AOSPINE

AOSPINE Curriculum

Your AOSpine Curriculum
for Lifelong Learning

Trauma

Tumor

Metabolic
Inflammatory
Genetic

Deform

Principles

Infection

Degeneration

Advanced

Masters

It is never too soon or too late to learn.

This is the core philosophy that drives AOSpine's educational activities. AOSpine aims to go above and beyond classical teaching: the goal is to challenge current paradigms, provoke thought, and open the mind to new ideas and skills.

Introduction

From the moment physicians complete their formal medical education, they are directly responsible for their own continued learning, which will last throughout their lifetime of practice.
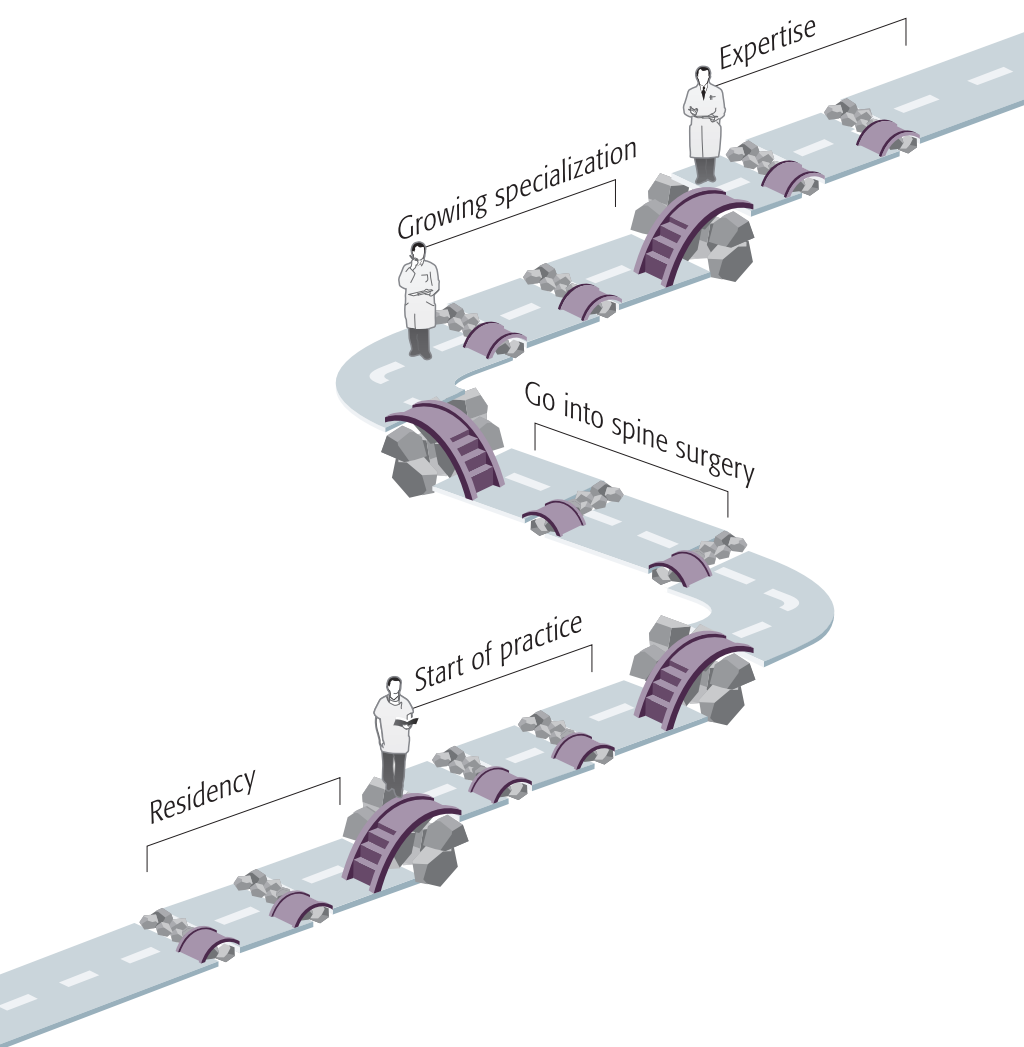
Because most surgeons do not follow a clearly prescribed career path, AOSpine has created a comprehensive, modular Curriculum to support our members in continuously acquiring the necessary knowledge and skills that will help you develop in your chosen areas of specialization, and at all stages of your career. We are convinced that active engagement with your AOSpine Curriculum will ultimately translate into better quality care for your patients.

Curriculum Advisory Group

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Contents

Lifelong learning

Today, continuous learning has become a necessity for all professionals, but spine surgeons in particular have to make sure that they acquire new skills and knowledge throughout their career. The professional development of a spine surgeon is composed of a series of successive steps: there are periods of relative stability, which are punctuated by "obstacles" where a surgeon needs to apply his or her knowledge. In between each stage are transition points—prime opportunities for professional growth. AOSpine offers an educational platform that helps surgeons overcome these obstacles and navigate the transitions as they progress in their career.

Levels

Masters

Learners with > 10 years of spine surgery experience.

Advanced

Learners with 3–10 years of spine surgery experience, who are aiming to improve their knowledge or specialization in spinal disorders or specific techniques.
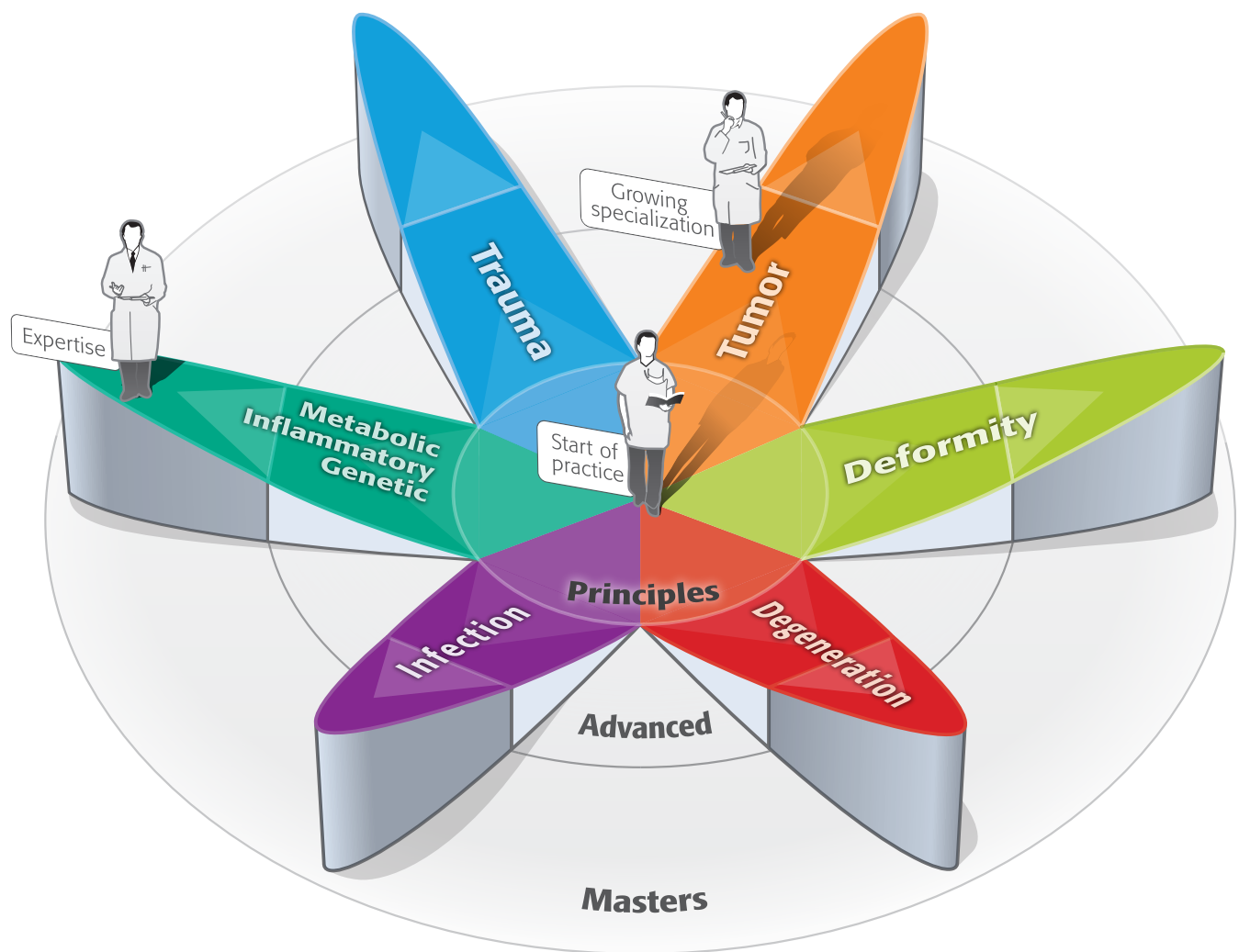
Principles

Learners with < 3 years of spine surgery experience or surgeons undergoing training in a new technique or procedure.

Note: The criteria for the levels may be adjusted or extended according to regional requirements.

Educational activities in the Curriculum are organized under six areas of pathology and are offered for three levels of experience: Principles, Advanced, and Masters.

Your AOSpine Curriculum

AOSpine offers a wide range of educational programs for continuous professional development of spine care specialists. Your AOSpine Curriculum is a framework that offers a foundation for continuing development in diverse practice settings. The Curriculum is based on the competencies that enable spine surgeons to perform effectively across six areas of pathology in their practice setting and to meet the standards of the profession.

The AOSpine Curriculum delivers educational content based on competencies, learning outcomes, and your needs, using the most appropriate learning methods and techniques.

The AOSpine Curriculum is designed to meet your lifelong needs for continuing medical education (CME) and continuing professional development (CPD). The Curriculum is supported by tools we have developed to enable you to self-assess your educational needs throughout all stages of your career.

AOSpine Curriculum—competencies

The Curriculum is based on competencies identified for each area of pathology. A **competency** = what a surgeon must be able to do to diagnose and treat patients with a specific clinical problem or issue.

Spinal trauma

1. **Resuscitate the patient** according to ATLS® guidelines
2. **Immobilize the spine** in a patient with a suspected spinal injury beginning at the scene of injury and during the assessment process
3. **Examine the patient**
4. **Order appropriate imaging**
5. **Classify the injury** according to fracture morphology, instability, and neurological status
6. **Apply evidence-based decision making** to the management of the patient
7. **Reduce/decompress/stabilize** appropriately
8. **Collaborate in the rehabilitation plan** for the patient
9. **Identify and manage** postinjury and postoperative **complications**

Tumor

1. **Recognize the possibility of spinal tumor** in a patient presenting with common symptoms of spinal pathology
2. **Establish a diagnosis based on histological verification** and plan appropriate treatment
3. **Optimize the physical condition of the patient** before treatment
4. **Recognize** the presence or possibility of **spinal instability**
5. **Recommend treatment** based on consideration of benefit vs risk
6. **Perform specific surgical interventions**
7. **Anticipate and manage postoperative complications**

Deformity

1. **Analyze the history** and physical examination of the patient presenting with spinal deformity
2. **Order and interpret appropriate imaging** to assess spinal balance, flexibility, and spinal cord anomalies
3. **Assess the patient** in terms of natural history, medical limitations, patient concerns, and treatment expectations
4. **Use evidence-based decision making** when recommending operative and nonoperative interventions
5. **Safely perform appropriate surgical procedures**
6. **Manage** intraoperative and postoperative **complications**
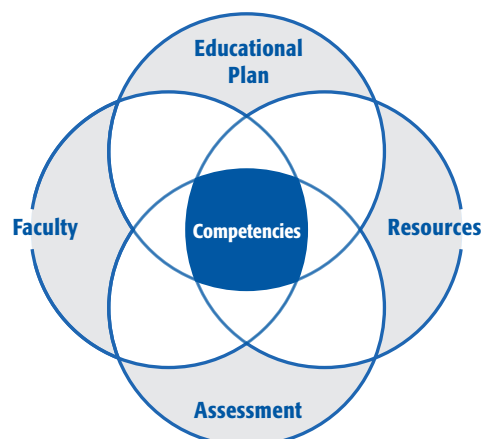7. **Use outcome measures** to assess the effectiveness of interventions

Degeneration

1. **Analyze the patient history and physical examination findings**
2. **Use** appropriate **diagnostic tools**
3. **Use evidence-based decision making** when recommending operative and nonoperative interventions
4. **Use appropriate nonoperative treatments**
5. **Select and perform appropriate surgical procedures** for specific indications
6. **Prevent/manage operative and postoperative complications**
7. **Use outcome measures** to assess the effectiveness of each intervention

How does the AOSpine Curriculum work?

Our competency-based approach aligns four components to ensure we address your needs:

- **Educational plan**—defines all learning activities
- **Faculty**—trained to deliver all content using our framework
- **Resources**—learning materials developed in response to your needs
- **Assessment**—identifies your needs and tracks your progress

Infection

1. Analyze the history and physical examination with a **high index of suspicion for** primary and postoperative **spinal infection**

2. **Order and interpret appropriate diagnostic tests** to confirm infection and identify the causative organism

3. **Prescribe appropriate evidence-based medical therapy** and preoperative prophylaxis

4. Assess the indications for surgical intervention and **perform appropriate surgical procedures**

5. **Manage postinfective complications**

6. **Manage postoperative infection**

7. **Maintain follow-up** until resolution of the infection

Metabolic

1. **Recognize the possibility of spinal osteoporosis** when evaluating any patient

2. **Order appropriate tests** to determine bone mass and to investigate and treat conditions causing osteoporosis

3. **Recognize** the presence of **comorbidities** that may influence bone metabolism

4. **Apply appropriate techniques** when instrumenting the osteoporotic spine or managing acute osteoporotic fractures

5. **Recognize** the possibility of **instrumentation failure** in the osteoporotic spine and **plan appropriate medical and surgical strategies** to compensate

Inflammatory

1. **Recognize the symptoms and signs** of inflammatory disorders

2. **Diagnose structural pathology** and underlying systemic disease

3. **Plan appropriate** medical and surgical **treatment**

4. **Perform surgical treatment**

5. **Recognize the need for follow-up**

Genetic

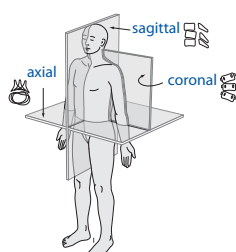1. **Recognize genetic disorders that cause spinal problems and treat appropriately**

The AOSpine Principles

The four principles to be considered as the foundation for proper spine patient management underpin the design and delivery of the Curriculum: Stability—Alignment—Biology—Function.
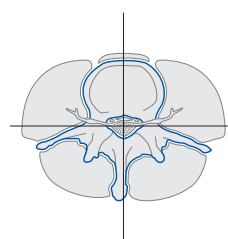

Stability
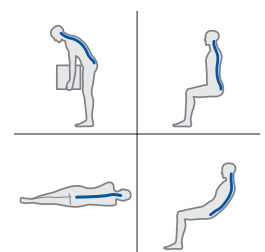Stabilization to achieve a specific therapeutic outcome

Alignment
Balancing the spine in three dimensions

Biology
Etiology, pathogenesis, neural protection, and tissue healing

Function
Preservation and restoration of function to prevent disability

Delivering your Curriculum

Your AOSpine competency-based Curriculum is delivered using a combination of educational activities and resources. An educational activity that has the Curriculum logo means that:

- The Chairperson and Faculty have participated in updated training that includes implementation of the Curriculum
- The Faculty have used the Curriculum framework to develop learning outcomes that are most relevant to the participants
- Assessment data have been gathered prior to the activity, and the educational content has been tailored to match the specific needs of the participants.

Successful implementation of the Curriculum depends on completing a series of steps—before, during, and after the activity. This helps Faculty to choose the most appropriate educational methods (eg, lecture, case discussion, hands-on practical, webinar) and to deliver a consistent, high-quality educational experience to participants.

AOSpine offers you a wide range of learning resources to deliver relevant educational content through a variety of channels:

- Face-to-face educational events (eg, courses, seminars)
- Distance learning (eg, webinars, virtual courses)
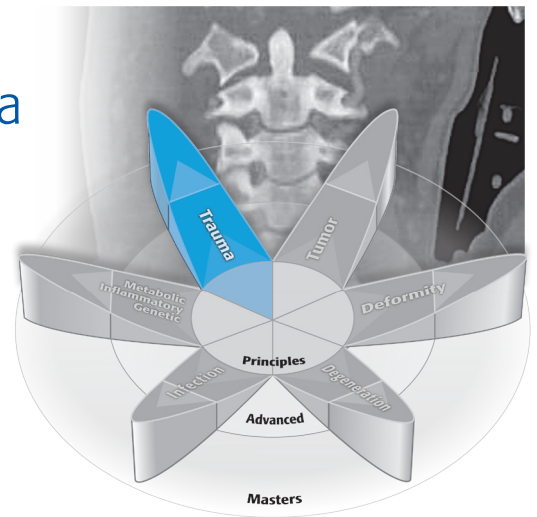- Self-directed resources (eg, eLearning, online cases).

Our activities are supported by many educational tools that enable you to measure your knowledge and continue your learning throughout your career, including:

- Assessments: based on competencies and clinical questions
- Online forums: to discuss cases and ask questions to Faculty
- Resources: to download before and after educational activities
- Surveys and tools: to support the application to your practice of knowledge and skills learned.

AOSpine Curriculum—Spinal trauma

AOSpine learning activities for spinal trauma focus on addressing common and critical patient problems. The competencies below are a guiding framework for the design and delivery of all our learning activities. Specific learning outcomes for each activity must be defined according to the needs of the participants.

Competencies	Key learning outcomes
1. Resuscitate the patient according to ATLS® guidelines	• Maintain the patient's oxygenation level • Administer IV fluids to the patient • Maintain normotension in the patient • Identify all other injuries • Prioritize the patient's injuries
2. Immobilize the spine in a patient with a suspected spinal injury beginning at the scene of injury and during the assessment process	• Identify potentially unstable spinal injuries • Recognize that the unconscious patient may have a spinal cord injury • Recognize that any movement of the patient can result in neurological injury • Perform spinal immobilization • Maintain immobilization during imaging procedures and until stability is proven
3. Examine the patient	• Assess the patient's motor score • Assess the patient's ASIA/Frankel score • Perform a complete neurological assessment • Assess the patient for secondary injury • Identify spinal cord shock • Consider the prognostic importance of sacral sparing • Serially re-examine the patient for evolving injury
4. Order appropriate imaging	• Order x-rays, CT, MRI, and other imaging modalities based on indications, limitations, timing, and availability • Recognize the radiographic features of spinal instability • Recognize spinal cord edema and hematoma
5. Classify the injury according to fracture morphology, instability, and neurological status	• Identify the history and, where possible, the mechanism of injury • Describe the injury based on an image-based morphological classification • Recognize spinal instability • Assess the neurological status and identify neural compression/compromise • Assess the patient using the injury severity score
6. Apply evidence-based decision making to the management of the patient	• Choose the best operative and nonoperative treatment option for each patient • Select the treatment based on the available evidence • Consider the prognosis for neurological deficit • Recognize limitations of surgery skills and hospital resources • Refer the patient to another center when appropriate to improve care
7. Reduce/decompress/stabilize appropriately	• Consider and apply strategies to minimize soft-tissue disruption • Perform reduction techniques • Perform decompression techniques • Perform stabilization techniques • Decide the optimal timing for the intervention • Recognize regional/junctional differences • Recognize spinal osteoporosis, if present • Seek to preserve function at uninjured levels
8. Collaborate in the rehabilitation plan for the patient	• Prevent and manage the consequences of neurological deficits • Recognize the importance of preserving proximal cervical levels in the quadriplegic patient • Implement a plan aimed at early mobilization • Collaborate with rehabilitation physicians • Recognize and address psychosocial issues • Recognize and address work and family issues
9. Identify and manage postinjury and postoperative complications	• Consider the potential risks of operative and nonoperative treatment • Recognize complications as early as possible • Treat complications promptly • Correct deformity • Seek to preserve motion and spinal alignment

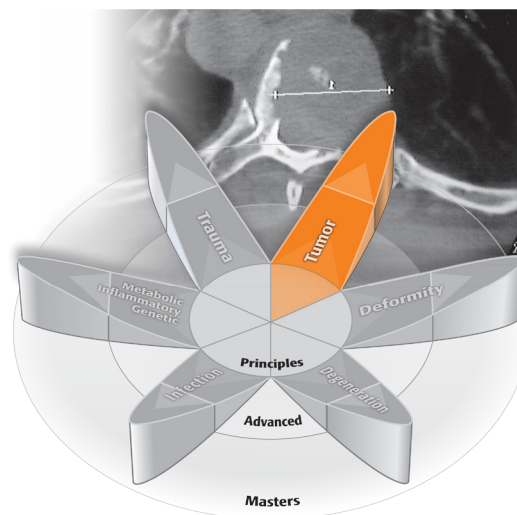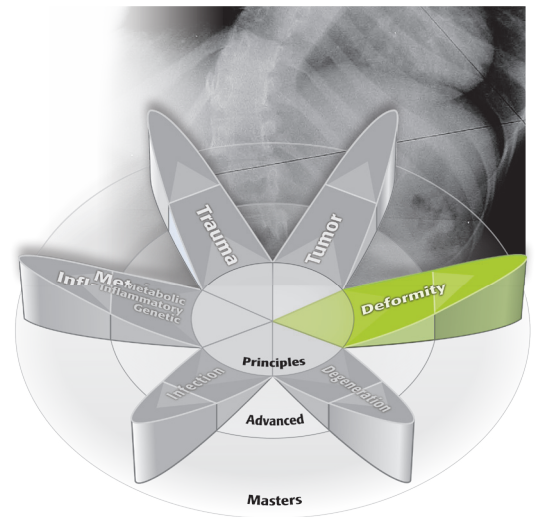| The AOSpine Principles	Stability—Apply biomechanical principles of internal fixation	Alignment—Restore normal alignment
for Spinal trauma	Biology—Protect the neural elements and enhance bone healing	Function—Preserve motion segments

AOSpine Curriculum—Tumor

All AOSpine learning activities for spinal tumor focus on addressing common and critical patient problems. The competencies below are a guiding framework for the design and delivery of all our learning activities. Specific learning outcomes for each activity must be defined according to the needs of the participants.

Competencies	Key learning outcomes
1. Recognize the possibility of spinal tumor in a patient presenting with common symptoms of spinal pathology	• Recognize that symptoms may be nonspecific but check for localizing signs • Recognize that a neurological emergency presentation may be the first sign of a spinal tumor • Identify patients who are at risk for spinal tumor • Investigate spinal symptoms in cancer patients as early as possible
2. Establish a diagnosis based on histological verification and plan appropriate treatment	• Order and interpret blood tests and imaging studies to confirm spinal tumor • Order or perform a biopsy to obtain a tissue diagnosis • Recognize that histological findings determine the treatment plan • Perform local and systemic staging • Collaborate with medical and radiation oncologists
3. Optimize the physical condition of the patient before treatment	• Identify and address medical comorbidities, nutritional status, hematological status, coagulation profile, and prior treatment
4. Recognize the presence or possibility of spinal instability	• Identify spinal instability from symptoms and imaging • Anticipate instability following treatment • Address instability as part of the treatment plan
5. Recommend treatment based on consideration of benefit vs risk	• Weigh the benefits, risks, and availability of each treatment option • Consider the impact of each treatment on the timing of others • Recognize the goals of treatment for primary and metastatic tumors
6. Perform specific surgical interventions	• Perform appropriate preoperative planning and interventions • Anticipate potential intraoperative complications • Involve other surgical specialists as required • Plan and implement a reconstruction and stabilization technique based on the chosen resection method
7. Anticipate and manage postoperative complications	• Recognize increased risk of wound problems with prior surgery or radiation and with patients in poor physical condition • Recognize increased risk of complications during resection and reconstruction • Address postoperative complications early • Recognize recurrent disease

The AOSpine Principles for Tumor

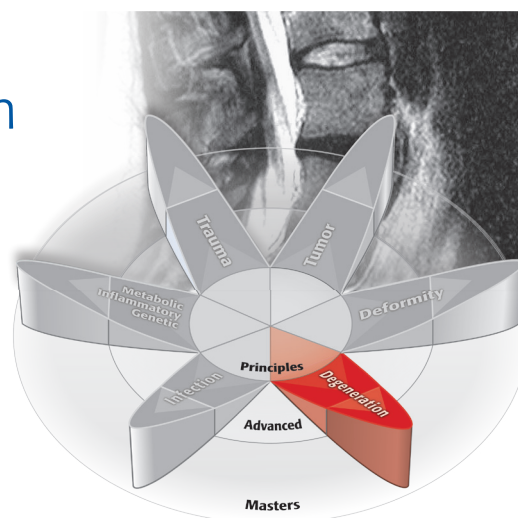|	
Stability—Stabilize pathological instability	Alignment—Restore balance in pathological deformity
Biology—Determine prognosis; collaborate with oncologists	Function—Preserve quality of life

AOSpine Curriculum—Deformity

All AOSpine learning activities for deformity focus on addressing common and critical patient problems. The competencies below are a guiding framework for the design and delivery of all our learning activities. Specific learning outcomes for each activity must be defined according to the needs of the participants.

Competency	Key learning outcomes
1. Analyze the history and physical examination of the patient presenting with spinal deformity	• Describe the classification systems for scoliosis, kyphosis, spondylolisthesis, and craniocervical deformities • Identify conditions and patient factors that are likely to cause progressive deformity • Recognize the physical features of an underlying condition • Examine for signs of spinal imbalance • Perform a full neurological examination
2. Order and interpret appropriate imaging to assess spinal balance, flexibility, and spinal cord anomalies	• Measure and interpret structural anomalies, degree of deformity, spinal imbalance, flexibility, and instability • Recognize any underlying and associated pathology
3. Assess the patient in terms of natural history, medical limitations, patient concerns, and treatment expectations	• Consider the natural history of the underlying condition • Consider possible medical and functional disabilities that may arise if deformity is not treated • Address patient/parent concerns about cosmesis, progression, treatment expectations, and future problems
4. Use evidence-based decision making when recommending operative and nonoperative interventions	• Review the published literature and critically analyze the benefits and risks of any recommended intervention • Discuss treatment expectations with the patient • Explain the risks and benefits of the recommended treatment • Recognize your own limitations and refer to colleagues/other specialists when appropriate
5. Safely perform appropriate surgical procedures	• Perform preoperative assessment to determine timing and goals of surgery • Perform the appropriate technique for correction of the specific deformity and/or decompression of the spinal cord, with involvement of other specialists as appropriate
6. Manage intraoperative and postoperative complications	• Monitor spinal cord function intraoperatively, if feasible • Identify infection, loss of correction, loss of fixation, failure of fusion, and neurological injury early and treat promptly
7. Use outcome measures to assess the effectiveness of interventions	• Use validated spinal assessment tools before and after all interventions • Enroll patients in a database and maintain long-term follow up • Measure and report outcomes as a quality assurance activity

The AOSpine Principles **for Deformity**	Stability—Stabilize junctional instability	Alignment—Aim for balance in all planes
	Biology—Evaluate etiology, pathogenesis, and natural history	Function—Preserve motion segments

AOSpine Curriculum—Degeneration

All AOSpine learning activities for spinal degeneration focus on addressing common and critical patient problems. The competencies below are a guiding framework for the design and delivery of all our learning activities. Specific learning outcomes for each activity must be defined according to the needs of the participants

Competencies	Key learning outcomes
1. Analyze the patient history and physical examination findings	• Assess the patient's pain • Assess the patient's disability and quality of life • Assess the patient's psychosocial situation and its relevance • Assess relevant comorbidities • Recognize abnormal findings in the history, including 'red flags' • Perform a comprehensive clinical examination • Exclude non-spine pathologies
2. Use appropriate diagnostic tools	• Order appropriate imaging studies based on the history and physical examination findings • Use additional diagnostic tools if indicated • Critically evaluate the use of invasive tests • Recognize the limitations of each diagnostic tool • Correlate the diagnostic test results with the clinical findings
3. Use evidence-based decision making when recommending operative and nonoperative interventions	• Critically review the benefits and risks of each operative and nonoperative intervention • Select operative and nonoperative interventions based on the best available evidence and on the natural history • Consider the patient's treatment preferences and expectations • Consider the psychosocial, cultural, and ethical implications of the recommended treatment
4. Use appropriate nonoperative treatments	• Initiate appropriate medical and physical treatment, based on available evidence • Know when to refer – recognize your own limitations • Recognize the importance of a multidisciplinary approach
5. Select and perform appropriate surgical procedures for specific indications	• Select the most appropriate surgical procedure for each patient based on the best available evidence • Recognize the optimal timing for each surgical procedure • Select the most appropriate surgical approach • Ensure an adequate technique is completed for each procedure • Apply sound biological and biomechanical principles to each procedure • Consider spinal alignment and spinopelvic parameters
6. Prevent/manage operative and postoperative complications	• Use measures to avoid preventable complications • Recognize and manage intraoperative complications • Identify early postoperative complications and treat promptly • Identify and treat late-presenting postoperative complications
7. Use outcome measures to assess the effectiveness of each intervention	• Use validated assessment tools before and after intervention • Enroll patients in a database and maintain follow up • Measure and report outcomes as a quality assurance activity • Continuously assess your clinical judgment and performance

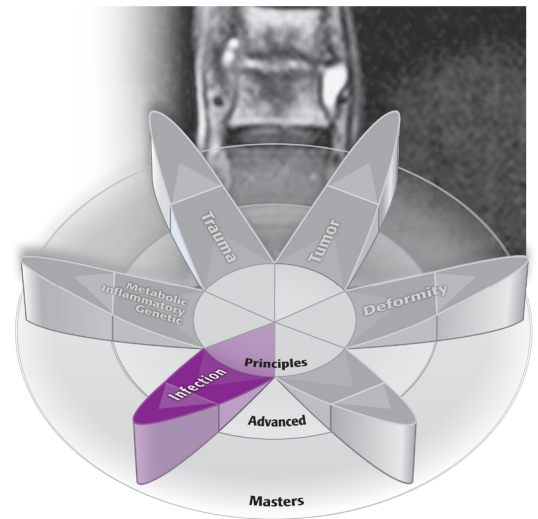| **The AOSpine Principles** **for Degeneration**	Stability—Protect adjacent segments	Alignment—Restore balance in degenerative deformity
	Biology—Explain the pathogenesis of degeneration	Function—Measure outcomes of interventions

AOSpine Curriculum—Infection

All AOSpine learning activities for spinal infection focus on addressing common and critical patient problems. The competencies below are a guiding framework for the design and delivery of all our learning activities. Specific learning outcomes for each activity must be defined according to the needs of the participants.
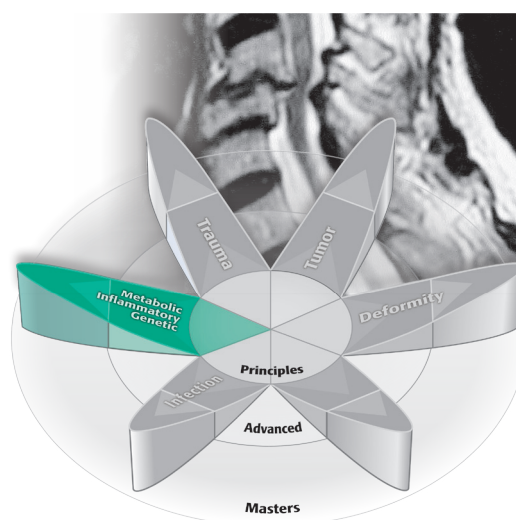

Competency	Key learning outcomes
1. Analyze the history and physical examination with a high index of suspicion for primary and postoperative spinal infection	• Recognize that symptoms of infection may be nonspecific, which may delay diagnosis • Identify patients at high risk for spinal infection
2. Order and interpret appropriate diagnostic tests to confirm infection and identify the causative organism	• Order and interpret hematological, microbiological, and imaging tests to confirm spinal infection • Isolate and identify the causative organism by aspiration or biopsy, if possible • Identify concurrent disease if present
3. Prescribe appropriate evidence-based medical therapy and preoperative prophylaxis	• Prescribe appropriate antimicrobial therapy according to the sensitivities of the isolated organism and/or evidence-based guidelines
4. Assess the indications for surgical intervention and perform appropriate surgical procedures	• Consider surgical intervention for neurological compression, spinal instability, and debridement
5. Manage postinfective complications	• Investigate deformity and neurological deficit and treat promptly
6. Manage postoperative infection	• Identify wound problems early and treat promptly • Investigate loss of fixation or failure of fusion for possible infection and treat promptly
7. Maintain follow-up until resolution of the infection	• Emphasize and review patient compliance with frequency and duration of treatment • Perform regular clinical and hematological review until resolution of the infection

The AOSpine Principles		
for Infection	Stability—Stabilize pathological instability	Alignment—Restore balance in postinfective deformity
	Biology—Use appropriate medical therapy	Function—Preserve neurological function

AOSpine Curriculum— Metabolic, Inflammatory, Genetic

AOSpine learning activities for metabolic, inflammatory, and genetic disorders involving the spine focus on addressing common and critical patient problems. The competencies below are a guiding framework for the design and delivery of all our learning activities. Specific learning outcomes for each activity must be defined according to the needs of the participants.

Metabolic disorders

Competencies	Key learning outcomes
1. Recognize the possibility of spinal osteoporosis when evaluating any patient	• Elicit any history of previous low-energy peripheral fractures • Identify osteopenia and insufficiency fractures • Identify factors affecting bone density • Consider quantifying bone mass before recommending surgical interventions
2. Order appropriate tests to determine bone mass and to investigate and treat conditions causing osteoporosis	• Describe the differences between various methods of quantifying bone mass • Recognize the common medical causes of osteoporosis and osteomalacia and order appropriate biochemical tests • Refer to medical colleagues for management of osteoporosis
3. Recognize the presence of comorbidities that may influence bone metabolism	• Recognize medical conditions that affect bone metabolism • Recognize that some therapeutic drugs may affect bone mass • Use a multidisciplinary approach to optimize treatment of medical comorbidities
4. Apply appropriate techniques when instrumenting the osteoporotic spine or managing acute osteoporotic fractures	• Perform intraoperative augmentation when necessary for secure instrumentation • Consider the role of vertebral body augmentation for acute osteoporotic fractures
5. Recognize the possibility of instrumentation failure in the osteoporotic spine and plan appropriate medical and surgical strategies to compensate	• Perform long instrumentation and additional sacropelvic fixation when indicated • Inform the patient of the additional morbidity associated with long fixations • Consider adjunctive medical and biologic therapy for fracture healing and fusion

Inflammatory disorders

Competencies	Key learning outcomes
1. Recognize the symptoms and signs of inflammatory disorders	• Analyze history for insidious (gradually evolving) symptoms • Examine and assess patients for spondyloarthropathy and neurological dysfunction • Evaluate for evidence of systemic disease
2. Diagnose structural pathology and underlying systemic disease	• Order appropriate imaging based on symptoms and clinical findings • Perform laboratory tests as appropriate to identify systemic disorders • Interpret radiology and laboratory test results
3. Plan appropriate medical and surgical treatment	• Involve a multidisciplinary team for systemic disease • Assess the need for and timing of surgery based on the best available evidence • Recognize the nonoperative treatments available and the evidence for each one
4. Perform surgical treatment	• Describe the advantages and disadvantages of anterior and posterior approaches • Perform appropriate neural decompression and stabilization procedures • Employ techniques for correction of deformity
5. Recognize the need for follow-up	• Anticipate and address early and late complications • Perform continual patient follow-up to identify disease sequelae

Genetic disorders

Competencies	Key learning outcomes
1. Recognize genetic disorders that cause spinal problems and treat appropriately	• List the genetic disorders that may affect the spine • Identify the radiological features of individual genetic disorders • Participate in interdisciplinary management of the patient • Perform appropriate corrective, decompressive, and stabilization procedures

The AOSpine Principles for Metabolic, Inflammatory, Genetic

Stability—Assess need for augmentation of the osteoporotic spine

Biology—Use appropriate medical therapies

Alignment—Restore balance in deformity associated with these disorders

Function—Maintain quality of life

The AOSpine website—keeping you up to date

To view the latest information on AOSpine educational events worldwide, visit:
www.aospine.org/coursedirectory.aspx and **www.aospine.org/abouteducation.aspx**