of the immobilized and adjacent joints during fracture treatment			
5. Elbow operative				
5.1 Arthroscopy				
Diagnostic arthroscopy	Teaches the surgeon the possibilities and limitations of arthroscopy in the diagnosis of elbow pathologies. The surgeon is taught how to respect the critical role of sterility and hygiene when applying arthroscopy to the elbow joint. The surgeon is taught the correlation between the different portals and the nerves around the elbow.	Expects the surgeon to be able to perform arthroscopic approaches to the elbow joint	Is aware of the significant role of elbow arthroscopy in the treatment of acute and chronic elbow pathologies. Is aware of the high relevance that the procedure can have for patient outcomes.	Overview Diagnosis Intervention Planning
Ligament repair	Teaches the surgeon the possibilities and limitations of arthroscopy in the treatment of ligament lesion around the elbow (PLRI).	Expects the surgeon to be able to perform arthroscopic surgical approaches to the elbow joint, and its ligamentous stabilizers and - if indicated - perform refixation of these structures in the acute setting, or plication in the chronic setting.	Is aware of the importance of stable joint functionality and therefore appreciates the necessity to be able to perform acute and late stabilization procedures.	Fixation Stabilization Ligament Anchor Repair
Tendon repair	Teaches the surgeon the possibilities and limitations of endoscopy in the treatment of tendon repair	Expects the surgeon to be able to perform endoscopic approaches to the elbow joint and the muscle origins to - if indicated - perform refixation of these structures in the acute setting.	Is aware of the importance of stable joint functionality and therefore appreciates the necessity to be able to perform acute and late tendon repair procedures.	Fixation Strength Tendon Anchor Repair

Removal of loose bodies	Teaches the surgeon the possibilities and limitations of arthroscopy in the removal of loose bodies. The surgeon is taught how to respect the critical role of sterility and hygiene when applying arthroscopy to the elbow joint.	Expects the surgeon to be able to perform surgical minimally-invasive, arthroscopic and open approaches to the elbow joint to - if indicated - remove loose bodies.	Is aware of possible effects of loose bodies on joint function and quality of life.	Locking Pain Effusion Removal Treatment
Cartilage treatment	Teaches the surgeon the possibilities and limitations of arthroscopy in cartilage treatment.	Expects the surgeon to be able to perform open and arthroscopic approaches to the elbow joint to - if indicated - remove loose bodies.	Is aware of the high relevance of osteoarthritis for patients' quality of life and its high impact on socioeconomic costs.	Arthritis Pain crepitus Lesion Stiffness
Removal of osteophytes	Teaches the surgeon the possibilities and limitations of arthroscopy of the most common locations of and the removal of osteophytes. Teaches the surgeon how to differentiate between osteophytes and normal bone	Expects the surgeon to be able to perform open and arthroscopic approaches to the elbow joint to - if indicated - remove osteophytes.	Is aware of the high relevance of osteophytes for patients' quality of life and its high impact on socioeconomic costs.	Motion Mobility Arthroscopic open
Arthrolysis	Teaches the surgeon the possibilities and limitations of arthrolysis (anterior, posterior, posterolateral) of the elbow. Teaches how to use extra retraction portals that can help to provide a better view. The surgeon is taught the correlation between the	Expects the surgeon to be able to perform open and arthroscopic approaches to the elbow joint to - if indicated - perform elbow arthrolysis.	Is aware of the high relevance of stiffness for patients' quality of life and its high impact on socioeconomic costs.	Stiffness Function Quality of Live Arthroscopic open

	different portals and the nerves around the elbow. teaches the difference between capsulectomy and capsulotomy			
Synovectomy	Teaches the surgeon the possibilities and limitations of synovectomy (anterior, posterior, posterolateral) of the elbow. The surgeon is taught the correlation between the different portals and the nerves around the elbow.	Expects the surgeon to be able to perform open and arthroscopic approaches to the elbow joint to - if indicated - perform synovectomy.	Is aware of the high relevance of synovitis for patients' quality of life.	Pain Inflammation Joint Capsule
Fracture treatment	Teaches the surgeon the possibilities and limitations of arthroscopic fracture treatment of the elbow. The surgeon is taught the removal of bony fragments, the arthroscopic reduction and fixation techniques of the elbow (radial head fixation, coronoid fracture, capitellum fracture, ...)	Expects the surgeon to be able to perform open and arthroscopic approaches to the elbow joint to - if indicated - perform fracture repair.	Is aware of the high relevance of fractures for patients' quality of life and its high impact on socioeconomic costs.	Stability Pain Function Reposition Plate Screw
5.2 Reconstructive procedures				
Open fracture treatment	Teaches the surgeon the possibilities and limitations of open fracture treatment. Teaches the different techniques that can be used to fix fractures - pinning, screw fixation, plate and screw fixation, osteosuturing	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint that are necessary for adequate open fracture repair.	Is aware of the high relevance of adequate open fracture treatment for patients' quality of life and its high impact on socioeconomic costs.	Approach Surgery Reduction Fixation

Open ligament repair	Teaches the surgeon the possibilities and limitations of ligament repair. Teaches the different techniques that can be used for ligament repair: transosseus fixation, and anchor treatment. Knowledge of the location of the proximal and distal attachment of the ligaments around the elbow	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint that are necessary for adequate open ligament repair.	Is aware of the high relevance of adequate open ligament repair for patients' quality of life and its high impact on socioeconomic costs.	Fixation Stabilization Ligament Anchor Repair
Open tendon repair	Teaches the surgeon the possibilities and limitations of tendon repair (biceps, triceps) Teaches the different techniques and approaches (single or double incision) that can be used for tendon repair. Transosseus, endobutton, anchors, screw fixation,	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate open tendon repair.	Is aware of the high relevance of adequate open tendon repair for patients' quality of life and its high impact on socioeconomic costs.	Fixation Strength Tendon Anchor Repair
Open stabilization procedures	Teaches the surgeon the possibilities and limitations of open stabilization procedures. Teaches the different techniques and approaches (medial-lateral)	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate open stabilization procedures.	Is aware of the high relevance of adequate open joint stabilization procedures for patients' quality of life and its high impact on socioeconomic costs.	Fixation Stabilization Ligament Anchor Repair

Open arthrolysis	Teaches the surgeon the possibilities and limitations of open artholysis procedures. Teaches the different techniques and approaches (medial-lateral, anterior-posterior).	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate open joint arthrolysis.	Is aware of the high relevance of adequate open joint release for patients' quality of life and its high impact on socioeconomic costs.	Stiffness Function Quality of Life open
5.3 Osteotomies				
Corrective osteotomies of the humerus	Teaches the surgeon the possibilities and limitations of corrective osteotomy humerus. Teaches the surgeon how to make a pre-op planning (with or without 3D measurements) different techniques (open wedge, closing wedge) (with or without a 3D guide), approaches and fixation techniques.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate corrective humerus osteotomies.	Is aware of the potentially high relevance of adequate corrective osteotomy of the humerus for patients' quality of life.	Deviation Saw bone Osteotomy
Corrective osteotomies of ulna	Teaches the surgeon the possibilities and limitations of corrective osteotomy ulna. Teaches the surgeon how to make a pre-op planning (with or without 3D measurements) different techniques (open wedge, closing wedge) (with or without a 3D guide), approaches and fixation techniques.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate corrective ulna osteotomies.	Is aware of the potentially high relevance of adequate corrective osteotomy of the ulna for patients' quality of life.	Deviation Saw Ulna Planning Osteotomy

Corrective osteotomies of radius	Teaches the surgeon the possibilities and limitations of corrective osteotomy radius. Teaches the surgeon how to make a pre-op planning (with or without 3D measurements) different techniques (open wedge, closing wedge) (with or without a 3D guide), approaches and fixation techniques.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate corrective radius osteotomies.	Is aware of the potentially high relevance of adequate corrective osteotomy of the radius for patients' quality of life.	Deviation Saw Radius Correction Planning Osteotomy
5.4 Osteosyntheses				
Distal humerus fractures	Teaches the surgeon the possibilities and limitations of osteosynthesis of the distal humerus fracture. The surgeon is taught the different techniques (plate and screw fixation -> 90-90, perpendicular, one plate, external fixator) depending on the type of fracture. The surgeon is taught the step-by-step approach how to reconstruct the intra-articular fragments in case of intra-articular fractures. The surgeon is taught the advantages and disadvantages of different surgical approaches (triceps-sparing, tricepspslit,	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate distal humerus fracture repair.	Is aware of the high relevance of adequate distal humerus fracture repair for patients' quality of life and its high impact on socioeconomic costs.	Humerus fracture Fixation ORIF Plate Screw Ulnar nerve

	olecranonosteotomy, ...)			
Ulna fractures	Teaches the surgeon the possibilities and limitations of osteosynthesis of the proximal ulna fracture. The surgeon is taught the different techniques (plate and screw fixation, screw fixation, tension band wiring, and suture fixation) and its different indications. The surgeon is taught the approach for olecranon, proximal ulna and/or coronoid fractures.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate ulnar fracture repair.	Is aware of the high relevance of adequate ulna fracture repair for patients' quality of life and its high impact on socioeconomic costs.	Ulna fracture Fixation ORIF Plate Screw Ulnar nerve
Radius fractures	Teaches the surgeon the possibilities and limitations of osteosynthesis of the radial head fractures. The surgeon is taught the different techniques (plate and screw fixation, screw fixation (tripod technique), suture fixation and its different indications.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for adequate radius fracture repair.	Is aware of the high relevance of adequate radius fracture repair for patients' quality of life and its high impact on socioeconomic costs.	Radius fracture Fixation ORIF Plate Screw Radial nerve
Fracture dislocations	Teaches the surgeon the possibilities and limitations of osteosynthesis of fracture dislocations. Teaches the	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for	Is aware of the high relevance of adequate fracture dislocation repair for patients' quality of life and its high impact on	Bones fracture Fixation ORIF Plate Screw nerve

	surgeon closed and open reduction techniques for the dislocation. Teaches the surgeon a step-by-step approach to stabilize the elbow with different osteosynthesis techniques. Learn how to correctly apply an external fixator in case of remaining instability.	adequate dislocation fracture repair.	socioeconomic costs.	
5.5 Resections				
Joint resection	Teaches the surgeon the possibilities and limitations of joint resection. Teach the surgeon the different indications (degenerative, traumatic, septic).	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for ajoint resection procedures.	Is aware of the potentially high relevance of joint resection for patients' quality of life.	Salvage Degeneration Bone loss Pain
Radial head resection	Teaches the surgeon the possibilities and limitations of radial head resection. Teach the surgeon the different indications (degenerative, traumatic) Teach the surgeon to evaluate the longitudinale of varus/valgus instability after resection and teach to handle these cases.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for radial head resection.	Is aware of the potentially high relevance of radial head resection for patients' quality of life.	Salvage Degeneration Bone loss Pain
5.6 Endoprosthetics				

Total elbow arthroplasty	Teaches the surgeon the possibilities and limitations of total elbow arthroplasty. The surgeon is taught the different types of total elbow arthroplasty (linked, unlinked or linkable) and its indications. The surgeon is taught the five different types of approaches used during TEA (each comes with its unique advantages and disadvantages).	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for correct implantation of TEA. Also expects the surgeon to be able to achieve safe implant fixation and stable implant mechanics.	Is aware of the high relevance of adequate TEA for patients' quality of life and its high impact on socioeconomic costs.	Replacement Defect Bone Pain Complication Loosening Planning
Hemiarthroplasty	Teaches the surgeon the possibilities and limitations of hemiarthroplasty. The surgeon is taught the type(s) of hemi elbow arthroplasty and its indications. The surgeon is taught the different types of approaches used during hemiarthroplasty.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for correct implantation of elbow Hemiarthroplasty. Also expects the surgeon to be able to achieve safe implant fixation and stable implant mechanics.	Is aware of the high relevance of adequate Hemiarthroplasty for patients' quality of life and its high impact on socioeconomic costs.	Replacement Defect Humerus Fracture Pain Complication Loosening Planning
Radial head replacement	Teaches the surgeon the possibilities and limitations of radial head arthroplasty. The surgeon is taught the different types of radial head arthroplasty (anatomic vs nonanatomic, loose fitted vs press fitted stem, bipolar, pyrocarbon) and its indications. The surgeon is taught	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for correct implantation of radial head arthroplasty. Also expects the surgeon to be able to achieve safe implant fixation and	Is aware of the high relevance of adequate radial head arthroplasty for patients' quality of life and its high impact on socioeconomic costs.	Replacement Defect Radius Fracture Pain Complication Loosening Planning

	the different types of approaches used during radial head arthroplasty and the advantages and disadvantages relative to the indication of the surgery	stable implant mechanics and prevent overstuffing.		
Interposition arthroplasty	Teaches the surgeon the possibilities and limitations of interposition arthroplasty. The surgeon is taught about different grafts that can be used, how to fix them and the use of an external fixator in this indication.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for interposition arthroplasty.	Is aware of the potentially high relevance of interposition arthroplasty for patients' quality of life.	Salvage Degeneration Bone loss Pain
5.7 Soft Tissues (Tendons/Nerves/Vessels..)				
Direct ligament repair	Teaches the surgeon the possibilities and limitations of direct ligament repair. The surgeon is taught when there is an indication for direct ligament repair or when non-operative treatment should be proposed. The surgeon is taught the anatomical landmarks of the attachment of the MCL and LCL. The surgeon is taught rehabilitation program after direct ligament repair.	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for stable ligament repair and to be capable of various techniques for ligament fixation.	Is aware of the high relevance of ligament repair for patients' quality of life and its potentially high impact on socioeconomic costs.	Fixation Stabilization Ligament Anchor Repair

Ligament reconstruction	Teaches the surgeon the possibilities and limitations of ligament reconstruction. The surgeon is taught when there is an indication for ligament reconstruction and which grafts (allograft-autograft can be used). The surgeon is taught the anatomical landmarks of the attachment of the MCL and LCL. The surgeon is taught rehabilitation program after ligament reconstruction	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for stable ligament reconstruction and to be capable of various techniques for ligament reconstruction.	Is aware of the high relevance of ligament reconstruction for patients' quality of life and its potentially high impact on socioeconomic costs.	reconstructions surgery Stabilization Ligament Anchor Repair
Internal bracing	Teaches the surgeon the possibilities and limitations of internal bracing. The surgeon is taught when there is an indication for internal bracing and which internal braces are currently on the market The surgeon is taught on the anatomical landmarks of the attachment of the MCL and LCL. The surgeon is taught rehabilitation program after internal bracing	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for internal bracing and to be capable of surgical techniques in the field of internal bracing.	Is aware of the high relevance of internal bracing for patients' quality of life.	reconstructions surgery Stabilization Ligament Anchor Repair

Direct tendon repair	Teaches the surgeon the possibilities and limitations of tendon repair. The surgeon is taught when there is an indication for operative treatment and when non-operative treatment can be advised. The surgeon is taught the anatomical landmarks of the attachment of the biceps and triceps and the several approaches and techniques. The surgeon is taught rehabilitation program after direct tendon repair	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, necessary for stable tendon repair and to be capable of various techniques for tendon fixation.	Is aware of the high relevance of tendon repair for patients' quality of life and its potentially high impact on socioeconomic costs.	Fixation Strength Tendon Anchor Repair
Tendon transfer	Teaches the surgeon the possibilities and limitations of tendon repair. The surgeon is taught when there is an indication for operative treatment with a tendon transfer and with allograft and autograft can be used. The surgeon is taught the anatomical landmarks of the attachment of the biceps and triceps and the several approaches and techniques. The surgeon is taught rehabilitation program after tendon transfer	Expects the surgeon to be able to perform the commonly available open surgical approaches to the elbow joint, that are necessary for tendon transfer surgery and to be capable of various techniques for tendon fixation.	Is aware of the high relevance of tendon transfer for patients' quality of life and its potentially high impact on socioeconomic costs.	Insufficiency Tendon Strength Healing Biology Graft
5.8 Amputations				

Forearm amputation	Teaches the surgeon the possibilities of forearm amputations. The surgeon is taught the rare indications for this invasive and definitive procedure. Also, the surgeon is taught to share help and support for patients during the aftercare, especially focusing on neurogenic pain as well as psychological help for the mental consequences of the loss of limb. The surgeon has to know about prosthetic options (traditional and modern as well as experimental) to offer the patient options for the future.	Expects the surgeon to know the key anatomical structures and to be able to dissect them safely. Also expects the surgeon to be able to ligate major vessels of the upper extremity and to handle nerves during amputation surgery.	Appreciates the high relevance of profound understanding and knowledge of forearm amputations.	Forearm Amputation Neurovascular anatomy Salvage Pain infection
Elbow exarticulation	Teaches the surgeon the possibilities of forearm amputations. The surgeon is taught the rare indications for this invasive and definitive procedure. Also, the surgeon is taught to share help and support for patients during the aftercare, especially focusing on neurogenic pain as well as psychological help for the mental consequences of the loss of limb. The surgeon has to	Expects the surgeon to know the key anatomical structures and to be able to dissect them safely. Also expects the surgeon to be able to ligate major vessels of the upper extremity and to handle nerves during amputation surgery.	Appreciates the high relevance of profound understanding and knowledge of elbow exarticulation.	Elbow Exarticulation Neurovascular anatomy Salvage Pain infection

	know about prosthetic options (traditional and modern as well as experimental) to offer the patient options for the future.			
Distal humerus amputation	Teaches the surgeon the possibilities of forearm amputations. The surgeon is taught the rare indications for this invasive and definitive procedure. Also, the surgeon is taught to share help and support for patients during the aftercare, especially focusing on neurogenic pain as well as psychological help for the mental consequences of the loss of limb. The surgeon has to know about prosthetic options (traditional and modern as well as experimental) to offer the patient options for the future.	Expects the surgeon to know the key anatomical structures and to be able to dissect them safely. Also expects the surgeon to be able to ligate major vessels of the upper extremity and to handle nerves during amputation surgery.	Appreciates the high relevance of profound understanding and knowledge of distal humerus amputations.	Distal Humerus Amputation Neurovascular anatomy Salvage Pain infection
5.9 Arthrodesis				
Elbow arthrodesis	Teaches the surgeon the possibilities and limitations of elbow arthrodesis. The surgeon is taught the advantages and disadvantages of the several positions of fixation. The	Expects the surgeon to know the key anatomical structures around the elbow and to be able to dissect them safely. Also expects the surgeon to be able to perform stable osteosynthetic	Is aware of the significant implications of elbow arthrodesis on the quality of life of the patient, and is aware of the rarity of the indications for elbow arthrodesis.	Arthrodesis Elbow Function Impairment Indication

	surgeon is taught the use of internal and external fixation	techniques, to gain stable fusion of the joint.		