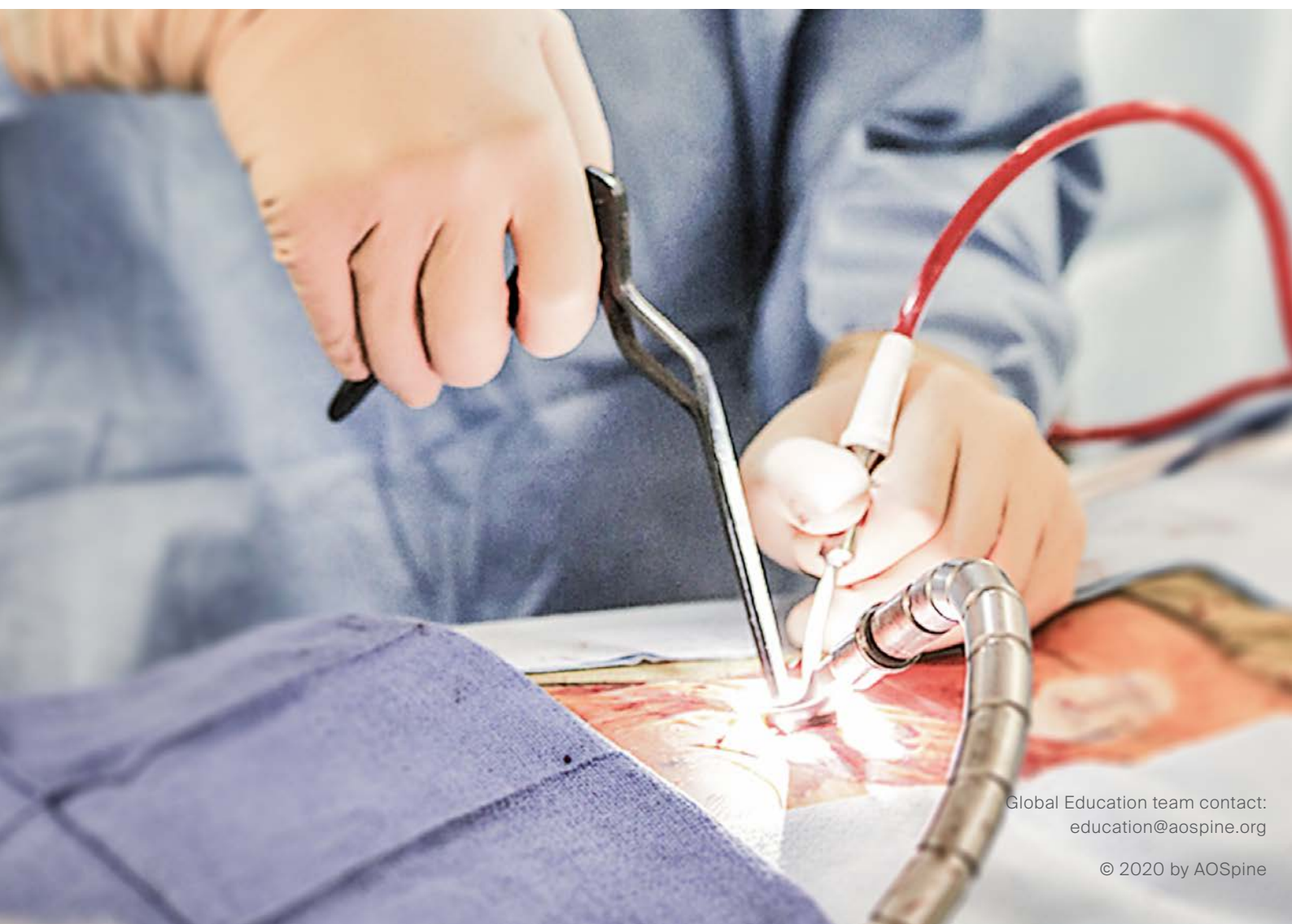


# Minimally Invasive Spine Surgery (MISS) Curriculum

AOSpine MISS Curriculum Task Force  
2018–2020



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# Minimally invasive spine surgery (MISS) is a suite of technology-dependent techniques and procedures that reduces local operative tissue damage and systemic surgical stress enabling earlier return to function striving for better outcomes than traditional techniques

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## **AOSpine MISS Curriculum Task Force May 3, 2018**

(meeting during Global Spine Congress in Singapore)

The MISS Task Force aims at enabling AOSpine to become the leading educator in minimally invasive techniques and procedures and meet surgeons' needs for improved surgical outcomes and reduced morbidity.

**The key objectives** of the Task Force are based on the following focus areas:

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**Target** - Optimized patient selection

**Technology** - Optimal combination of access, visualization, navigation, instrumentation, biologic augmentation

**Technique** - Microsurgery, neural protection, decompression, stabilization

**Training** - Simulation, observation, mentorship

**Testing the boundaries** - MISS for deformity, robotics

The idea and goal to establish the MISS curriculum framework was to create a pathway for surgeons into MISS.

This introduction to MISS should be independent of surgeon's background and his training level, which he is practicing and therefore should be applicable to all surgeons world-wide.

The MISS framework should be independent of available types of resources a surgeon has access to, i.e. referring to operating tools, resources, etc. Therefore, this pathway into MISS was created, that hopefully is applicable for most surgeons world-wide.

**It's important to create a curriculum on MISS.**

As in many other surgical specialties, we realized that the best way to teach technology is to go from "simple" to "complex". Therefore, the "simple" starts with the indications for surgeries, progresses with the tools and technologies and proceeds into the "complex" level on teaching the surgical techniques.

This document is meant to support AOSpine faculty members in focusing on the standards to teach MISS techniques from the "simple" to more "complex" technologies.

We believe this is the best opportunity to convey the knowledge of MISS to surgeons globally.

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# The curriculum

## Competencies

(these are the basis for the learning objectives for all our educational events)

1. Diagnose the patient problem correlating the clinical findings with imaging and work up
2. Recognize appropriate indications based on your skill set and case experience and outcomes
3. Select the appropriate MISS procedure for the pathology and indication, and recognize when MISS is not the appropriate option
4. Correctly set up the technology, OR, and the team for the procedure
5. Perform microscopic MISS procedures: posterior cervical foraminotomy, interlaminar lumbar discectomy, lumbar extraforaminal discectomy, and unilateral laminotomy for bilateral decompression
6. Perform endoscopic MISS procedures: interlaminar lumbar discectomy, transforminal lumbar foraminotomy and discectomy, and unilateral laminotomy for bilateral decompression
7. Perform the fusion MISS procedures (percutaneous screw and rod placement, TLIF, and LLIF) and apply strategies to optimize arthrodesis
8. Manage complications and apply a backup plan
9. Use MISS techniques for revision surgery

## Target audiences

- Surgeons doing open surgery but with little or no MISS experience
- Surgeons with some experience with microscopes and tubes but not for complex MISS
- Surgeons with experience in MISS who use microscope and burr including complex MISS
- Surgeons of any level without any experience with endoscope

## What our curriculum offers faculty

(AOSpine Faculty Lounge) and participants (website)

[aospine.org > faculty lounge](https://aospine.org/faculty-lounge)

[aospine.org/MISScurriculum](https://aospine.org/MISScurriculum)

- Course and module templates
- Curriculum guides

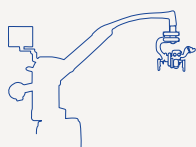
- Step-by-step procedure guides and assessment tools (metrics)

- Lectures
- Cases
- Guides for practical exercises

- Videos
- Book chapters
- Online and paper resources

- Assessment questions and procedure metrics

# General MISS skills (not procedure specific) and defined learning objectives



## Using a microscope

- Identify the advantages of using a surgical microscope for minimally invasive spine surgeries
- Identify the differences between microscopes and loupes
- Recognize the main characteristics of modern surgical microscopes
- Describe how to place a surgical microscope in the OR
- Apply basic techniques in the use of surgical microscopes



## Using an endoscope

- Describe the characteristics and setup of working channel endoscopes
- Identify the differences between microscopes and endoscopes
- Describe how to handle an endoscope
- Explain the key differences of working channel endoscopes for transforaminal vs interlaminar approaches



## Using a burr with an endoscope

- Describe the various types of burrs used in full endoscopic spine surgery
- Identify key differences between the use of burrs in microscopic compared to endoscopic spine surgery
- Explain how to utilize burrs in full endoscopic surgery
- Describe strategies for avoiding complications related to burrs



## Using a burr in MISS

- Describe the types of burrs commonly used in MISS
- Describe how to correctly use a burr in MISS
- Identify advantages of using a burr in MISS
- Recognize potential risks and dangers of using a burr



## Using 2-D and 3-D navigation and assistive technologies

- Describe the types of navigation and their pros and cons
- Describe how to integrate navigation into the surgical workflow, eg, pedicle screw insertion
- Optimize set-up and technique intraoperatively to achieve the best imaging



## Managing a dural tear

- Describe the use of different methods of closing dural tears (incidental durotomy) in MISS
- Describe safe microsurgical techniques to prevent the creation of a dural tear
- Describe how to perform techniques to safely close a dural tear in the OR
- Explain how to manage patients with dural tears intraoperatively and postoperatively, and apply rescue strategies



## Bleeding control

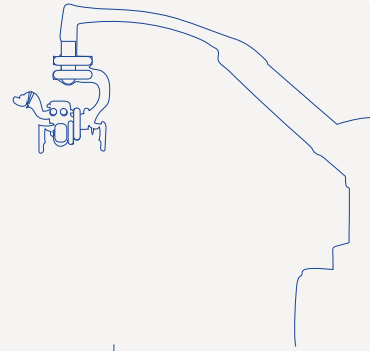
- Describe the different hemostasis options in MISS
- Describe how to perform hemostasis in a tubular surgery
- Identify the vascular anatomy in posterior, oblique and lateral approaches
- Identify the different bleeding control techniques for the approaches
- Recognize the importance of hemostatic and soft tissue management in MISS



## Radiation reduction

- Describe the advantages and disadvantages of intraoperative imaging
- Describe how to reduce radiation exposure to the surgeon, team, and patient
- Identify all ways to optimize intraoperative imaging and reduce radiation exposure

# Microscopic procedures



## Microscopic procedures

### Interlaminar microscopic tubular lumbar discectomy (IMTLD)

- Explain the rationale for tubular interlaminar accesses
- Identify the fluoroscopic landmarks for tube placement
- Identify and palpate the anatomy using the first tube dilator
- Describe how to dock the sequential dilators, avoid muscle creeping, and place the appropriate working channel
- Recognize the limitations of tubular retractors, identify complications, and describe the corrective measures

### Posterior microscopic tubular cervical foraminotomy (PMTCF)

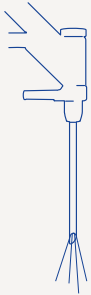
- Describe the indications and contraindications for posterior foraminotomy
- Explain the steps of MISS in posterior microscopic tubular cervical foraminotomy (PMTCF)
- Recognize possible complications and explain how to avoid and manage them

### Extraforaminal microscopic tubular lumbar discectomy (EMTLD)

- Describe the indications and contraindications for the procedure
- Explain the steps in the procedure
- Recognize possible complications and explain how to avoid and manage them

### Microscopic tubular unilateral laminotomy for bilateral decompression (“over the top” decomp, MT-ULBD)

- Explain the rationale for tubular “over the top” decompression
- Identify the fluoroscopic landmarks for tube placement
- Identify and palpate the anatomy using the first tube dilator
- Describe how to dock the sequential dilators, avoid muscle creeping, and place the appropriate working channel
- Describe the maneuvers used to achieve bilateral “over the top” access via a unilateral approach
- Recognize the limitations of tubular retractors, identify complications, and describe the correctives measures



## Endoscopic procedures

### Interlaminar endoscopic lumbar discectomy (IELD)

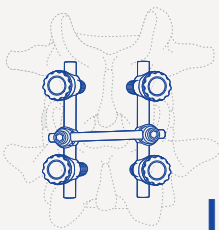
- Describe the indications and contraindications of interlaminar endoscopic lumbar discectomies
- Describe the basic steps of endoscopic procedures via the interlaminar window
- Recognize possible complications and discuss how to avoid complications with endoscopic spinal procedures

### Transforaminal endoscopic lumbar foraminotomy and discectomy (TELF/TELD)

- Describe the indications and contraindications of transforaminal endoscopic procedures
- Describe the basic steps of endoscopic procedures through Kambin's triangle
- Recognize possible complications and discuss how to avoid complications with endoscopic spinal procedures

### Lumbar endoscopic unilateral laminotomy for bilateral decompression (Endoscopic "over the top" decompression or endoscopic LE-ULBD)

- Describe the indications and contraindications for interlaminar endoscopic procedures of the lumbar spine
- Explain the progression fluoroscopic imaging - palpation - visualization
- Describe how to plan the surgical interlaminar approach and to perform basic procedural steps of the unilateral laminotomy for bilateral decompression.
- Recognize possible complications and discuss how to avoid complications with endoscopic spinal procedures



## Instrumented procedures

### Percutaneous screw and rod placement

- Identify the landmarks to introduce a screw to the pedicle percutaneously
- Describe the radiological anatomy of the pedicle path
- Check positioning of the bar inside the head of the pedicle screws
- Identify the possible missed trajectories of a pedicle screw and how to reposition it

### MISS TLIF

- Describe the indications for TLIF and the pros and cons compared with other "LIF" techniques
- Describe the phases and the steps of MISS TLIF performed through a tubular retractor
- Recognize the possible complications of the technique and describe ways to prevent and address these

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# Implementing the AOSpine MISS Curriculum

## Steps for the chairperson to prepare and finalize the program

- ❑ Read the curriculum framework and background information in the Faculty Support Package from the AOSpine Faculty Lounge and ask the EA to also review the material
- ❑ Define your target audience and the pathologies and patient problems you will cover in the course
- ❑ Based on the curriculum competencies, select the ones you want participants to achieve from your event (adapt some if necessary)
- ❑ Select the skills and procedures you want to include in your event—decide which simulations you will use
- ❑ Insert the AOSpine MISS lecture at the start of your program - review it and the supporting videos from the curriculum taskforce on implementing the curriculum (GSC launch)
- ❑ Create your program based on an existing approved template (endoscopic, microscopic Davos 2018 in the Faculty Support Package) or based on local needs and resources
- ❑ Share the program with a regional member of the MISS curriculum taskforce member and the EA for feedback (check if one of them can support you as faculty at the course: this needs to be done as early as possible)

## Faculty support and preparation

- ❑ Communicate with the faculty and assign the various activities when you have gathered their expertise profiles in the various types of MISS
- ❑ Share the general skills and specific procedures folders with the faculty and recommend that they teach the topics based on the phases, steps, etc they find there
- ❑ Ask faculty to view the videos explaining one of the general skills and one specific procedure at the GSC launch
- ❑ Ask faculty to review all the procedure and skills videos, guides, etc for their assigned topics (they should also be familiar with the content in the blended learning materials shared with participants)
- ❑ Ask faculty to view the existing videos of the set up for practical exercises, along with the instrument lists, step by step info, etc

## Blended learning and resources for participants

- ❑ If your participants will use the materials, request the standard blended learning material from [education@aospine.org](mailto:education@aospine.org) with the help of your event organizer
- ❑ If you want to include moderated discussion in the blended learning, appoint 2 faculty and request they follow the tasks and timeline
- ❑ Identify any other materials in the package that you want to precirculate



**Roger Härtl**

Task Force Leader,  
Weill Cornell Medical College  
New York, United States



**Richard Assaker**

Centre Hospitalier Regional  
Universitaire Lille, France



**Muhammed Assous**

Razi Spine Clinic  
Amman, Jordan



**Christoph Hofstetter**

University of Washington  
Seattle, United States



**JinSung Kim**

The Catholic University of Korea  
Seoul, South Korea



**Avelino Parajon**

Hospital Universitario  
Ramón y Cajal Madrid, Spain



**Néstor Taboada**

Clinica PortoAzul  
Barranquilla, Colombia



**Paul Taylor**

SpinesWA Mount Hospital  
Perth, Australia

### Supporting surgeons

**Kevin Foley**, North America

**Dan Gelb**, North America

**Andreas Korge**, Europe

**Peter van Daele**, Europe

### AOSpine Global Education

Stettbachstrasse 6

8600 Duebendorf

Switzerland

[www.aospine.org](http://www.aospine.org)

[education@aospine.org](mailto:education@aospine.org)