

## Orthopedic Trauma Fellow Education Curriculum – Revised 2020

### Overview:

This curriculum contains those educational objectives – both cognitive and technical, in which the graduating orthopedic trauma fellow is expected to demonstrate competence. The experiences that will drive this competence will derive from several sources. Ideally, every educational objective will be associated with an actual trauma patient encountered by the fellow during the fellowship year. In the cases that do present, the educational objectives will be met during a weekly case conference in which general characteristics of the injury including patient evaluation, perioperative management, and relevant anatomy are discussed. The technical aspects of the procedure will be introduced (including timing of surgery, patient position, selection of table, instruments required etc.) and then reinforced and solidified in the actual execution of the surgical procedure by the fellow and trauma faculty member. Unfortunately, there is no guarantee that every type of patient and injury will be seen by the orthopedic trauma service during that time interval. This is particularly true of unusual injury patterns (such as the intra-articular glenoid fracture). Educational objectives in these cases will be met by didactic lecture, journal club, literature review, and a reading program of the fellow. Many of these competencies overlap, as they should, with those of a general orthopedic residency, and some are unique to an orthopedic trauma fellowship.

The bolded educational objectives are those that are emphasized in the trauma fellowship. We have incorporated the areas specific to trauma in the ACGME milestones and will use as a supplement to the curriculum. Fellows should be evaluated at least quarterly, as well as biannually for clinical competency .

### Topics:

#### **I. General Principles of Trauma Care:**

1. Biology of Bone Repair and Fracture Healing
  - Review in detail the steps and the process of bone healing (secondary and primary bone healing)
  - Review the factors that influence the degree and type of bone healing to include systemic factors and the biomechanical and biological local conditions
  - **To discuss the current knowledge of the biochemical mediators of bone healing including the role of BMP's, parathyroid hormone, thyroid stimulating hormone, testosterone**
  - **Discuss patient factors in bone healing such as smoking, NSAID use, malnutrition, endocrine abnormalities, and infection**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc0>

2. Biomechanical Considerations for Fractures, Implants and Fracture Treatment

- Review the fracture patterns typically seen with different modes of loading
- To discuss and understand the definitions and factors influencing fracture stability
- Review the biomechanical properties of intramedullary rods and intramedullary fixation and how these factors can be changed by altering the implant
- Review the biomechanical properties of plates and screws in fracture treatment and how these factors can be altered (i.e. number of screws, length of plate, lag screws, etc.)
- **Discuss the biomechanics of fixed angle and locking plate constructs and their indications in fracture surgery**
- **Review the biomechanical properties of external fixation and how these factors can be altered**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc1>

### 3. Wound Care Management

- Review local wound management strategies, including topical enzymatic preparations, dermal regenerative matrices, wet to dry dressings, and negative pressure dressings to address non-epithelialized wounds
- Recognize scenarios whereby local wound care is insufficient and surgical intraoperative debridement is required to control the wound
- Appreciate host factors which can be optimized to improve wound healing, such as diabetes, nutrition, vasculopathy
- Recognize the ladder of reconstruction for soft tissue injuries
- Understand when to contact the plastic surgery service for help with more complex soft tissue coverage issues
- Familiarize the efficacy of post-operative wound coverage options, such as silver nitrate impregnated dressings or negative pressure dressings for at risk surgical wounds
- Understand the timing of suture or staple removal based upon host factors and location of wound

Sample articles:

[https://journals.lww.com/jaaos/Fulltext/2018/12010/Advances\\_in\\_Wound\\_Management.3.aspx](https://journals.lww.com/jaaos/Fulltext/2018/12010/Advances_in_Wound_Management.3.aspx)

[https://journals.lww.com/jaaos/Fulltext/2018/05010/The\\_Use\\_of\\_Closed\\_Incision\\_Negative\\_Pressure\\_Wound.1.aspx](https://journals.lww.com/jaaos/Fulltext/2018/05010/The_Use_of_Closed_Incision_Negative_Pressure_Wound.1.aspx)

[https://journals.lww.com/jaaos/Fulltext/2012/09000/Use\\_of\\_Negative\\_pressure\\_Wound\\_Therapy\\_in.3.aspx](https://journals.lww.com/jaaos/Fulltext/2012/09000/Use_of_Negative_pressure_Wound_Therapy_in.3.aspx)

### 4. Pathologic Fractures

- Review the appropriate radiographic evaluation of pathologic fractures
- Understand the appropriate work-up for a pathologic fracture with an unknown primary (labs, imaging, and possibly biopsy).
- Review pathologic bone conditions like osteopetrosis/atypical femoral fractures and implications on fracture care
- Review Mirels score for impending fractures
- Review surgical strategies for impending/pathologic fractures
- Review implications for chemotherapy/radiation therapy on wound/fracture healing

Sample articles:

[https://journals.lww.com/jaaos/Fulltext/2019/05150/Contemporary\\_Management\\_of\\_Appendicular\\_Skeletal.1.aspx](https://journals.lww.com/jaaos/Fulltext/2019/05150/Contemporary_Management_of_Appendicular_Skeletal.1.aspx)

[https://journals.lww.com/jaaos/Fulltext/2014/02000/Surgical\\_Management\\_of\\_Metastatic\\_Long\\_Bone.4.aspx](https://journals.lww.com/jaaos/Fulltext/2014/02000/Surgical_Management_of_Metastatic_Long_Bone.4.aspx)

5. Geriatric Patient Management

- Understand the role frailty plays in geriatric fracture patients
- Understand how to perform a basic cognitive assessment of geriatric patients
- Understand how to evaluate for delirium in geriatric patients and methods of reducing the risk • of delirium in the perioperative period
- Review advantages to patient outcomes in geriatric co-management model of care
- Understand role of palliative care in appropriate patient

Sample articles:

[https://journals.lww.com/jaaos/Fulltext/2020/02010/Outcomes\\_in\\_Multidisciplinary\\_Team\\_based\\_Approach.9.aspx](https://journals.lww.com/jaaos/Fulltext/2020/02010/Outcomes_in_Multidisciplinary_Team_based_Approach.9.aspx)

[https://journals.lww.com/jaaos/Fulltext/2004/11000/Recommendations\\_for\\_Optimal\\_Care\\_of\\_the\\_Fragility.3.aspx](https://journals.lww.com/jaaos/Fulltext/2004/11000/Recommendations_for_Optimal_Care_of_the_Fragility.3.aspx)

[https://journals.lww.com/jaaos/Fulltext/2010/05000/The\\_Role\\_of\\_the\\_Orthopaedic\\_Surgeon\\_in\\_Minimizing.4.aspx](https://journals.lww.com/jaaos/Fulltext/2010/05000/The_Role_of_the_Orthopaedic_Surgeon_in_Minimizing.4.aspx)

6. Initial Assessment and Management of the Multiply Injured Patient

- Review the basic ATLS protocols for assessment of injured patients
- Review the resuscitation and ongoing assessment of resuscitation efforts in injured patients
- To discuss the appropriate roles and interactions between the various subspecialists involved in trauma care
- **Discuss the prioritization of injuries in the polytrauma patient**
- **Review the various trauma scores in use and their relevance (AIS, ISS, NISS)**
- **Discuss how fracture treatment is altered in the treatment of the polytraumatized patient**
- **Discuss the concept of “damage control orthopedics” versus “early total care” and what criteria are examined to help choose the more appropriate algorithm.**
- **Be familiar with the spectrum of skeletal stability in “damage control orthopedics”**
- **Discuss the timing of secondary procedures when “damage control orthopedics” is initially selected**
- Review site specific massive transfusion protocols and when to consider activation

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc9>

7. Assessment, Management of Polytrauma Patients with Head Injuries

- To understand the assessment of the head injured polytrauma patient
- Review the Glasgow Coma Scale and its relevance

- **To consider the effect of fracture treatment on the head injured patient and how it may need to be altered in these patients**
- **To consider the effect of head injury on fracture treatment (i.e. inability of patient to cooperate with post-operative protocols, contractures, spasticity, heterotopic ossification, etc.)**
- **Understand the concerns of the neurosurgeon with respect to early fracture care and how optimal care of the trauma patient with head injuries and long bone fractures can be “negotiated”.**

Sample articles:

[https://journals.lww.com/jaaos/Fulltext/1998/09000/Extremity\\_Fractures\\_in\\_the\\_Patient\\_With\\_a.5.aspx](https://journals.lww.com/jaaos/Fulltext/1998/09000/Extremity_Fractures_in_the_Patient_With_a.5.aspx)

[https://journals.lww.com/jorthotrauma/Fulltext/2010/02000/Femur\\_Shaft\\_Fracture\\_Fixation\\_in\\_Head\\_Injured.7.aspx](https://journals.lww.com/jorthotrauma/Fulltext/2010/02000/Femur_Shaft_Fracture_Fixation_in_Head_Injured.7.aspx)

8. Principles of External Fixation and its use in the trauma patient
  - Review the indications for use of external fixation in fracture treatment including both definitive and temporary use.
  - **Review basic frame constructs for external fixators to include uniplanar and multiplanar and the use of half pins and thin wires**
  - **Review techniques and locations for placement of pins and wires**
  - **Review the biomechanical considerations with different pins, wires and constructs and how these enter decision making in fracture treatment**
  - **Review the techniques for pin site management**
  - Review cost of various external fixator components

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc7>

JAAOS:

[https://journals.lww.com/jaaos/Fulltext/2015/11000/External\\_Fixation\\_Principles\\_and\\_Applications.5.aspx](https://journals.lww.com/jaaos/Fulltext/2015/11000/External_Fixation_Principles_and_Applications.5.aspx)

9. Multiplanar External Fixation
  - **Understand the spectrum of use of multiplanar external fixation in the acute and reconstructive phases of orthopedic trauma care**
  - **Understand the basic frame configurations for treating periarticular tibial fractures (pilon and plateau), segmental bone loss (bone transport), and deformity correction**
  - **Understand how to use the software to create a computer assisted deformity correction prescription.**

Sample article:

[https://journals.lww.com/jaaos/Fulltext/2006/00001/Distractio\\_n\\_Osteogenesis.37.aspx](https://journals.lww.com/jaaos/Fulltext/2006/00001/Distractio_n_Osteogenesis.37.aspx)

10. Basic Principles and Techniques of Internal Fixation of Fractures
  - To understand the rationale for internal fixation of fractures

- To understand reduction techniques (direct and indirect) and how they relate to internal fixation
- To discuss the concept of stability, both absolute and relative and how this affects fracture healing--primary bone healing vs. secondary callus formation
- Understand interfragmentary compression using lag screws, compression plates, and the articulated tensioner
- Review techniques and the ways to create both absolute and relative stability.
- Review and understand tension band wire principles, its proper technique and its indications for use

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc1>

#### 11. Principles for Evaluation and Treatment of Patients with Vascular Injuries

- To understand the principles of assessment and the interpretation of the assessment of the vascular system in patients with fractures to include physical examination, doppler signals, doppler pressure measurements and indices, including ankle-brachial index
- To discuss and understand the use of arteriography and duplex scan to include indications, technique and location (in the operating room or in radiology)
- To understand the types of vascular injuries and their significance
- **To understand the principles of the treatment protocols for the patient with their fracture and ischemic injury to include a discussion of the timing, order of treatment, indication for shunts, different options for fracture fixation both temporary and definitive treatment, and consideration for amputation.**
- **To understand the indications and importance of fasciotomies in patients with vascular injuries following restoration of flow**
- **Discuss who should perform fasciotomies in these patients (vascular vs orthopedics)**
- **To discuss and understand principles of post-operative management in patients with vascular injuries.**
- Discuss which vascular repairs may require anticoagulation and the implications of this on the surgical and post-surgical management of patients with vascular injuries
- **Understand the concerns of the vascular surgeon in treating an ischemic limb in a patient with a fracture, such as post-bypass manipulation during skeletal reconstruction, and how optimal care of the patient can often be achieved by working in parallel with the vascular team**

Sample article:

[https://journals.lww.com/jaaos/Fulltext/2011/08000/Vascular\\_Injury\\_Associated\\_With\\_Extremity\\_Trauma\\_.5.aspx](https://journals.lww.com/jaaos/Fulltext/2011/08000/Vascular_Injury_Associated_With_Extremity_Trauma_.5.aspx)

#### 12. Compartment Syndromes

- Review the definition of compartment syndromes
- Review the anatomy of the compartments of the upper and lower extremities
- Review and understand the pathophysiology of compartment syndromes
- Review the possible etiologies of compartment syndromes

- Review the diagnosis of compartment syndromes
- **Review compartment pressure measurements to include the techniques and the interpretation of the pressure measurement in light of the current patient hemodynamics**
- Discuss the utility of continuous compartment pressure monitoring
- **To understand the local anatomy and surgical technique used in the treatment of compartment syndromes in the upper and lower extremities**
- **To be familiar with the sequelae of untreated compartment syndromes**
- **Understand when one should NOT release a compartment syndrome**
- **Know options for soft tissue coverage and closure including mobilization of lateral compartment with anterior compartment loss.**
- **To understand the medical-legal issues of compartment syndromes, particularly the importance of thorough documentation in a timely manner.**
- **Discuss unusual compartment syndromes such as deltoid or gluteal and their surgical treatment**
- **Discuss the rationale and indications for alternative fasciotomies pending fracture fixation considerations**
- Review future possible diagnostic modalities including direct measurement of oxygen, pH, lactate and tissue glucose

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc2>

### 13. Fractures with Soft Tissue Injuries – the open fracture

- To understand the importance of the etiology and mechanism of injury as it relates to the energy dissipated to the extremity.
- Be familiar with both the Gustilo-Anderson Classification as well as the Tscherne Classification of soft tissue injuries and the implication of the various categories.
- Understand the assessment and early treatment objectives in the open fracture including the timing of debridement, antibiotic use, tetanus prophylaxis, and splinting.
- Discuss the need for, and timing of, serial wound debridement in the open fracture. Understand “ladder of decolonization” of open wounds with a WV.
- Know indication for WV bead pouch vs local antibiotics.
- Discuss the early involvement of plastic surgery consultants in this process.
- Understand the sequence and technique of debridement in a wound with tissue and bone loss.

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc8>

### 14. Wound Coverage Techniques

- Be familiar with the spectrum of wound coverage techniques and how they apply in a given clinical setting.
- Discuss definitive and temporary wound coverage technique and their uses.
- **Understand the effects of timing of wound coverage on infection, bone healing, and patient metabolism.**

- **Understand the indications and techniques for a split thickness skin graft**
- **Understand the indications for a rotational as well as free flap in the injured extremity including a specific review of the various rotational flaps and types of free flaps available and their advantages/disadvantages**
- **Understand the use and limitations of vacuum assisted closure techniques in the management of open wounds and soft tissue defects**

Sample article:

[https://journals.lww.com/jaaos/Fulltext/2011/02000/Reconstruction\\_of\\_Soft\\_tissue\\_Injury\\_Associated.3.aspx](https://journals.lww.com/jaaos/Fulltext/2011/02000/Reconstruction_of_Soft_tissue_Injury_Associated.3.aspx)

#### 15. Biology of Bone Grafting and Bone Graft Substitutes

- Review and understand the indications and function for bone grafts
- To understand the process of incorporation of bone grafts
- **To understand and review the techniques and sites for harvesting autograft including RIA – reamer aspirator irrigator**
- **Review the current options for bone graft substitutes including demineralized bone matrix and ceramics**
- **Understand the use of BMP (bone morphogenetic protein) and PDGF and role in fracture healing and non-unions**
- **Know need for Vitamin D as well as dose and duration.**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc0>

#### 16. Osteoporosis and Osteoporotic Fractures

- Understand the implications of osteoporosis on fracture fixation techniques
- **Understand the need for screening and post-injury treatment of underlying osteoporosis**
- **Understand the indications for referral to an endocrine specialist in refractory cases of osteoporosis**
- **Understand how to interpret a DEXA study**
- Basic understanding of available medications (Forteo, bisphosphonates etc\_)

Sample articles:

<https://journals.lww.com/jorthotrauma/pages/articleviewer.aspx?year=2008&issue=09000&article=00007&type=Fulltext>

[https://journals.lww.com/jaaos/Fulltext/1999/01000/Osteoporosis\\_Current\\_Modes\\_of\\_Prevention\\_and.3.aspx](https://journals.lww.com/jaaos/Fulltext/1999/01000/Osteoporosis_Current_Modes_of_Prevention_and.3.aspx)

[https://journals.lww.com/jaaos/Fulltext/1993/09000/Osteoporosis\\_The\\_Role\\_of\\_the\\_Orthopaedist.7.aspx](https://journals.lww.com/jaaos/Fulltext/1993/09000/Osteoporosis_The_Role_of_the_Orthopaedist.7.aspx)

[https://journals.lww.com/jaaos/Fulltext/2019/10150/Diagnosis\\_and\\_Treatment\\_of\\_Osteoporosis\\_What.6.aspx](https://journals.lww.com/jaaos/Fulltext/2019/10150/Diagnosis_and_Treatment_of_Osteoporosis_What.6.aspx)

#### 17. ARDS Fat Embolism Syndrome and Thromboembolic Disorders in the Injured Patient

- Review the etiology, the diagnosis and the pathophysiology of ARDS and fat embolism syndrome
- **Review the significance of fat embolism syndrome as it relates to the treatment of fractures - particularly intramedullary nailing**
- **Review the treatment of fat embolism syndrome**
- Review and understand the relationship of injured patients and concerns with thromboembolic disorders to include the incidence of deep vein thrombosis and pulmonary emboli in trauma patients
- Review and understand the mechanisms of action of the possible techniques for prophylaxis against deep vein thrombosis in trauma patients
- To discuss the indications for deep vein thrombosis prophylaxis in trauma patients
- **To understand the available and use of screening methods and methods of diagnosis of deep vein thrombosis and pulmonary emboli (Venous duplex scanning, MRI venography, and CT angiography)**
- **Review and discuss indications for vena caval filters and their complications**
- **Review the treatment of deep vein thrombosis and PE and the implications for fracture treatment**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc9> and <https://ota.org/education/evidence-based-medicine-resource-list/general#toc3>

#### 18. General Principles in the Assessment and Treatment of Nonunions

- Review and understand the definitions of delayed union and nonunion
- Review laboratory workup of nonunion patients (infectious, nutritional, and hormonal) and role of possible endocrinology consultation
- Review and understand the etiologies of nonunions to include systemic fractures affecting bone healing and the local mechanical and biologic conditions affecting bone healing
- To understand factors important in the patient's history, physical exam and evaluation as related to the etiology and treatment of non-unions
- Review and understand the diagnosis of nonunions by clinical and radiographic examination
- **To understand the principles of nonunion treatment**
- **Review nonoperative treatment of nonunions to include a review of the role of bone stimulators to treat nonunions**
- **To understand operative treatment methods for nonunions and the potential advantages and disadvantages of all of these methods and to also understand their indications and contraindications**

Dr. Brinker's chapter on nonunions:

<http://drbrinker.com/attachments/articles/48/Nonunion%20Chap%202009%20proof.pdf>

#### 19. Nonunions with a Segmental Bone Defect

- Know definition of a Critical sized bone defect



- **To understand treatment options for acute fractures and nonunions with critical sized bone defects including: Masquelet technique, bulk autografting, vascularized free bone grafts and bone transport (distraction osteogenesis) and review the advantages and disadvantages with each method**
- **To discuss bulk autografting techniques for bony defects**
- **To understand the histology of distraction histiogenesis (bone transport) and to discuss and to understand the techniques and instrumentation for bone transport**
- **Discuss the use of BMP's (bone morphogenetic protein), ceramics, Calcium sulfate and calcium phosphate other bone void fillers in the treatment of acute fractures and non-unions**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc7>

JAAOS:

[https://journals.lww.com/jaaos/Fulltext/2015/03000/Management\\_of\\_Segmental\\_Bone\\_Defects.2.aspx](https://journals.lww.com/jaaos/Fulltext/2015/03000/Management_of_Segmental_Bone_Defects.2.aspx)

## 20. Assessment and Treatment of Malunions and post-traumatic deformities

- Review and understand the natural history of malunited fractures
- Review the indications for treatment of malunions
- **Review the radiographic evaluation and preoperative planning in patients with malunited fractures**
- **Understand the importance and techniques in deformity analysis in both the coronal, axial, and sagittal planes.**
- **Review the treatment options and understand the different types of osteotomies and fixation methods with their potential advantages and disadvantages**
- **Understand the use of, and indications for, computer assisted multiplanar fixator for the treatment of multiplanar malunions.**
- **Review the use of closed femoral shortening in the treatment of post-traumatic leg length discrepancies.**

Dr. Brinker's chapter on malunion:

[http://www.drbrinker.com/attachments/files/72/Brinker\\_PrinciplesofMalunions.pdf](http://www.drbrinker.com/attachments/files/72/Brinker_PrinciplesofMalunions.pdf)

JAAOS:

[https://journals.lww.com/jaaos/Fulltext/2003/09000/Lower\\_Extremity\\_Angular\\_Malunion\\_Evaluation\\_and.3.aspx](https://journals.lww.com/jaaos/Fulltext/2003/09000/Lower_Extremity_Angular_Malunion_Evaluation_and.3.aspx)

## 21. Pathophysiology and Treatment Decisions for the Treatment of Osteomyelitis

- To understand the diagnosis of osteomyelitis – and post fixation infections involving implants
- To understand the natural history of both treated and untreated osteomyelitis

- To understand the classification systems of osteomyelitis and how these relate to treatment decisions
- **To understand the bacteriology and histology as related to the pathophysiology of osteomyelitis both with and without implants**
- **To understand surgical treatment options and techniques for osteomyelitis**
- **To understand antibiotic treatment and suppressive treatment for osteomyelitis**
- **Understand the indications for Infectious disease consultations when treating a patient with osteomyelitis**
- **Understand mechanism of action, dose, route, and duration of antibiotics treatment**
- **Review the possibility of “culture negative” infections and implications on treatment**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc6>

## 22. Fractures Secondary to Gunshot Wounds

- Review and understand the ballistics of bullets and guns including distinguishing between high- and low-velocity injuries
- Review and understand injuries associated with gunshot wounds to include vascular injuries and nerve injuries and their evaluation and treatment with penetrating trauma
- Review and understand the principles of treatment of a soft tissue injury associated with a gunshot wound
- Review and understand the principles of treatment of a bony injury secondary to a gunshot wound to include the timing and indications for surgical treatment
- **Review the use of antibiotics in patients with fractures secondary to gunshot wounds**
- **Review and discuss the principles for treatment of intra-articular injuries from gunshot wounds both with and without fractures.**
- **Understand the difference in zone of injury, and debridement requirements, between the high energy hunting rifle or military rifle, shotgun, and the low energy handgun**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/general#toc7>

## 23. Fracture Classification

- Review the significance and use of fracture classification systems
- To understand the criteria of a useful classification system
- **Review the AO/OTA classification system in detail stressing basic principles**
- **To understand the significance of inter-observer variation**
- Fracture Management of specific Anatomic areas.

Classification:

[https://www2.aofoundation.org/AOFileServerSurgery/MyPortalFiles?FilePath=/Surgery/en/\\_docs/AOTA%20Classification%20Compendium%202018.pdf](https://www2.aofoundation.org/AOFileServerSurgery/MyPortalFiles?FilePath=/Surgery/en/_docs/AOTA%20Classification%20Compendium%202018.pdf)

#### 24. Injuries of the Clavicle, Acromioclavicular Joint and Sternoclavicular Joint

- Review the anatomy pertinent to injuries in these areas
- Review the physical examination and radiographic evaluation for fractures of the clavicle and acromioclavicular joint
- To understand treatment options for clavicle fractures
- **To understand the indications for acute surgical treatment of scapula, AC/SC joints and clavicle fractures**
- **Review complications of operative and non-operative treatment**
- **Review and understand the principles for the treatment of clavicle nonunions**
- Review and become familiar with the classification of distal clavicle fractures and understand the relevant anatomy associated with this classification system. Review expected outcomes with operative and nonoperative treatment specific to distal clavicle fractures
- Review the classification and principles of treatment for acromioclavicular joint injuries
- Review the anatomy of the sternoclavicular joint including its medial physis
- **To understand the radiographic techniques for assessing the sternoclavicular joint in patients with a suspected injury**
- **To understand injuries associated with sternoclavicular joint dislocations**
- **Review the treatment of anterior and posterior sternoclavicular dislocations**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/shoulder#toc0> and <https://ota.org/education/evidence-based-medicine-resource-list/shoulder#toc2>

#### 25. Scapular Fractures and Scapulothoracic Dissociation

- Review the anatomy of the scapula and shoulder girdle
- To understand the mechanisms of injury and associated injuries with scapula fractures and scapulothoracic dissociation
- To understand the appearance on physical examination and radiographic evaluation of patients with scapula fractures and scapulothoracic dissociations
- Review common fracture patterns and the classification of scapula fractures
- To understand the principles of management of scapula fractures
- **To understand the indications for surgical treatment of scapula fractures and the basis for these indications**
- **Review the techniques of surgical treatment for scapula fractures to include approaches, methods of reduction and fixation and potential complications**
- **Review expected outcomes with scapula fractures**
- **To understand the principles of management of scapulothoracic dissociation and its potential associated injuries including vascular and neurologic injury**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/shoulder#toc1>

#### 26. Fractures of the Proximal Humerus and Glenohumeral Dislocation

- Review the pertinent anatomy and functional requirements of the proximal humerus and glenohumeral joint
- Review the etiology and mechanism of injury for proximal humerus fractures
- Review the physical examination and radiographic evaluation in patients with proximal humerus fractures
- Review the classification of proximal humerus fractures
- Review the treatment options and principles for decision making in patients with proximal humerus fractures
- **Review the indications for surgical treatment, surgical treatment, and implant selection for each fracture classification of the proximal humerus**
- **Review the indications and techniques for hemiarthroplasty or reverse arthroplasty in patients with proximal humerus fractures**
- **Review the post-operative management, rehabilitation and complications for patients with proximal humerus fractures**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/shoulder#toc3>

#### 27. Fractures of the Humeral Shaft

- Review the relevant anatomy and deforming forces for fractures about the humeral shaft
- Review classification system of humeral shaft fractures
- Review and understand the mechanism of injury, pertinent history and physical examination in patients with humeral shaft fractures
- Review and understand methods of closed management in patients with humeral shaft fractures
- To understand the surgical options of humeral shaft fractures with specific attention to intramedullary fixation vs. plate fixation vs. external fixation
- **Review the issues regarding a radial nerve injury at the time of presentation in a patient with a humeral shaft fracture**
- **Review the surgical techniques and surgical approaches for the treatment of humeral shaft fractures**
- **Review the outcome and complications of the treatment of humeral shaft fractures**
- **To understand factors that may lead to humeral shaft nonunions and to understand the basic principles for the treatment of humeral shaft nonunions**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/humerus#toc0>

#### 28. Fractures of the Distal Humerus

- Review the pertinent surgical and functional anatomy about the elbow
- Review the classification of fractures at the distal humerus
- Review and understand the mechanism of injury, history and physical exam in patients with distal humerus fractures
- Review the radiographic evaluation of distal humerus fractures

- **Review and understand surgical approaches, patient positioning and treatment options / techniques for all types of distal humerus fractures including extra-articular and intra-articular fractures, unicondylar and bicondylar intra-articular fractures and capitellar fractures,**
  - **Understand the indications and techniques for olecranon osteotomies in the treatment of distal humerus fractures including various options for repair**
  - **To understand the principles of post-operative management for fractures about the distal humerus with expected outcomes and potential complications**
- EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/humerus>

#### 29. Elbow Dislocations and Elbow Instability

- To understand the mechanisms of injury, history and physical exam in patients with elbow dislocations
- Review the radiographic evaluation of elbow dislocations
- Review the pathoanatomy with elbow dislocations and its possible effects on post-reduction stability
- Review the classification of elbow dislocations
- Review and understand the techniques for reduction of elbow dislocations and subsequent determination of stability
- To understand the post reduction management principles given inherent elbow stability, and to recognize potential early and late complications.
- To understand Essex-Lopresti injuries and evaluation of wrist and forearm stability following the surgical management of complex elbow injuries
- **To understand the principles of assessment of the elbow if the elbow remains unstable after reduction**
- **To understand the principles for the diagnosis and treatment of recurrent dislocations or instability at the elbow after a closed reduction of the elbow dislocation to include surgical approaches, techniques, the use of external fixation and open reduction internal fixation of associated fractures (coronoid fractures), and the reconstruction of collateral ligaments**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/forearm#toc5>

#### 30. Olecranon Fractures and Radial Head Fractures

- To understand principles of radiographic evaluation of olecranon fractures
- To understand the classification of olecranon fractures
- Review treatment options for patients with olecranon fractures and the indications for surgery
- Review and understand the surgical techniques with their biomechanical considerations, advantages and disadvantages of these techniques for treatment of olecranon fractures

- Review the expected outcomes and complications of patients treated for olecranon fractures
- Review the use of non-operative management of olecranon fractures in the appropriate geriatric patient.
- Review the mechanism of injury, history and physical exam in patients with radial head fractures
- Review the radiographic evaluation of patients with radial head fractures
- **To understand the role of the radial head in a patient with a radial head fracture and elbow dislocation**
- **Review the classification of patients with radial head fractures and specific treatment recommendations for each classification**
- **To understand the indications and surgical techniques for operative treatment of radial head fractures including radial head replacement**
- **Review the expected outcomes and complications of treatment in patients with radial head fractures**

EBQVS articles on elbow fracture/dislocations:

<https://ota.org/education/evidence-based-medicine-resource-list/forearm#toc3>

### 31. Forearm Fractures

- Review all pertinent anatomy and function of the forearm including particular importance of radial bow
- Review the incidence, mechanisms of injury and clinical findings related to forearm fractures
- Review the classification of forearm fractures
- Review the indications for surgical treatment of forearm fractures
- Review the surgical approaches to the forearm with the advantages and disadvantages as related to the approach and the fracture location and patterns
- **Review Galeazzi fractures to include the treatment considerations for the distal radial ulnar joint dislocation**
- **Review Monteggia fractures and the evaluation of persistent radial head subluxation**
- **Review the outcomes and possible complications related to fractures about the forearm**

EBQVS articles on Both bone fractures:

<https://ota.org/education/evidence-based-medicine-resource-list/forearm#toc3>

### 32. Fractures of the Distal Radius

- Review pertinent clinical assessment, clinical findings and radiographic assessment for distal radius fractures
- Review the classification systems for distal radius fractures

- To understand the general principles and goals of management of distal radius fractures by patient age and functional level
- Review the techniques for closed reduction of distal radius fractures to include anesthetic techniques and to include the radiographic assessment of the acceptability of the reduction and the alignment
- **Review the indications for surgery and surgical options for treatment of distal radius fractures - including the use of volar locked plating and dorsal bridge plating, and definitive external fixation**
- **Discuss post-operative rehabilitation of a patient with a distal radius fracture**
- **Review the outcomes and potential complications related to distal radius fractures and its treatment**

EBQVS articles on wrist fractures:

<https://ota.org/education/evidence-based-medicine-resource-list/wrist>

### 33. Amputations of the Upper Extremity

- Review and understand the general principles of amputations of the upper extremity
- Review the techniques for amputations about the upper extremity
- **Review complications and their management following amputations of the upper extremity (include pain control and phantom sensations/pain)**
- **Review prosthetic options and prosthetic wear in upper extremity amputees**
- **Appreciate options for targeted muscle reinnervation for the treatment of post-amputation related neurologic symptoms**

<https://orthop.washington.edu/patient-care/limb-loss-education.html>

### 34. Hip Dislocations and Femoral Head Fractures

- Review the relevant anatomy with relation to dislocations and femoral head fractures with emphasis on the blood supply to the femoral head
- Review the incidence, mechanisms of injury and clinical findings with hip dislocations and femoral head fractures
- Review the classification systems for hip dislocations
- Review the goals and the principles of treatment for hip dislocations to include the techniques of closed reduction and open reduction and how the presence of a femoral head fracture with a dislocation affects the decision making
- Review the radiographic assessment of the hip before and after reduction to include a discussion of the role for CT scans, MRI scans and bone scans
- To understand the principles for treatment after reduction of hip dislocations
- To understand the expected outcomes and complications associated with patients after hip dislocations
- **Review the classification systems for femoral head fractures**

- **Review the goals and principles of treatment for femoral head fractures to include the indications for operative treatment**
- **Review the techniques for operative treatment of femoral head fractures with discussions of fragment excision, open reduction and internal fixation and prosthetic hip replacement.**
- **Understand the appropriate surgical approaches to the hip in patients with femoral head fractures**
- **Review the expected outcomes and complications for patients with hip dislocations and/or femoral head fractures**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/femur#toc2>

### 35. Fractures of the Femoral Neck

- Review the pertinent anatomy and to understand the issues related to the blood supply about the hip (include intracapsular hematoma)
- Review the incidence and mechanisms of injury for femoral neck fractures and to distinguish the high energy fractures in young patients from the low energy fractures in the osteoporotic patients
- Review the classification systems for femoral neck fractures
- **To understand the principles and options for treatment of femoral neck fractures to include an understanding of the advantages and disadvantages for fixation of femoral neck fractures, hemiarthroplasty and total hip replacement based on patient age and functional level.**
- **Review expected outcomes in patients with femoral neck fractures and to understand all potential complications, sequelae and treatment**
- **Discuss the timing of surgical intervention in the young high energy femoral neck fracture, and the choice of surgical approaches and implants for each fracture type.**
- **Discuss the indications and technique of closed capsulotomy in the high energy femoral neck fracture**
- **Discuss the issues and decision-making process for treating a femoral neck fracture associated with a femoral shaft fracture.**
- **To understand principles and techniques for treatment of femoral neck nonunions including the preoperative planning and surgical execution of the Pauwel's Osteotomy**
- **Understand indications and techniques for acute THA in acute femoral head and acetabular fractures or post-traumatic arthrosis or fixation failure**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/femur#toc2>



### 36. Intertrochanteric Femur Fractures

- Review the mechanisms of injury, incidence and physical findings related to patients with intertrochanteric femur fractures
- Review the radiographic assessment of intertrochanteric femur fractures
- Review the classification systems for intertrochanteric femur fractures
- To understand the goals and options for treatment of patients with intertrochanteric femur fractures
- **To understand the techniques and the rationale for implants used for operative treatment in patients with intertrochanteric femur fractures based on age and energy of injury, and to understand the expected outcomes and possible complications in these patients**
- **To understand the possible causes for failure of treatment of intertrochanteric femur fractures and the options and techniques for salvage in these patients**
- **Appreciate the role of multidisciplinary care team to lessen peri-operative complications following geriatric intertrochanteric fracture**
- **Appreciate the preoperative medical evaluation to improve patient optimization prior to geriatric intertrochanteric fracture treatment**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/femur#toc2>

### 37. Femoral Shaft Fractures (Including subtrochanteric femur fractures)

- Review the pertinent anatomy as it relates to fractures of the femur
- Review the incidence, mechanisms of injury, physical findings and commonly associated injuries in patients with femur fractures
- Review the classification systems for femur fractures
- Review the goals and options for treatment of femoral fractures
- Review the incidence of concurrent femoral neck fractures and the appropriate radiographic workup
- **To understand the issues of femur fractures as related to the treatment and management of multiply-injured patients - including the “damage control approach” versus early total care.**
- **Review the techniques for surgical treatment of femur fractures, including intramedullary nailing – both antegrade and retrograde, and the antegrade starting site – both piriformis and lateral. Discuss plating options for femoral shaft fractures**
- **Review the management of femur fractures requiring special consideration, to include open fractures, pathologic fractures, fractures associated with a vascular injury, fractures related to gunshot wounds and fractures with an ipsilateral femoral neck fracture**
- Review techniques for managing concurrent femoral shaft/neck injuries

- **Review the treatment of subtrochanteric femur fractures including possible options for reduction, surgical fixation and their respective techniques**
- **Review the expected outcomes and complications for treatment of fractures about the femur**
- **Review the treatment of femur nonunions**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/femur#toc2>

### 38. Supracondylar and Intercondylar Fractures of the Distal Femur

- Review the pertinent anatomy as related to the distal femur and the deforming forces about distal femoral fractures
- Review the incidence and mechanism of injury of distal femur fractures
- Review and understand the physical examination and radiographic evaluation and commonly associated injuries with distal femur fractures
- Review the classification system of distal femur fractures
- Review and understand the principles for management and decision making in the treatment of distal femur fractures
- **Understand the indications and techniques for the staged management of the complex intra-articular distal femur fracture including spanning external fixation and CT scanning**
- **Review fractures requiring special considerations about the distal femur to include those with vascular injury, open fractures, fractures with large degree of bone loss, fractures secondary to gunshot wounds, pathologic fractures and fractures with extensive intra-articular comminution**
- **Discuss the surgical approaches for treatment of the distal femur fracture including direct lateral, anterolateral, and medial.**
- **Discuss the choice of implant including retrograde femoral nailing, locked plating, and polyaxial locking plates**
- **Review the post-operative management in patients with distal femur fractures**
- **Review the outcomes and possible complications related to distal femur fractures and its treatment**
- **Appreciate how incorrect placement of a distal femur condylar plate results in iatrogenic malreduction of the articular segment**

EBQVS articles: <https://ota.org/education/evidence-based-medicine-resource-list/femur#toc2>

### 39. Periprosthetic Fractures

- Understand the incidence and mechanism of injury of periprosthetic fractures around a total hip or a total knee replacement.
- Understand the radiographic evaluation of patients with a periprosthetic fracture.

- **Be familiar with the classifications systems used to describe periprosthetic fractures and the impact of classification type on treatment.**
- **Understand the surgical treatment of periprosthetic fractures including internal fixation and revision joint arthroplasty.**
- **Understand the use of locking plates, periprosthetic fracture plates, or intramedullary nails in the treatment of these injuries.**
- **Discuss and understand the need for the involvement of total joint specialists in the evaluation and treatment of these injuries**

#### 40. Knee Dislocations

- Review the relevant anatomy associated with the knee and knee dislocations
- Review the mechanism of injury and incidence of knee dislocations
- Review and understand the physical examination associated with patients with knee dislocations including a thorough vascular and neurologic examination
- **Review the radiographic diagnosis and findings associated with knee dislocations - including a review of the Moore classification and the subtle radiographic findings associated with these injuries**
- **Review and understand the early management with techniques for reduction, indications for arteriogram and techniques for bony stabilization in patients with knee dislocations – including spanning external fixation**
- **Review definitive management and the role for MRI scans in patients with knee dislocations**
- **Review the indications and timing for knee ligamentous repair/reconstruction in patients with knee dislocations**
- **Review the techniques for ligamentous repair/reconstruction in patients with knee dislocations**
- **Review the post-operative management in patients who have undergone knee reconstruction for knee dislocations**
- **Review the outcomes and complications following knee dislocations in those patients who have and have not undergone knee ligamentous reconstruction**
- **To understand and differentiate the anatomy of those patients who undergo extremely high energy traumatic knee dislocations versus those who have sports related lower energy dislocations or obese patients with “ultralow energy” dislocations.**
- **Understand the role of the sports medicine specialist in the treatment of these injuries**

EBQVS articles on : <https://ota.org/education/evidence-based-medicine-resource-list/knee-dislocation>

#### 41. Injuries to the Patella and Extensor Mechanism

- Review the relevant anatomy and biomechanical considerations of the extensor mechanism of the knee
- Review the incidence and mechanism of injury of extensor mechanism in patella injuries
- Review the physical exam and radiographic evaluation for patella injuries and extensor mechanism injuries
- Review the fracture classification for patella fractures
- Review the treatment options and techniques for nonoperative treatment for patella fractures and extensor mechanism disruptions
- Review the indications for surgery of patella fractures and extensor mechanism injuries
- **Review surgical techniques including tension band techniques, distal or proximal pole excision and patellectomy and late extensor mechanism reconstruction**
- **Understand the post-operative management for patients with knee dislocations and extensor mechanism injuries**
- **Review outcomes and potential complications in patients with patellar fractures and extensor mechanism disruptions**

EBQVS articles on : <https://ota.org/education/evidence-based-medicine-resource-list/knee-dislocation>

#### 42. Fractures of the Tibial Plateau

- Review the relevant anatomy of the proximal tibia and knee
- Review the incidence and mechanism of injury of tibial plateau injuries
- Review the physical exam and radiographic evaluation including the role for special radiographic evaluation in patients with tibial plateau fractures (MRI and CT) (include discussion on potential vascular injuries)
- Review the injuries associated with tibial plateau fractures including meniscus and ligament injuries and their impact on management
- Review the classification systems for tibial plateau fractures (Moore, Schatzker, Column and AO/OTA)
- Review the indications for and techniques of spanning external fixation in the early treatment of a tibial plateau fracture
- Review the goals of treatment and the basic principles of treatment for decision making in patients with tibial plateau fractures
- Review the options and techniques for closed treatment of tibial plateau fractures
- **Review the indications for surgical treatment of tibial plateau fractures, including surgical incisions based on fracture location.**
- **Discuss the indications for knee arthroscopy in the treatment of tibial plateau fractures**

- **Discuss the decision making and techniques for managing a patient with a tibial plateau fracture and a compartment syndrome**
- **Review the indications and techniques for fixation of the posteromedial fragment.**
- **Familiarize with posterior approaches to the tibia, including the extended posteromedial approach and the posterolateral approach.**
- **Discuss the surgical management of tibial plateau fractures by fracture type, and the use of the femoral distractor, and the management of meniscal and ligament injuries**
- **Review the uses and limitations of locked plating in the treatment of tibial plateau fractures**
- **Discuss the options for a space filling bone substitute in the management of the void in the surgical treatment of a tibial plateau fracture (cancellous allograft vs calcium phosphate ceramic)**
- **Review the post-operative management including splinting, early motion, and possible late knee manipulation.**
- **Review the late management of a patient with a tibial plateau fracture including the need for, and implications of, total knee arthroplasty**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/tibia>

#### 43. Fractures of the Tibial Diaphysis (open and closed)

- Review the relevant anatomy about the tibia
- Review the incidence and mechanism of injury of tibial shaft fractures
- Review the physical exam, radiographic evaluation and commonly associated injuries in patients with tibial shaft fractures
- Review the classification systems for tibial shaft fractures
- Review the goals and principles of treatment and to understand the basis for what is considered acceptable alignment for tibial shaft fractures
- Review the techniques for reduction, casting and functional bracing for closed tibial shaft fractures
- Review the indications for surgical treatment of tibial shaft fractures
- **Review the options for surgical treatment with the advantages and disadvantages of each of these options for tibial shaft fractures (including IM nailing, plating, and external fixation)**
- **Review the techniques for surgical treatment of tibial shaft fractures**
- **Review the expected outcomes and complications of fractures of the tibial shaft based on the injury and based on the form of treatment**
- **Review briefly compartment pressure measurements and compartment syndromes as related to tibial shaft fractures**
- **Review the principles of treatment of the soft tissue injury related to tibial shaft fractures and issues of coverage**

- **Discuss the staged treatment of the open tibial shaft fracture with initial use of external fixation and subsequent conversion to definitive internal fixation.**
- **Review treatment options for stabilization of the bones in patients with open tibial shaft fractures with the advantages and disadvantages of each option**
- **Review the considerations and possible indications for early amputation to include a discussion of commonly used scores**
- **Review the complications of open tibial shaft fractures and their subsequent treatment including infection, nonunion, and malunion**
- **Review expected outcomes with open and closed tibial shaft fractures**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/tibia>

#### 44. Fractures of the Tibial Plafond

- Review and understand the relevant anatomy of the distal tibia and ankle with pertinent biomechanical considerations
- Review the incidence, mechanism of injury and physical examination in patients with tibial plafond fractures
- Review the radiographic evaluation including the role of CT scans in patients with tibial plafond fractures
- Review assessment of soft tissues in patients with tibial plafond fractures
- Review the classification of tibial plafond fractures
- Review the goals and principles for treatment of tibial plafond fractures
- Review nonoperative treatment of tibial plafond fractures with the review of the techniques and indications
- Review the operative treatment with its indications and options for fractures of the tibial plafond
- **Review the concept and technique of staged management of tibial plafond fractures with the early use of spanning external fixation – with or without fibular fixation**
- **Understand the importance of appropriate timing in the surgical treatment of the tibial plafond fracture to allow soft tissue recovery**
- **Review the goals and techniques of the surgical treatment of tibial plafond fractures including:**
  - **Surgical approaches based on fracture location**
  - **Choice of implant including indications for locked plating**
  - **Use of the femoral distractor**
  - **Choice of space filling agent (allograft vs calcium phosphate)**
- **Review the complications related to tibial plafond fractures and those related to the treatment itself**
- **Discuss the post-operative management of the patient with a plafond fracture including initiation of range of motion, splinting and initiation of weight bearing**
- **Review the expected outcomes in patients with tibial plafond fractures based on the fracture classification and soft tissue injury as well as the form of treatment**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/tibia>

#### 45. Ankle Fractures and Dislocations

- Review the relevant anatomy, biomechanical considerations and kinematics of the ankle joint
- Review the incidence and mechanism of injury in ankle fractures
- Review the physical examination and radiographic evaluation of patients with ankle fractures
- Review the classification systems for ankle fractures
- Review the goals and principles for treatment of ankle fractures
- To understand the indications and techniques for surgical treatment of ankle fractures
- To understand the evaluation and treatment of syndesmotic injuries in patients with ankle fractures
- **Understand the need for spanning external fixation in the staged treatment of highly unstable ankle-fracture dislocations.**
- **Understand the injury continuum between the rotational ankle fracture and the axially loaded plafond fracture and the treatment of the transitional trimalleolar fracture**
- **Review the reduction and fixation of the posterior malleolus fracture including prone patient positioning and the posterolateral approach with antiglide plating of the posterior fragment**
- **Review fractures that require special considerations including those with soft tissue injury and with associated dislocation of the ankle**
- **Review the principles of post-operative management**
- **Review the outcomes and possible complications in these patients**
- Review indications for early weightbearing
- Know differences in treatment for patients with DM and/Charcot changes.

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/ankle>

#### 46. Fractures of the Talus and Subtalar Dislocations

- Review the relevant anatomy of the talus and subtalar joint including the blood supply to the talus
- Review the incidence, physical examination and mechanism of injury in patients with talus fractures and subtalar dislocations
- Review the radiographic evaluation and the indications for special tests such as CT scans in patients with talus fractures and subtalar dislocations
- Review the classification for talar neck fractures
- Review the options and principles for management of talar neck fractures
- To understand the issues with nonoperative treatment of talar neck fractures

- To understand the technique of closed reduction for talar neck fractures
- **To understand the indications and techniques for operative treatment of talar neck fractures including use of the anterolateral and anteromedial incisions, and use of the femoral distractor**
- **To understand the post-operative management with attention to the concerns for avascular necrosis in patients who have been treated for talar neck fractures**
- **Review the issues regarding fractures of the body of the talus, the head of the talus and the lateral process of the talus.**
- **Understand the indications and technique for the medial malleolus osteotomy in the exposure of the talar body fracture**
- Review the classification of subtalar dislocations
- Review the techniques for closed reduction and open reduction of patients with subtalar dislocations and Review the post-reduction management in these patients
- Review the treatment of an extruded talus.
- Review the expected outcomes and complications related to talus fractures and subtalar injuries

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/foot>

#### 47. Calcaneus Fractures

- Review the relevant anatomy and function about the calcaneus
- Review the incidence, mechanism of injury and physical examination related to patients with calcaneus fractures
- Review the radiographic evaluation and role for CT scans in patients with calcaneus fractures
- Review the classification and fracture patterns in patients with calcaneus fractures
- Review and understand the appropriate evaluation of the soft tissues about the foot in patients with calcaneus fractures and review the issues of compartment syndromes about the foot
- Review the issues related to closed treatment of calcaneus fractures
- Understand which calcaneus fracture benefit from urgent intervention (Beak type fractures)
- **Understand the importance of surgical delay to allow for soft tissue recovery in the surgical treatment of the displaced calcaneus fracture**
- **Understand management of open fracture wound and tissue necrosis post injury.**
- **Review the indications and goals for surgical treatment of fractures of the calcaneus**
- **Review the techniques and indications for surgical treatment and soft tissue handling with fractures about the calcaneus including:**
  - *Extensile lateral surgical approach*
  - *Limited medial and lateral approaches*
  - *Percutaneous techniques*



- **Review the post-operative management of calcaneus fractures including the timing of weight bearing**
- **Review the potential complications of calcaneus fractures and its related treatment including the need for late subtalar fusion, lateral wall – decompression, and calcaneus osteotomy**
- **Discuss the staged management of the open calcaneus fracture**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/foot>

#### 48. Fractures and Dislocations of the Mid-Foot Including Lisfranc Injuries

- Review the relevant anatomy of the midfoot and tarsometatarsal joints
- Review the tarsometatarsal joint dislocations with attention to the incidence, mechanisms of injury, physical exam and radiographic evaluation
- **Review the treatment options and techniques for tarsometatarsal joint injuries and the post-operative management for those that are treated surgically**
- Appreciate the role of arthrodesis for tarsal instability, particularly with ligamentous patterns
- **Review the outcome with tarsometatarsal joint injuries**
- **Review the issues related to navicular fractures**
- **Review the issues related to cuboid and cuneiform fractures and dislocations**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/foot>

#### 49. Fractures of the Forefoot

- Review the pertinent anatomy
- Review the issues related to metatarsal fractures to include those issues specific to the fifth metatarsal shaft fracture, stress fractures and open fractures
- **Review the techniques of open and closed, antegrade and retrograde pinning of metatarsal shaft fractures**
- **Review the evaluation and treatment of dislocations and fractures of the metatarsophalangeal joint**
- Review the issues related to fractures of the toe phalanges

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/foot>

#### 50. Amputations of the Lower Extremity

- Review and understand the general principles of lower extremity amputations

- **Review the levels of amputations and the techniques of amputations about the lower extremities including the indications and techniques of the Ertl amputation in young patients**
- **Review the prosthetic options and issues of prosthetic wear in lower extremity amputees**
- **Review the complications and their management following amputations of the lower extremities**
- **Understand pain management techniques in amputation surgery including use of regional anesthesia and TMR or RPNI surgery for nerve phantom pain mitigation.**

<https://orthop.washington.edu/patient-care/limb-loss-education.html>

#### 51. Radiographic Evaluation, Anatomy and Classification of Pelvic Ring Injuries

- **Review the bony anatomy of the pelvis**
- **Review the soft tissue and ligamentous anatomy of the pelvis**
- **Review the pertinent vascular and neurologic structures relevant to a discussion for pelvic anatomy**
- **Review of the visceral anatomy about the pelvis**
- **Review the biomechanical considerations of the pelvis**
- **Review the concept and issues related to "pelvic stability"**
- **Review the radiographic evaluation of the pelvic ring with plain x-rays to include discussion of the AP and the caudal and caudad projection x-rays**
- **Review the findings and evaluation of the pelvic ring by CT evaluation**
- **Review the commonly used classification systems with their relative merits discussed**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/pelvis>

#### 52. The Acute Management of Pelvic Ring Injuries

- **Review the mechanism of injury and the profile of patients with pelvic ring disruptions**
- **Review the general principles of assessment of the polytrauma patient**
- **To understand the principles of assessing shock and hemodynamic stability and the effects of resuscitation efforts**
- **Review and understand the determination of the source of blood loss in the polytrauma patient with a pelvic ring injury**
- **Review the role for arteriography in patients with pelvic ring injuries**
- **Review the role for the use of the pelvic binder and emergent external fixation in patients with pelvic ring disruptions**

- **Review the role for other methods of emergent stabilization of the pelvis in polytrauma patients**
- **Understand the role of pelvic packing to control bleeding in the hemodynamically unstable patient**
- **To understand the assessment of the GU tract and neurologic injuries in patients with pelvic ring injuries**
- **To understand the importance of the location for placement of ostomies in patients with pelvic ring injuries**
- **To understand the issues related to open pelvic fractures including a discussion of debridement and colostomies**
- **Review and understand the appropriate interaction for the orthopaedic surgeon in the resuscitation and treatment process of a hemodynamically unstable patient with a pelvic ring injury**
- **Review and understand an algorithm for treatment of patients with hemodynamic instability and pelvic ring disruptions**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/pelvis>

### 53. Definitive Treatment of Pelvic Ring Disruptions

- **Review the assessment of displacement and instability and how this relates to decision making in pelvic ring disruptions**
- **Review the nonoperative treatment protocols for pelvic ring injuries**
- **Review the indications for surgery both posterior and anterior**
- **Review the role of external fixation - both temporary and definitive, in pelvic ring injuries**
- **Review the approaches to the anterior pelvic ring**
- **Review the techniques for open reduction and internal fixation of the anterior pelvic ring**
- **Review the approaches to the posterior ring, both from anterior and posterior**
- **Review the techniques for open reduction and internal fixation of the posterior pelvic ring**
- **Review the methods of closed reduction for pelvic ring disruptions**
- **Review the issues related to percutaneous screw fixation for anterior and posterior pelvic ring injuries**
- **Review complications related to pelvic fractures and the treatment of pelvic fractures**
- **Understand need for lumbopelvic fixation and involvement of spinal surgeon**
- **Review the outcomes and the factors that are important in determining the outcomes as related to both the bony and soft tissue injuries in patients with pelvic ring injuries**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/pelvis>

54. Radiographic Evaluation, Anatomy and Classification of Acetabular Fractures

- **Review the bony anatomy and pertinent soft tissue and vascular anatomy**
- **Review the radiographic evaluation and radiographic lines seen on the plain x-rays on the AP pelvic view**
- **Review the 458 oblique x-rays of the pelvis with the bony landmarks seen there**
- **To understand the principles of determining congruency of the hip and the effect of a fracture on the weight bearing dome to include a review of roof arc measurements for appropriate fractures**
- **Review the CT scan assessment and the role for CT reconstructions**
- **Review the classification of acetabular fractures (Letournel and AO/OTA)**
- Review the radiographic characteristics associated with poor outcomes in acetabular fracture patients

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/pelvis>

55. Surgical Approaches to Acetabular Fractures

- **Review surgical approaches for anterior column exposures**
- **Review surgical approaches for posterior column exposures**
- **Review the role and technique for extensile surgical approaches**
- **Review the role for two surgical approaches to acetabular fractures**
- **Review approaches based on the fracture classification and pattern**
- **Review complications related to the approach used for the treatment of acetabular fractures and how these can be avoided and/or treated**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/pelvis>

56. Surgical Treatment of Acetabular Fractures

- **Review the decision making and indications for surgical treatment for acetabular fractures**
- **To understand the timing of surgical treatment of acetabular fractures**
- **Review the techniques for reduction of the different fracture types as they would be approached through common incisions**
- **Review appropriate placement for plates, screws and lag screws for treatment of acetabular fractures**
- **Review assessment of fracture reduction for acetabular fractures**
- **Review patient positioning for operative treatment of acetabular fractures**
- **Review post-operative management of acetabular fractures**
- **Review the complications of surgical treatment of acetabular fractures**
- **Review the outcomes of surgical treatment of acetabular fractures**

- **Discuss the acetabular fracture in the elderly patient and how the management differs from the young patient.**
- **Discuss the indications and techniques for combined acetabular ORIF and immediate or delayed total hip arthroplasty.**

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/pelvis>

#### 57. Fractures of the Pelvis and Acetabulum in Pediatric Patients

- **Review pelvic and acetabular fractures and those issues of these injuries that are unique to the skeletally immature patient and how their treatment may be different in this patient population**
- **Review apophyseal avulsions about the pelvis**
- **Review the issues related to triradiate injuries in the pediatric patients**

#### 58. Initial Evaluation of the Spine Injured Patient

- Review c-spine clearance and role of clinical evaluation and imaging CT vs. MRI?
- Review the incidence and demographics of spinal cord injuries
- Review the anatomy of the spinal column and the neurologic structures that pass through it
- Review the pathophysiology of spinal cord injuries
- Review the pattern of spinal cord injuries, both complete and incomplete and to include the incomplete cord syndromes
- Review the initial exam and determination of the level of injury in spinal cord injury patients
- **Review the appropriate radiographic evaluation in patients with spinal cord injuries including special studies**
- **Review injuries commonly associated in patients with spinal cord injuries**
- **Review the concept of spinal shock**
- **Review the effects of spinal cord injury on the management of polytrauma patients and how it effects decision making in definitive treatment of extremity fractures**
- **Review timing of surgery in patients with spinal cord injuries and prognostic issues related to spinal cord injuries**
- 

EBQVS articles on: <https://ota.org/education/evidence-based-medicine-resource-list/spine>

### **Professionalism, Business, and Research:**

#### 59. Professionalism

Many standards exist. They all can be summarized by:

- Treat patients as you want yourself or family treated
- Even though it is difficult, unusual or inconvenient, it still may be the “Right thing to do”
- Be Familiar with AAOS Standards of Professionalism  
<https://www.aaos.org/about/bylaws-policies/ethics-and-professionalism/professional-compliance-program-main/standards-of-professionalism/?ssopc=1>
- Abide by the SOPs for patient care:  
<https://www.aaos.org/globalassets/about/standards-of-professionalism/microsoft-word---sop-providing-musculoskeletal-services-rev-4-23.doc.pdf>
- An orthopaedic surgeon shall, while caring for and treating a patient, regard his or her responsibility to the patient as paramount.
- An orthopaedic surgeon shall treat patients equally and shall not decline to accept patients solely on the basis of race, color, ethnicity, gender, sexual orientation, religion or national origin.
- An orthopaedic surgeon, or his or her qualified designee, shall be available to provide needed and appropriate care of a patient.
- An orthopaedic surgeon, or his or her qualified designee, shall present pertinent medical facts and recommendations to and obtain informed consent from the patient or the person responsible for the patient.
- An orthopaedic surgeon shall serve as the patient’s advocate for treatment needs and exercise all reasonable means to ensure that the most appropriate care is provided to the patient.
- An orthopaedic surgeon shall safeguard patient confidentiality and privacy within the constraints of the law.
- An orthopaedic surgeon shall maintain appropriate relations with patients.
- An orthopaedic surgeon shall respect a patient’s request for additional opinions.  
Aspirational: AAOS Code of Medical Ethics and Professionalism for Orthopaedic Surgeons
- An orthopaedic surgeon shall commit to life-long medical and scientific learning.
- An orthopaedic surgeon shall provide only those services and use only those techniques for which he or she is qualified by personal education, training, or experience
- An orthopaedic surgeon with a temporary or permanent impairment due to substance abuse (alcohol and/or drugs) shall seek professional evaluation and treatment in order not to jeopardize patient care and safety. He or she shall limit or cease his or her practice as recommended by his or her physician(s) or health care professional(s).
- An orthopaedic surgeon with a temporary or permanent physical or mental disability shall seek professional evaluation and treatment in order not to jeopardize patient care and safety. He or she shall limit or cease his or her practice as recommended by his or her physician(s) or health care professional(s).

- An orthopaedic surgeon shall disclose to the patient any conflict of interest, financial or otherwise, that may influence his or her ability to provide appropriate care
- An orthopaedic surgeon shall not enter into any contractual relationship whereby the orthopaedic surgeon pays for the right to care for patients with musculoskeletal conditions.
- An orthopaedic surgeon shall make a reasonable effort to ensure that his or her academic institution, hospital or employer shall not enter into any contractual relationship whereby such institution pays for the right to care for patients with musculoskeletal conditions.
- An orthopaedic surgeon or his or her professional corporation shall not couple a marketing agreement or the provision of medical services, supplies, equipment or personnel with required referrals to that orthopaedic surgeon or his or her professional corporation.

#### 60. Workman's Compensation assessment and ratings

- Understand the role a worker's compensation liaison plays in the care of a patient injured at work.
- Understand the time and role of an Independent Medical Evaluation in determining permanency and final disability in worker's compensation claims
- Learn how to calculate disability ratings using accepted references, eg American Medical Association Guides to the Evaluation of Permanent Impairment, 6<sup>th</sup> ed.

#### 61. Business Principles

- Be familiar with ethical and efficient Coding and Billing practices
- See **Reno Orthopaedic Trauma Fellowship Business Curriculum**  
<https://journals.lww.com/jorthotrauma/pages/articleviewer.aspx?year=2014&issue=07001&article=00002&type=Fulltext>

#### 62. Research and Education Basics

- Be familiar with different study designs: Study design: Retrospective, Observational, Case, Contro, Matched-Cohort, Prospective, Nested trials
- Understand Levels of Evidence I-V
- Comprehension of statistical concepts of statistics: Bias, Confounders, Type 1 and Type 2 errors, effect size, Power,
- Know indications for specific Tests: T-test, Chi squared, Mann-Whitney, Pearson correlation, ANOVA, Binary and Linear Regression, statistical vs clinical difference, MCID.
- Commit to lifelong Adult Education

Articles:

[https://journals.lww.com/jbjsjournal/pages/articleviewer.aspx?year=2012&issue=02150&article=00013&type=Fulltext&casa\\_token=-5kMGMHhJT0AAAAA:w9eVx1mU2ThaV9LHxb\\_2AiFXMUZ36AYgHvtTCY7JgT8ry4D\\_twewgISy7apmIty8gBGtVp8G-IL-M-LxGcDkQWE](https://journals.lww.com/jbjsjournal/pages/articleviewer.aspx?year=2012&issue=02150&article=00013&type=Fulltext&casa_token=-5kMGMHhJT0AAAAA:w9eVx1mU2ThaV9LHxb_2AiFXMUZ36AYgHvtTCY7JgT8ry4D_twewgISy7apmIty8gBGtVp8G-IL-M-LxGcDkQWE)

[https://journals.lww.com/jorthotrauma/fulltext/2011/12003/Research\\_Getting\\_Started\\_in\\_an\\_Academic\\_Setting.9.aspx?casa\\_token=t9\\_okzHSPf0AAAAA:OYNE4Os3yxMZrsTZSibZDCMDiwnNshqPW-WlvHECzYwHOZDdkSki13jFaROp5aN2HkQ1EGH66R8w76UZGvYXT3eo](https://journals.lww.com/jorthotrauma/fulltext/2011/12003/Research_Getting_Started_in_an_Academic_Setting.9.aspx?casa_token=t9_okzHSPf0AAAAA:OYNE4Os3yxMZrsTZSibZDCMDiwnNshqPW-WlvHECzYwHOZDdkSki13jFaROp5aN2HkQ1EGH66R8w76UZGvYXT3eo)

[https://www.sciencedirect.com/science/article/pii/S002013830600057X?casa\\_token=9mkuwd41OOkAAAAA:1u1wVya9YN02gmtB6\\_s-9fEGhOVODwHwII0QzQRmw8mJ2YuJRY\\_pis8SNhpn7I4bihTnqk87](https://www.sciencedirect.com/science/article/pii/S002013830600057X?casa_token=9mkuwd41OOkAAAAA:1u1wVya9YN02gmtB6_s-9fEGhOVODwHwII0QzQRmw8mJ2YuJRY_pis8SNhpn7I4bihTnqk87)

**I have reviewed the goals and objectives of the Orthopaedic Trauma Service**

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**Signature**

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**Date**