AO Trauma Masters Course—Current Concepts—Upper Extremity I
Scapula—Clavicle—Humerus—Elbow

December 1–6, 2019
Davos, Switzerland

Lecture room: Flüela
The AO's flagship educational event, the AO Davos Courses offer surgeons at all stages of their career outstanding educational and networking opportunities. Experience this pioneering spirit of peer-to-peer collaboration and learn skills that will help advance your career.
Mission
The AO’s mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

Purpose statement
AO Trauma is committed to improve patient care outcomes through the highest quality education. We strive to combine the right knowledge and surgical skills that empower the orthopedic and trauma surgeons to put theory into practice and to improve fracture management for the benefit of the patient.

The AO principles of fracture management

1. Fracture reduction and fixation to restore anatomical relationships.

2. Fracture fixation providing absolute or relative stability, as required by the “personality” of the fracture, the patient, and the injury.

3. Preservation of the blood supply to soft-tissues and bone by gentle reduction techniques and careful handling.

4. Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.
Welcome
Dear AO Trauma course participant,

Welcome to AO Trauma's first-class schedule of activities at the AO Davos Courses 2019. We provide a wide range of relevant courses designed to meet your specific professional needs—and we are confident that you will find your course and the networking experiences professionally rewarding.

With a global reputation for innovation, leadership, and excellence in continuing medical education (CME), AO Trauma and the AO Education Institute are transforming education by expanding the educational activities available to you. CME is not just about face-to-face courses. Our educational opportunities address the specific clinical problems that you encounter daily. Visit our website (www.aotrauma.org) to discover the latest educational activities.

At the AO Davos Courses 2019, AO Trauma offers you a chance to actively engage in your course as well as opportunities to:

- Interact with over 300 international faculty
- Expand your professional network by establishing contacts and new relationships with colleagues, including faculty and participants from over 80 countries
- Meet with staff and surgeons from the AO's clinical divisions, institutes, and initiatives.
- Visit the AO experience or take a tour of our headquarters, the AO center, to gain insight into the AO's ongoing activities and resources available to support you in your clinical work
- Experience the AO spirit of collegiality and camaraderie that is felt by participants and faculty alike

Your current level of knowledge, attitudes, and skills will be challenged throughout the week. At the same time, our best-in-class curriculum and faculty will provide you with a memorable learning experience that will remain with you for a lifetime.

Your experiences with us over the next few days will result in the realization of new and meaningful knowledge, skills, and understanding that we hope will translate into improved patient care.

If you enjoy your experience this week and want to stay in touch, we invite you to become a member of AO Trauma. Doctors of medicine and osteopathy who have completed AO Trauma basic principles course are eligible for membership; contact us to learn more.

Yours sincerely,

Wa'el Taha
Chairperson AO Trauma Education Commission

Kodi Kojima
Chairperson AO Trauma International Board
Course description

Current Concepts courses and modules address the latest techniques and best practices in operative fracture management to deal with complex orthopedic trauma problems. The course includes many case presentations and open group discussions moderated by experts in the field. Best evidence is presented through summary lectures and practical exercises, and simulations are integrated where appropriate.

Course structure

This five-day, Masters-level course comprises three one-day modules. Participants also select two from a wide choice of one-day self-directed learning modules.

Goal of the course

The goal of this course is to increase knowledge and skills for managing difficult and complex cases. State-of-the-art techniques and approaches, best practices for treatment, and the management of complications will all be addressed at a high level.

Target participants

Participants must have completed the AO Trauma Basic Principles and Advanced Principles courses. They must be actively involved in orthopedic trauma management and preferably have at least five years of experience postresidency in trauma surgery. Participants must be willing to share their ideas and be able to communicate well in English.

Learning objectives

Upon completion of this course, participants will be able to:

• Explain the latest developments in the treatment of clavicular, scapular, proximal humeral, humeral shaft, distal humeral, and elbow injuries
• Select and perform fracture-specific approaches in the areas described above
• Analyze complicated clinical cases of these fractures and choose the optimal treatment strategy
• Integrate practical tips and tricks for fracture reduction and fixation techniques
• Identify the causes of failure and describe how to develop an appropriate salvage strategy
Overall chairperson
Friedrich Baumgaertel
Private Practice, Vallendar, Germany

Chair-person
Hatem Said
Assiut University Hospital, Assiut, Egypt

Co-chair-person
Michael Gardner
Stanford University School of Medicine, Redwood, USA

International faculty
Saeed Al-Thani
Orthocure Medical Center, Dubai, UAE

Terry Axelrod
Sunnybrook Health Sciences Centre, Toronto, Canada

Gregory Bain
Flinders University of South Australia, North Adelaide, Australia

Ziyad El-Qirem
King Hussein Medical Center, Amman, Jordan

Harry Hoyen
Case Western Reserve University, Cleveland, USA

Hyong-Keun Oh
Inje University / Ilsan Paik Hospital, Goyang-si, South Korea

Jorge Terrazas Callisperis
Clinica del Sur, La Paz, Bolivia

Regional faculty
Simon Lambert
University College London Hospital NHS Foundation Trust, London, United Kingdom

National faculty
Reto Babst
Kantonsspital Luzern, Luzern, Switzerland

Guest lecturer
Jesse Jupiter
Massachusetts General Hospital, Boston, USA
Self-directed learning module
External fixation

Learning objectives

Tuesday, December 3, 2019
External fixation for acute trauma and nonunion
Upon completion of this module, participants will be able to:
• Describe the principles of external fixation and correct techniques for wire and pin insertions
• Describe the principles of distraction osteogenesis
• Recognize the external fixation methods for acute trauma, nonunion and bone transportation
• Describe the methods and indications for unilateral external fixation and circular external fixation
• Apply the principles to manage acute trauma and nonunion with external fixation
• Apply the proper techniques in basic circular frame construction
• Recognize safe techniques, implementation of post-op care program, and manage complications

Thursday, December 5, 2019
External fixation for bone defects and deformity correction
Upon completion of this module, participants will be able to:
• Describe the principles of external fixation, distraction osteogenesis, and long bone deformity
• Analyze clinical, radiographic findings and the center of rotation of angulation (CORA)
• Describe the techniques using conventional circular frame and 6-axis hexapod systems to correct bone defects and deformity
• Apply the principles of management of bone defects and deformity correction with external fixation
• Perform long bone deformity correction using circular external fixation with hinges, the 6-axis hexapod system, and its software application
• Recognize safe techniques, implementation of post-op care program, and manage complications

Chair-
person

Co-chair-
person

International faculty

Sergio Iriarte Vincenti
Clinica del Sur | La Paz | Bolivia

Mahmoud Mahran
Medical School-Ain Shams University | Cairo | Egypt

Stephen Quinnan
University of Miami | Miami | USA

Spence Reid
Pennsylvania State University College of Medicine, Milton S. Hershey Medical Center | Hershey | USA

Regional faculty

Dankward Höntzsch
Private Practice | Tübingen | Germany

Leonid Solomin
Vreden Russian Research Institute of Traumatology | St.Petersburg | Russia

National faculty

Theddy Slongo
Inselspital | Bern | Switzerland
Self-directed learning module
Intramedullary nailing

Learning objectives

Tuesday, December 3, 2019

Nailing of complex fractures—special situations
Upon completion of this module, participants will be able to:

- Perform correct decision making and preoperative planning for nailing procedures for complex diaphyseal and metaphyseal fractures
- Perform correct decision making and preoperative planning for nailing procedures for special situations (osteoporotic bone, atypical fractures, polytrauma, and soft-tissue injury)
- Explain the indications and limitations of nailing for fractures involving articular segments
- Describe options for obtaining and keeping good reduction while nailing more proximal and distal diaphyseal fractures
- Explain how to minimize the likelihood of complications, and how to recognize and manage complications when they occur

Thursday, December 5, 2019

Complications related to nailing
Upon completion of this module, participants will be able to:

- Define and recognize delayed union, nonunion, malunion, and infection and carry out an appropriate diagnostic work-up
- Develop a treatment plan based on the cause
- Explain the treatment options and indications for delayed union and nonunion
- Explain the treatment options and indications for nailing in malunion
- Explain the treatment options and indications for infection and broken nails

Chair-person

Ernest Kwek
Tan Tock Seng Hospital, Singapore, Singapore

Co-chair-person

Christopher Finkemeier
Orthopedic Trauma Surgeons of North California, Carmichael, USA

International faculty

Hayder Abdul Hadi
Rashid Hospital | Dubai | UAE

Paulo Barbosa
Hospital Quinta D’Or | Rio de Janeiro | Brazil

Mark Lee
University of California, Davis | Sacramento | USA

Jong-Keon Oh
Korea University Guro Hospital | Seoul | South Korea

Chang-Wug Oh
Kyungpook National University Hospital | Daegu | South Korea

Regional faculty

Martin Hessmann
Academic Teaching Hospital Fulda | Fulda | Germany

Christian Kammerlander
Ludwig Maximilian University Munich | Munich | Germany
Self-directed learning module
Pediatric fractures

Learning objectives

Pediatric fractures of the upper extremity
Upon completion of this module, participants will be able to:

- Recognize how bone characteristics and fracture classification are different in children and adolescents compared to adults, and describe how this affects bone healing and fracture management
- Evaluate a range of nonsurgical and surgical options for the treatment of common pediatric fractures of the upper extremity
- Manage pediatric upper limb fractures according to biological and mechanical principles and apply appropriate techniques and technologies
- Apply treatment strategies for pediatric fractures of the upper limb based on available evidence and discuss areas of controversy
- Provide strategies for the prevention and management of complications associated with pediatric fractures
- Demonstrate the ability to perform proper fixation of common upper limb fractures in children and using the Elastic Stable Intramedullary Nailing (ESIN) in forearm fractures

Pediatric fractures of the lower extremity
Upon completion of this module, participants will be able to:

- Recognize how bone characteristics and fracture classification are different in children and adolescents compared to adults, and describe how this affects bone healing and fracture management
- Evaluate a range of nonsurgical and surgical options for the treatment of common pediatric fractures of the lower extremity
- Manage pediatric lower limb fractures according to biological and mechanical principles and apply appropriate techniques and technologies
- Apply treatment strategies for pediatric fractures of the lower extremity based on available evidence and discuss areas of controversy
- Provide strategies for the prevention and management of complications associated with pediatric fractures
- Demonstrate the ability to perform proper fixation of common lower limb fractures in children and using the Elastic Stable Intramedullary Nailing (ESIN) in femoral fractures

Chair-person

Mamoun Kremli
Dallah Hospital, Riyadh, Saudi Arabia

Co-chair-person

Matej Kastelec
University Medical Centre Ljubljana, Ljubljana, Slovenia

International faculty

Daniel Green
Hospital for Special Surgery | New York | USA
James Hui
National University Hospital Singapore | Singapore | Singapore
Talal Ibrahim
Sidra Medical and Research Center | Doha | Qatar
Unni Narayanan
The Hospital for Sick Children | Toronto | Canada
Jamil Soni
Pontifical Catholic University Paraná | Curitiba | Brazil

Regional faculty

Arnold Besselaar
Maxima Medical Centre | Veldhoven | The Netherlands
Fergal Monsell
Bristol Childrens Hospital | Bristol | United Kingdom
Self-directed learning module
Polytrauma and soft tissue

Learning objectives

Polytrauma
Upon completion of this module, participants will be able to:
• Define and recognize a polytrauma patient from the clinical presentation and lab work
• Identify key clinical parameters that will direct surgical management and timing of care for polytrauma patients
• Use up-to-date principles to surgically manage a polytrauma patient based upon their clinical reaction to resuscitation
• Recognize that polytrauma is a disease that will affect a patient and their family for a lifetime

Soft tissue
Upon completion of this module, participants will be able to:
• Demonstrate strategies for assessing and treating open fractures and mangled limbs
• Use soft-tissue techniques to create local and rotational flaps to deal with soft-tissue defects
• Understand surgical techniques and rehabilitation to ensure amputations are successful

Tuesday, December 3, 2019

Polytrauma

Wednesday, December 4, 2019

Soft tissue

Thursday, December 5, 2019

Polytrauma

Regional faculty

Richard Buckley
University of Calgary
Calgary, Canada

Waleed Abdulwahid Alsaadan
Medical City Teaching Complex, Baghdad, Iraq

International faculty

Khalid Alawadi
Rashid Hospital | Dubai | UAE

Jay Bridgeman
Missouri Orthopedic Institute | Columbia | USA

Tito Rocha
Instituto Nacional de Ortopedia e Traumatologia | Rio de Janeiro | Brazil

Chair-person

Co-chair-person

Jasmin Gaab
Bundeswehr Krankenhaus Berlin | Berlin | Germany

John McMaster
John Radcliffe Hospital | Oxford | United Kingdom

Inger Schipper
Leiden University Medical Center | Leiden | The Netherlands

Christian Willy
Bundeswehr Krankenhaus Berlin | Berlin | Germany
Sunday
December 1, 2019

15:00  Opening of the congress center
15:00–17:00  Registration of participants
17:00–19:00  Opening Ceremony and Founders’ Reception

Monday
December 2, 2019

Location: Flüela

Clavicle, scapula, and elbow

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–08:10</td>
<td>Welcome and introduction to the course</td>
<td>H Said, M Gardner</td>
</tr>
<tr>
<td>08:10–08:30</td>
<td>Proximal humerus—when to operate?</td>
<td>H Hoyen</td>
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<tr>
<td>08:30–08:55</td>
<td><strong>Video presentation—reduction technique proximal humeral fractures</strong></td>
<td>M Gardner</td>
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<tr>
<td>08:55–09:10</td>
<td>The stiff shoulder—analysis and treatment strategy</td>
<td>S Lambert</td>
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<tr>
<td>09:10–09:30</td>
<td>Transfer to the hospital</td>
<td></td>
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<tr>
<td></td>
<td>Meeting point 09:10 at congress center main entrance</td>
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<tr>
<td>09:30–09:40</td>
<td>Preparation for anatomical specimen laboratory</td>
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<tr>
<td>09:40–11:20</td>
<td><strong>Anatomical specimen laboratory</strong></td>
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<tr>
<td></td>
<td>• Clavicular approaches—anterolateral arm</td>
<td>R Babst, J Terrazas Callisperis</td>
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<td></td>
<td>• Elbow—medial</td>
<td>Z El-Qirem, G Bain</td>
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<tr>
<td></td>
<td>• Elbow—lateral</td>
<td>J Jupiter, S Al-Thani</td>
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<tr>
<td>11:20–11:50</td>
<td>Coffee break</td>
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<tr>
<td>11:50–13:00</td>
<td><strong>Anatomical specimen laboratory</strong></td>
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<td></td>
<td>• Humeral approaches—posterior</td>
<td>All faculty</td>
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<tr>
<td></td>
<td>• Elbow—posterior</td>
<td>T Axelrod, S Al-Thani</td>
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<tr>
<td></td>
<td>• Olecranon osteotomies</td>
<td>HK Oh, Z El-Qirem</td>
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<td>G Bain, R Babst</td>
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<tr>
<td>13:00–13:30</td>
<td>Transfer to the congress center</td>
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<tr>
<td></td>
<td>Meeting point 13:00 at Hospital main entrance</td>
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<tr>
<td>13:30–14:10</td>
<td>Lunch break</td>
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<tr>
<td>Time</td>
<td>Session</td>
<td>Speaker(s)</td>
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<tr>
<td>14:10–14:30</td>
<td>Current concepts and evidence in clavicular fractures</td>
<td>Z El-Qirem</td>
</tr>
<tr>
<td>14:30–14:50</td>
<td>Acromioclavicular (AC) joint injuries</td>
<td>G Bain</td>
</tr>
<tr>
<td>14:50–15:10</td>
<td><strong>Case-based panel discussion</strong> AC joint injuries</td>
<td>Moderator: H Hoyen Panel: HK Oh, S Lambert, S Al-Thani</td>
</tr>
<tr>
<td>15:10–15:40</td>
<td><strong>Video presentation—hook plate and suture button—AC joint injuries</strong></td>
<td>H Said, H Hoyen</td>
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<tr>
<td>15:40–16:00</td>
<td>Coffee break</td>
<td></td>
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<tr>
<td>16:00–16:20</td>
<td>Current concepts of scapular fractures</td>
<td>M Gardner</td>
</tr>
<tr>
<td>16:20–16:40</td>
<td><strong>Video presentation—elbow fractures</strong></td>
<td>T Axelrod</td>
</tr>
<tr>
<td>16:40–16:45</td>
<td>Location change to discussion groups</td>
<td></td>
</tr>
<tr>
<td>16:45–18:00</td>
<td><strong>Discussion group 1</strong>&lt;br&gt;Clavicular and AC joint injuries</td>
<td>H Hoyen, HK Oh&lt;br&gt;S Lambert, Z El-Qirem&lt;br&gt;T Axelrod, R Babst&lt;br&gt;G Bain, J Terrazas Callisperis</td>
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<tr>
<td></td>
<td>Group 1 – Landwasser 16</td>
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<td></td>
<td>Group 2 – Landwasser 18</td>
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<td></td>
<td>Group 3 – Landwasser 20</td>
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<td></td>
<td>Group 4 – Flüela</td>
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</tbody>
</table>
External fixation for acute trauma and nonunion

**Location:** Schiahorn (lectures) Strela/Rinerhorn (practicals)

<table>
<thead>
<tr>
<th>Time</th>
<th>Module 1: General principles</th>
<th>Moderator</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00-08:10</td>
<td>Welcome and introduction to today’s module</td>
<td>V Phiphobmongkol, A Volna</td>
<td></td>
</tr>
<tr>
<td>08:10-08:20</td>
<td>Spectrum of external fixation in acute trauma</td>
<td>A Volna</td>
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<tr>
<td>08:20-08:35</td>
<td>Safe zones for the insertion of wires and half-pins</td>
<td>V Phiphobmongkol</td>
<td></td>
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<tr>
<td>08:35-08:50</td>
<td>Techniques of pin and wire insertion, to avoid complications</td>
<td>T Slongo</td>
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<tr>
<td>08:50-09:05</td>
<td>Principles of circular frame construction—equipment and terminology</td>
<td>L Solomin</td>
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</tr>
<tr>
<td>09:05-09:10</td>
<td>Question and answer session</td>
<td>All faculty</td>
<td></td>
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</tbody>
</table>

**Module 2: Acute trauma**

<table>
<thead>
<tr>
<th>Time</th>
<th>Moderator: A Volna</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00-09:25</td>
<td>External fixation for Damage Control Orthopedics (DCO) and soft-tissue management—tips and tricks</td>
<td>D Höntzsch</td>
</tr>
<tr>
<td>09:25-09:40</td>
<td>Case-based lecture—ring fixation in definitive fracture management</td>
<td>V Phiphobmongkol</td>
</tr>
<tr>
<td>09:40-09:55</td>
<td>Question and answer session</td>
<td>All faculty</td>
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<tr>
<td>09:50-10:00</td>
<td>Coffee break</td>
<td></td>
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<tr>
<td>10:00-11:00</td>
<td>Discussion group 1: External fixation in acute trauma Group 1 – Landwasser 2 Group 2 – Landwasser 4 Group 3 – Schiahorn</td>
<td>All faculty</td>
</tr>
<tr>
<td>11:00-11:05</td>
<td>Location change to practical exercise room</td>
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</tbody>
</table>

**Module 3: Nonunion**

<table>
<thead>
<tr>
<th>Time</th>
<th>Moderator: L Solomin</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:35-13:50</td>
<td>Biology of distraction osteogenesis and techniques of corticotomy</td>
<td>M Mahran</td>
</tr>
<tr>
<td>13:50-14:05</td>
<td>Nonunion and infected nonunion, diagnosis and treatment</td>
<td>S Iriarte Vincenti</td>
</tr>
<tr>
<td>14:05-14:20</td>
<td>Case-based lecture—treatment strategies for nonunion with external fixation</td>
<td>M Mahran</td>
</tr>
<tr>
<td>14:20-14:35</td>
<td>Case-based lecture—infected nonunion</td>
<td>S Reid</td>
</tr>
<tr>
<td>14:35-14:40</td>
<td>Location change to discussion groups</td>
<td></td>
</tr>
<tr>
<td>14:40-15:35</td>
<td>Discussion group 2: External fixation in nonunion/infection treatment Group 1 – Landwasser 2 Group 2 – Landwasser 4 Group 3 – Schiahorn</td>
<td>All faculty</td>
</tr>
<tr>
<td>15:35-15:50</td>
<td>Coffee break</td>
<td></td>
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<tr>
<td>15:50-17:10</td>
<td>Practical exercise 2: Bone transportation with D0 system</td>
<td>All faculty S Quinnan, A Volna</td>
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<tr>
<td>17:10-17:15</td>
<td>Location change to lecture room</td>
<td></td>
</tr>
</tbody>
</table>

**Module 4: Pin/frame management and removal**

<table>
<thead>
<tr>
<th>Time</th>
<th>Moderator: S Quinnan</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:15-17:30</td>
<td>Management of complications in the external fixator</td>
<td>D Höntzsch</td>
</tr>
<tr>
<td>17:30-17:45</td>
<td>External frame removal and post-removal management</td>
<td>S Iriarte Vincenti</td>
</tr>
<tr>
<td>17:45-17:55</td>
<td>Question and answer session</td>
<td>All faculty</td>
</tr>
<tr>
<td>17:55-18:00</td>
<td>Summary, evaluation, and take-home messages</td>
<td>V Phiphobmongkol, A Volna</td>
</tr>
<tr>
<td>17:45-20:30</td>
<td>AO Davos Courses night</td>
<td></td>
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</tbody>
</table>
# Nailing of Complex Fractures—Special Situations

**Location:** Flüela (lectures) Foyer C/Studio (practicals)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–08:10</td>
<td>Welcome and introduction to today’s module</td>
<td>E Kwek</td>
</tr>
<tr>
<td>08:10–08:25</td>
<td><strong>Module 1</strong>&lt;br&gt;Moderator: M Hessmann&lt;br&gt;Complex and periarticular fractures</td>
<td></td>
</tr>
<tr>
<td>08:10–08:25</td>
<td>Case-based lecture—proximal humeral fractures—can we nail it?</td>
<td>M Hessmann</td>
</tr>
<tr>
<td>08:25–08:40</td>
<td>Nailing of trochanteric fractures—tips to improve implant positioning and results</td>
<td>JK Oh</td>
</tr>
<tr>
<td>08:40–08:55</td>
<td>Nailing subtrochanteric fractures of the femur—tips and tricks</td>
<td>C Finkemeier</td>
</tr>
<tr>
<td>08:55–09:10</td>
<td>Nailing complex distal femoral fractures</td>
<td>M Lee</td>
</tr>
<tr>
<td>09:10–09:25</td>
<td>Segmental fractures of the femur and tibia—tips and tricks for nailing</td>
<td>E Kwek</td>
</tr>
<tr>
<td>09:25–09:40</td>
<td>Metaphyseal tibial fractures—reduction and nailing techniques</td>
<td>P Barbosa</td>
</tr>
<tr>
<td>09:40–09:50</td>
<td>Question and answer session</td>
<td>All faculty</td>
</tr>
<tr>
<td>09:50–10:15</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>10:15–11:25</td>
<td><strong>Discussion group 1</strong>&lt;br&gt;Nailing of complex fractures&lt;br&gt;Group 1 – Landwasser 6&lt;br&gt;Group 2 – Landwasser 8&lt;br&gt;Group 3 – Flüela</td>
<td>M Hessmann, E Kwek, H Abdul Hadi, M Lee, P Barbosa, JK Oh, C Finkemeier, CW Oh, C Kammerlander</td>
</tr>
<tr>
<td>11:25–11:30</td>
<td>Location change to practical exercise room (Foyer C2)</td>
<td></td>
</tr>
<tr>
<td>11:30–13:00</td>
<td><strong>Practical exercise 1</strong>&lt;br&gt;Proximal humeral nailing</td>
<td>All faculty</td>
</tr>
<tr>
<td>13:00–14:00</td>
<td>Lunch break</td>
<td>M Hessmann, E Kwek</td>
</tr>
<tr>
<td>14:00–14:15</td>
<td>Nailing of fractures in the elderly/osteoporotic bones</td>
<td>C Kammerlander</td>
</tr>
<tr>
<td>14:15–14:30</td>
<td>Nailing atypical fractures and fractures with abnormal anatomy—tips and tricks</td>
<td>E Kwek</td>
</tr>
<tr>
<td>14:30–14:45</td>
<td>Nailing fractures in polytrauma patients—current concepts and contemporary trends</td>
<td>H Abdul Hadi</td>
</tr>
<tr>
<td>14:45–15:00</td>
<td>Periprosthetic tibial nailing</td>
<td>M Lee</td>
</tr>
<tr>
<td>15:05–15:05</td>
<td>Location change to practical exercise room (Studio)</td>
<td>All faculty</td>
</tr>
<tr>
<td>15:05–16:25</td>
<td>Practical exercise 2&lt;br&gt;Proximal femoral nailing with augmentation demo</td>
<td>C Kammerlander, H Abdul Hadi</td>
</tr>
<tr>
<td>16:25–16:40</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>16:40–17:40</td>
<td><strong>Discussion group 2</strong>&lt;br&gt;Nailing in special situations&lt;br&gt;Group 1 – Landwasser 6&lt;br&gt;Group 2 – Landwasser 8&lt;br&gt;Group 3 – Flüela</td>
<td>M Lee, CW Oh, C Kammerlander, M Hessmann, H Abdul Hadi, C Finkemeier, P Barbosa, JK Oh, E Kwek</td>
</tr>
<tr>
<td>17:40–17:45</td>
<td>Location change to lecture room</td>
<td>M Lee</td>
</tr>
<tr>
<td>17:45–18:00</td>
<td>Extreme nailing concepts</td>
<td>C Kammerlander</td>
</tr>
<tr>
<td>18:00–18:10</td>
<td>Summary, evaluation, and take-home messages</td>
<td>C Finkemeier</td>
</tr>
<tr>
<td>17:45–20:30</td>
<td>AO Davos Courses night</td>
<td></td>
</tr>
</tbody>
</table>
Pediatric fractures of the upper extremity

Location: Seehorn (lectures) Sanada 2/Ducan/Altein (practicals)

08:00–08:10 Welcome and introduction to today’s module
M Kremli, M Kastelec

Module 1
Moderator: M Kremli
Upper limb—shoulder and humerus

Upon completion of this module, participants will be able to:
• Recognize the range of treatment options of humeral fractures in children
• Identify indications for operative intervention in humeral fractures
• Describe assessment of injuries associated with musculoskeletal trauma around the shoulder (eg peripheral nerve injury, brachial plexus injury, vascular injury, labral tears)

08:10–08:20 Plenary session
Evaluation of warm-up cases—common injuries around the shoulder in children
M Kremli

08:20–09:00 Round table discussion 1
Shoulder girdle and humerus
Table 1-5
All faculty

09:00–09:10 Plenary session
Reevaluation of warm-up cases—common injuries around the shoulder in children
M Kremli

Module 2
Moderator: A Besselaar
Upper limb—elbow injuries and supracondylar fractures

Upon completion of this module, participants will be able to:
• Discuss management of supracondylar humerus fractures and method of management
• Perform proper fixation of supracondylar fractures and discuss possible complications and methods to avoid them
• Describe the late complications of lateral condylar fractures (eg nonunion, malunion, tardy ulnar nerve palsy)
• Avoid missing the Monteggia lesion

09:10–09:20 Plenary session
Evaluation of warm-up cases—important pediatric elbow injuries
A Besselaar

09:20–09:35 Supracondylar fracture
U Narayanan

09:35–09:55 Coffee break

09:55–10:45 Round table discussion 2
Pediatric elbow injuries and supracondylar fractures
Table 1-5
All faculty

10:45–10:55 Plenary session
Reevaluation of warm-up cases—important pediatric elbow injuries
A Besselaar

10:55–11:00 Location change to practical exercise room (Sanada 2)

11:00–12:00 Practical exercise 1
Supracondylar humerus fracture, lateral condyle fracture and medial epicondyle fracture
T Ibrahim, J Hui

12:00–13:30 Lunch break

Module 3
Moderator: D Green
Upper limb—forearm and wrist fractures

Upon completion of this module, participants will be able to:
• Explain how the forearm functions as a multi-axial joint
• Explain the methods of stabilization and fixation according to the level of fracture in the forearm and wrist
• Describe the indications for surgical treatment
• Perform ESIN techniques for forearm and radial neck fractures
• Discuss the indications for and application of other techniques

13:30–13:45 Plenary session
Evaluation of warm-up cases—forearm and wrist injuries
D Green

13:45–14:00 Proximal forearm injuries—radial head, Monteggia
J Soni

14:00–14:50 Round table discussion 3
Treating forearm and wrist fractures
Table 1-5
All faculty

14:50–15:05 Plenary session
Reevaluation of warm-up cases—forearm and wrist injuries
D Green

15:05–15:25 Coffee break and location change to practical exercise room (Ducan/Altein)

15:25–16:35 Practical exercise 2a
Elastic nailing of forearm fractures
M Kastelec, F Monsell

16:35–17:00 Practical exercise 2b
Elastic nailing of radial neck fracture
M Kastelec, F Monsell

17:00–17:05 Summary, evaluation, and take-home messages
U Narayanan

17:45–20:30 AO Davos Courses night

Tuesday
December 3, 2019
# Polytrauma

**Location:** Sanada 1 (lectures) Sanada 2 (practicals)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–08:30</td>
<td>Welcome and introduction to the course and today's module, pre-test—polytrauma factoids you must know</td>
<td>R Buckley, W Abdulwahid</td>
</tr>
<tr>
<td>08:30–08:25</td>
<td>Location change to discussion groups</td>
<td></td>
</tr>
</tbody>
</table>
| 08:35–10:10   | **Discussion group 1**  
|               | Polytrauma  
|               | Group 1 – Landwasser 12                                                    | All faculty               |
|               | Group 2 – Landwasser 25                                                   | K Alawadi, J Gaab, J McMaster |
|               | Group 3 – Sanada 1                                                        | W Abdulwahid, J Bridgeman, I Schipper, R Buckley, T Rocha, C Willy |
| 10:10–10:30   | Coffee break                                                              |                           |
| 10:30–12:00   | Plenary case discussion—cases that went badly (patient death or disability) and why?  
|               | Summary of key points/questions                                             | All faculty               |
| 12:00–13:30   | Lunch break                                                               |                           |
| 13:30–15:10   | **Practical exercise 1**  
|               | Preoperative planning—polytrauma case—the participant, must keep the patient alive and provide the best clinical outcome | All faculty               |
|               | R Buckley, I Schipper                                                    |                           |
| 15:30–17:15   | **Practical exercise 2**  
|               | Rotation through hands-on multiple stations including:  
|               | Group A1—ATLS case management and leadership  
|               | Group B1—Pelvic packing  
|               | Group B2—Antibiotic beads and rod manufacture  
|               | Group B3—Principles of amputations                                     | All faculty               |
|               | R Buckley, J McMaster                                                    | I Schipper, T Rocha       |
|               | W Abdulwahid, J Bridgeman, I Schipper, R Buckley, T Rocha, C Willy         | J Bridgeman, C Willy, J Gaab |
| 17:15–17:30   | Summary lecture 1—questions When can I safely proceed with “early total care”?—evidence-based facts | I Schipper               |
| 17:30–17:45   | Summary lecture 2—questions Long-term outcome of polytrauma patients and how to do the best job with their care—evidence-based facts | J McMaster               |
| 17:45–17:55   | Summary, evaluation, and take-home messages                               | R Buckley, W Abdulwahid   |
| 17:45–20:30   | **AO Davos Courses night**                                               |                           |
### Location: Hospital

**Scapula and shoulder**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:00–07:20</td>
<td>Transfer to the hospital</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meeting point 07:00 at congress center main entrance</td>
<td></td>
</tr>
<tr>
<td>07:20–07:30</td>
<td>Preparation for anatomical specimen laboratory</td>
<td></td>
</tr>
<tr>
<td>07:30–09:00</td>
<td><strong>Anatomical specimen laboratory</strong></td>
<td>All faculty</td>
</tr>
<tr>
<td></td>
<td>• Minimally invasive plate osteosynthesis (MIPO) of the humerus</td>
<td>M Gardner, R Babst</td>
</tr>
<tr>
<td></td>
<td>• Deltopectoral approach</td>
<td>S Lambert, HK Oh</td>
</tr>
<tr>
<td></td>
<td>• AC joint</td>
<td>H Hoyen, T Axelrod</td>
</tr>
<tr>
<td>09:00–09:25</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>09:25–10:15</td>
<td><strong>Anatomical specimen laboratory</strong></td>
<td>All faculty</td>
</tr>
<tr>
<td></td>
<td>• Scapular approaches</td>
<td>H Said, M Gardner</td>
</tr>
<tr>
<td>10:15–10:30</td>
<td>Location change to lecture room at hospital</td>
<td></td>
</tr>
<tr>
<td>10:30–10:40</td>
<td>Malunion in the proximal humeral neck and tuberosity</td>
<td>H Said</td>
</tr>
<tr>
<td>10:40–11:00</td>
<td>Salvage of proximal humeral fractures</td>
<td>T Axelrod</td>
</tr>
<tr>
<td>11:00–11:10</td>
<td>Question and answer session</td>
<td>All faculty</td>
</tr>
<tr>
<td>11:10–11:35</td>
<td>Transfer to the congress center</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meeting point 11:10 at Hospital main entrance</td>
<td></td>
</tr>
<tr>
<td>11:35–13:15</td>
<td>Lunch break</td>
<td></td>
</tr>
</tbody>
</table>

### Location: Flüela

**Discussion group 1**

Proximal humeral fractures and dislocations

- Group 1 – Landwasser 16
- Group 2 – Landwasser 18
- Group 3 – Landwasser 20
- Group 4 – Flüela

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:15–14:15</td>
<td><strong>Discussion group 1</strong></td>
<td>S Lambert, HK Oh</td>
</tr>
<tr>
<td></td>
<td>Proximal humeral fractures and dislocations</td>
<td>H Hoyen, J Terrazas Callisperis</td>
</tr>
<tr>
<td></td>
<td>Group 1 – Landwasser 16</td>
<td>G Bain, R Babst</td>
</tr>
<tr>
<td></td>
<td>Group 2 – Landwasser 18</td>
<td>T Axelrod, S Al-Thani</td>
</tr>
<tr>
<td>14:45–14:50</td>
<td>Location change to lecture room</td>
<td></td>
</tr>
<tr>
<td>14:50–15:05</td>
<td>Difficult supracondylar fractures and nonunions</td>
<td>HK Oh</td>
</tr>
<tr>
<td>15:05–15:20</td>
<td>Transolecranon fracture dislocations</td>
<td>R Babst</td>
</tr>
<tr>
<td>15:20–15:30</td>
<td>Introduction of the concept for case-based analysis and group</td>
<td>H Said</td>
</tr>
<tr>
<td></td>
<td>discussions</td>
<td></td>
</tr>
<tr>
<td>15:30–15:50</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>15:50–16:50</td>
<td><strong>Preparation for case-based discussions</strong></td>
<td>All faculty</td>
</tr>
<tr>
<td></td>
<td>Group 1–Landwasser 16</td>
<td>S Lambert</td>
</tr>
<tr>
<td></td>
<td>Group 2–Landwasser 18</td>
<td>J Terrazas Callisperis</td>
</tr>
<tr>
<td></td>
<td>Group 3–Landwasser 20</td>
<td>G Bain</td>
</tr>
<tr>
<td></td>
<td>Group 4–Landwasser 22</td>
<td>Z El-Qirem</td>
</tr>
<tr>
<td></td>
<td>Group 5–Flüela</td>
<td>HK Oh</td>
</tr>
</tbody>
</table>

Working in small groups together with faculty members, participants will prepare a case analysis of a fracture and develop a treatment strategy. Five groups will prepare five different case analyses. Participants will have 60 minutes to create a presentation with a group strategy that is to be delivered to the whole group. The presentation will be followed by a plenary discussion including all participants and faculty. At the end of each presentation a faculty member (author of the case) will show his real-life strategy. The summary of each case discussion and presentation should show a useful algorithm.
External fixation for bone defects and deformity correction

**Module 1**  
**Moderator:** M Mahran  
**General principles**

- **Welcome and introduction to today’s module**  
  V Phiphobmongkol, A Volna

- **External fixation options for bone defects and deformity**  
  S Quinnan

- **Circular frame construction—equipment and terminology**  
  L Solomin

**Module 2**  
**Moderator:** S Iriarte Vincenti  
**Bone defects**

- **Options for long bone defects—tips and tricks for bone transport**  
  S Quinnan

- **Modulation of bone transport—the problem of bad regeneration**  
  A Volna

- **Case-based lecture—transport/lengthening then intramedullary nailing**  
  S Reid

- **Case-based lecture—transport over intramedullary nail or along a plate**  
  V Phiphobmongkol

- **Location change to discussion groups**

- **Discussion group 1**  
  **Long bone defect management**
  - Group 1 – Landwasser 12
  - Group 2 – Landwasser 14
  - Group 3 – Landwasser 16
  - Group 4 – Landwasser 18
  - Group 5 – Aspen 1

- **Discussion group 2**  
  **All faculty**

- **Coffee break**

**Module 3**  
**Moderator:** S Reid  
**Long bone deformity**

- **Radiographic analysis of deformity**  
  L Solomin

- **Principles of deformity correction**  
  T Slongo

- **Location change to practical exercise room**

- **Practical exercise 1—Circular frame construction for deformity correction**  
  All faculty

- **Lunch break**

**Module 4**  
**Moderator:** A Volna  
**Long bone deformity**

- **Analysis of oblique plane deformity and placement of hinges**  
  S Reid

- **Principles of deformity correction using 6-axis orthopedic hexapods**  
  L Solomin

- **Case-based lecture—treatment of complex long bone deformity with orthopedic hexapod—new technology**  
  T Slongo

- **Location change to discussion groups**

- **Discussion group 2**  
  **Long bone deformity management**
  - Group 1 – Landwasser 12
  - Group 2 – Landwasser 14
  - Group 3 – Landwasser 16
  - Group 4 – Landwasser 18
  - Group 5 – Aspen 1

- **All faculty**

- **Coffee break**

- **Practical exercise 2—Hexapod system for complex deformity correction**  
  All faculty

- **Location change to lecture room**

- **Question and answer session**  
  All faculty

- **Summary, evaluation, and take-home messages**  
  V Phiphobmongkol, A Volna

---

**Thursday December 5, 2019**

**External fixation for bone defects and deformity correction**

**Location:** Aspen 1 (lectures) Foyer C2 (practicals)

- **08:00–08:10** Welcome and introduction to today’s module  
  V Phiphobmongkol, A Volna

- **08:10–08:25** External fixation options for bone defects and deformity  
  S Quinnan

- **08:25–08:40** Circular frame construction—equipment and terminology  
  L Solomin

---

**Module 2**  
**Moderator:** S Iriarte Vincenti  
**Bone defects**

- **Options for long bone defects—tips and tricks for bone transport**  
  S Quinnan

- **Modulation of bone transport—the problem of bad regeneration**  
  A Volna

- **Case-based lecture—transport/lengthening then intramedullary nailing**  
  S Reid

- **Case-based lecture—transport over intramedullary nail or along a plate**  
  V Phiphobmongkol

- **Location change to discussion groups**

- **Discussion group 1**  
  **Long bone defect management**
  - Group 1 – Landwasser 12
  - Group 2 – Landwasser 14
  - Group 3 – Landwasser 16
  - Group 4 – Landwasser 18
  - Group 5 – Aspen 1

- **Discussion group 2**  
  **All faculty**

- **Coffee break**

---

**Module 3**  
**Moderator:** S Reid  
**Long bone deformity**

- **Radiographic analysis of deformity**  
  L Solomin

- **Principles of deformity correction**  
  T Slongo

- **Location change to practical exercise room**

- **Practical exercise 1—Circular frame construction for deformity correction**  
  All faculty

- **Lunch break**

---

**Module 4**  
**Moderator:** A Volna  
**Long bone deformity**

- **Analysis of oblique plane deformity and placement of hinges**  
  S Reid

- **Principles of deformity correction using 6-axis orthopedic hexapods**  
  L Solomin

- **Case-based lecture—treatment of complex long bone deformity with orthopedic hexapod—new technology**  
  T Slongo

- **Location change to discussion groups**

- **Discussion group 2**  
  **Long bone deformity management**
  - Group 1 – Landwasser 12
  - Group 2 – Landwasser 14
  - Group 3 – Landwasser 16
  - Group 4 – Landwasser 18
  - Group 5 – Aspen 1

- **All faculty**

- **Coffee break**

---

**Practical exercise 2—Hexapod system for complex deformity correction**  
**All faculty**

**Location change to lecture room**

**Question and answer session**  
**All faculty**

**Summary, evaluation, and take-home messages**  
V Phiphobmongkol, A Volna
## Complications related to nailing

**Location:** Flüela (lectures) Studio (practicals)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–08:05</td>
<td>Welcome and introduction to today’s module</td>
<td>C Finkemeier</td>
</tr>
<tr>
<td>08:05–08:25</td>
<td>Case-based lecture—inadequate entry point and its consequences for the femur</td>
<td>JK Oh</td>
</tr>
<tr>
<td>08:25–08:40</td>
<td>Fractures of the femoral neck while nailing diaphyseal fractures—what now?</td>
<td>C Finkemeier</td>
</tr>
<tr>
<td>08:40–08:55</td>
<td>Implant loosening and loss of fixation in proximal femoral fractures—prevention and management strategies</td>
<td>C Kammerlander</td>
</tr>
</tbody>
</table>

### Module 1
**Moderator:** JK Oh

**Complications related to nailing techniques**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:15–11:30</td>
<td>Malunions of the lower limb after nailing—diagnostic work-up and deformity analysis</td>
<td>JK Oh</td>
</tr>
<tr>
<td>11:30–11:45</td>
<td>Angular and complex malunions of the lower limb—nailing strategies and techniques</td>
<td>M Hessmann</td>
</tr>
<tr>
<td>11:45–12:00</td>
<td>Correcting length and rotational deformities with nails</td>
<td>CW Oh</td>
</tr>
<tr>
<td>12:00–12:10</td>
<td>Question and answer session</td>
<td>All faculty</td>
</tr>
<tr>
<td>12:10–13:30</td>
<td>Lunch break</td>
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</tr>
</tbody>
</table>

### Module 2
**Moderator:** H Abdul Hadi

**Nonunion after nailing**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:30–13:45</td>
<td>Challenges of the surgical treatment of infections after nailing</td>
<td>CW Oh</td>
</tr>
<tr>
<td>13:45–14:00</td>
<td>Extended indications and tips for reaming</td>
<td>P Barbosa</td>
</tr>
<tr>
<td>14:00–14:05</td>
<td>Location change to practical exercise room</td>
<td></td>
</tr>
<tr>
<td>15:25–15:40</td>
<td>Coffee break</td>
<td></td>
</tr>
</tbody>
</table>

### Module 3
**Moderator:** CW Oh

**Malunion after nailing**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:40–17:00</td>
<td>Discussion group 1: Complications related to nailing Group 1 – Landwasser 4 Group 2 – Landwasser 6 Group 3 – Landwasser 8 Group 4 – Landwasser 10 Group 5 – Flüela</td>
<td>M Lee, H Abdul Hadi P Barbosa, JK Oh C Kammerlander, E Kwek C Finkemeier M Hessmann, CW Oh</td>
</tr>
<tr>
<td>17:00–17:05</td>
<td>Location change to lecture room</td>
<td></td>
</tr>
<tr>
<td>17:05–17:20</td>
<td>What is new about implants for infection prevention and treatment?</td>
<td>C Kammerlander</td>
</tr>
<tr>
<td>17:20–17:30</td>
<td>Summary, evaluation, and take-home messages</td>
<td>E Kwek</td>
</tr>
</tbody>
</table>
### Pediatric fractures of the lower extremity

**Location:** Seehorn (lectures) Ducan/Altein (practicals)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Participant(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–08:10</td>
<td>Introduction to today’s module—schedule highlights and how it works</td>
<td>M Kremli, M Kastelec</td>
</tr>
<tr>
<td>08:10–08:20</td>
<td>Plenary session—Evaluation of warm-up cases to promote understanding of modeling capacity</td>
<td>M Kastelec</td>
</tr>
<tr>
<td>08:20–08:35</td>
<td>The influence of growth and modeling in pediatric fractures</td>
<td>A Besselaar</td>
</tr>
<tr>
<td>08:35–08:50</td>
<td>Choice of treatment of children’s fractures—surgical or nonsurgical?</td>
<td>U Narayanan</td>
</tr>
<tr>
<td>08:50–09:00</td>
<td>Plenary session—Reevaluation of warm-up cases to promote understanding of modeling capacity</td>
<td>M Kastelec</td>
</tr>
<tr>
<td>09:00–09:20</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>09:20–09:35</td>
<td>Principles of elastic nails—hints and pitfalls</td>
<td>T Ibrahim</td>
</tr>
<tr>
<td>09:35–10:25</td>
<td>Round table discussion 1—Clinical decision making</td>
<td>All faculty</td>
</tr>
<tr>
<td>10:25–10:35</td>
<td>Summary of discussions: Key learning points presented by tables 1–7</td>
<td>M Kastelec</td>
</tr>
<tr>
<td>10:45–10:55</td>
<td>Treatment of femoral shaft fractures—options in relation to age, and how to choose</td>
<td>D Green</td>
</tr>
<tr>
<td>10:55–12:00</td>
<td>Round table discussion 2—Treat ing femoral fractures in children and adolescents</td>
<td>All faculty</td>
</tr>
<tr>
<td>12:00–13:30</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>13:30–14:25</td>
<td>Practical exercise 1a—Elastic stable intramedullary nailing (ESIN) in the femur—retrograde technique</td>
<td>U Narayanan, F Monsell</td>
</tr>
<tr>
<td>14:25–14:55</td>
<td>Practical exercise 1b—ESIN in the femur—anterograde technique</td>
<td>U Narayanan, F Monsell</td>
</tr>
<tr>
<td>14:55–15:00</td>
<td>Location change to lecture room</td>
<td></td>
</tr>
<tr>
<td>15:00–15:15</td>
<td>Plenary session—Reevaluation of warm-up cases demonstrating the principles in management of common femoral fractures</td>
<td>J Hui</td>
</tr>
</tbody>
</table>

### Module 1

**Moderator:** M Kastelec

**Fundamentals of managing pediatric fractures**

Upon completion of this module, participants will be able to:
- Recognize the relevance of age in relation to injury pattern
- Describe the optimum treatment of pediatric fractures and how it is different from fractures in adults
- Explain the relationship of age to modeling capacity and define acceptable limits of malunion
- Describe the impact of growth disturbance in the management of pediatric fractures

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Participant(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:10–08:20</td>
<td>Plenary session—Evaluation of warm-up cases to promote understanding of modeling capacity</td>
<td>M Kastelec</td>
</tr>
<tr>
<td>09:00–09:20</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>09:20–09:35</td>
<td>Principles of elastic nails—hints and pitfalls</td>
<td>T Ibrahim</td>
</tr>
<tr>
<td>09:35–10:25</td>
<td>Round table discussion 1—Clinical decision making</td>
<td>All faculty</td>
</tr>
<tr>
<td>10:25–10:35</td>
<td>Summary of discussions: Key learning points presented by tables 1–7</td>
<td>M Kastelec</td>
</tr>
<tr>
<td>10:45–10:55</td>
<td>Treatment of femoral shaft fractures—options in relation to age, and how to choose</td>
<td>D Green</td>
</tr>
<tr>
<td>10:55–12:00</td>
<td>Round table discussion 2—Treat ing femoral fractures in children and adolescents</td>
<td>All faculty</td>
</tr>
<tr>
<td>12:00–13:30</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>13:30–14:25</td>
<td>Practical exercise 1a—Elastic stable intramedullary nailing (ESIN) in the femur—retrograde technique</td>
<td>U Narayanan, F Monsell</td>
</tr>
<tr>
<td>14:25–14:55</td>
<td>Practical exercise 1b—ESIN in the femur—anterograde technique</td>
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<td>J Hui</td>
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</table>

### Module 2

**Moderator:** J Hui

**Lower limb—femoral fractures**

Upon completion of this module, participants will be able to:
- Evaluate the range of treatment options for epiphyseal, metaphyseal and diaphyseal femoral fractures in children
- Define indications for and principles of femoral traction
- Perform the technique for elastic nailing of femoral fractures and discuss limitations
- Compare and contrast treatment options of femoral fractures in children of different ages (ie, casting, traction, plating, external fixation, and intramedullary devices)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>10:35–10:45</td>
<td>Plenary session—Evaluation of warm-up cases to demonstrate principles in management of common femoral fractures</td>
<td>J Hui</td>
</tr>
<tr>
<td>15:00–15:15</td>
<td>Plenary session—Evaluation of warm-up cases—common tibial fractures and important ankle injuries</td>
<td>J Soni</td>
</tr>
<tr>
<td>15:25–15:50</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>15:50–16:40</td>
<td>Round table discussion 3—Tibial diaphysis and distal tibial fractures</td>
<td>All faculty</td>
</tr>
<tr>
<td>16:40–16:50</td>
<td>Plenary session—Reevaluation of warm-up cases—common tibial fractures and important ankle injuries</td>
<td>J Soni</td>
</tr>
<tr>
<td>16:50–16:55</td>
<td>Location change to practical exercise room</td>
<td></td>
</tr>
<tr>
<td>16:55–18:05</td>
<td>Practical exercise 2—Tillaux and triplane fractures</td>
<td>D Green, T Ibrahim</td>
</tr>
<tr>
<td>18:05–18:10</td>
<td>Summary, evaluation, and take-home messages</td>
<td>M Kremli, M Kastelec</td>
</tr>
</tbody>
</table>

### Module 3

**Moderator:** J Soni

**Lower limb—tibial, fibular, and ankle injuries**

Upon completion of this module, participants will be able to:
- Recognize the range of treatment options of tibial diaphysal fractures in children
- Describe the presentation of compartment syndrome
- Describe the pattern of Tillaux and triplane fractures
- Apply principles of fracture reduction and fixation that maintain the function of the physis

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<td>Location change to lecture room</td>
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</tr>
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<td>15:00–15:15</td>
<td>Plenary session—Reevaluation of warm-up cases demonstrating the principles in management of common femoral fractures</td>
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</tr>
</tbody>
</table>
Thursday
December 5, 2019

Soft tissue

**Location:** Sanada 1 (lectures) Sanada 2 (practicals)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Facilitators</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–08:10</td>
<td>Welcome and introduction to the course and today's module</td>
<td>R Buckley, W Abdulwahid</td>
</tr>
<tr>
<td>08:10–08:15</td>
<td>Location change to discussion groups</td>
<td></td>
</tr>
</tbody>
</table>
| 08:15–10:00   | **Discussion group 1** Soft tissue  
Group 1 – Landwasser 2  
Group 2 – Landwasser 4  
Group 3 – Landwasser 6  
Group 4 – Landwasser 25  
Group 5 – Landwasser 1 | All faculty  
J Gaab, J Mcmaster  
J Bridgeman, T Rocha  
W Abdulwahid, I Shipper  
K Alawadi, C Willy  
R Buckley |
| 10:00–10:20   | Coffee break                                                                                       |                                   |
| 10:20–11:30   | **Principles of soft-tissue management and stabilization of the wound**  
• Reconstructive ladder—timing of definitive coverage— anatomical basis for flaps  
• Negative pressure wound therapy (NPWT)  
• Skin grafting  
• Extremity flap principles  
• Detection of infection—what tools do we have?  
• Mangled extremities and decision making | J Gaab  
J Bridgeman  
K Alawadi  
J Gaab  
C Willy  
R Buckley |
| 11:30–11:55   | **Interactive case-based discussion**                                                               | J Bridgeman                       |
| 11:55–12:00   | Summary of key points—questions                                                                     | W Abdulwahid                       |
| 12:00–13:30   | Lunch break                                                                                        |                                   |
| 13:30–15:10   | **Practical exercise 1** Soft-tissue care  
Group 1—Anatomy—understanding the possible flaps  
Group 2—Negative pressure wound therapy—how to do a good VAC  
Group 3—Vascular shunts  
Group 4—Fasciotomies  
Group 5—Z-plasties | (rotating stations 20 min each)  
J Gaab  
J Bridgeman, I Shipper  
C Willy, J Mcmaster  
R Buckley, T Rocha  
W Abdulwahid, K Alawadi |
| 15:10–15:30   | Coffee break                                                                                       |                                   |
| 15:30–16:40   | **Practical exercise 2** Soft-tissue planning  
• Irrigation and debridement  
• Timing of procedures  
• Soft-tissue preparation  
• Bone stabilization  
• Definitive soft-tissue coverage  
• Aftercare with rehabilitation of the limb | All faculty  
W Abdulwahid |
| 16:40–17:10   | **Case discussion 2** Summary cases of the day | R Buckley, W Abdulwahid |
| 17:10–17:30   | **Summary, evaluation, and take-home messages**                                                    | R Buckley, W Abdulwahid |

22   AO Trauma Masters Course—Current Concepts—Upper Extremity I
**Friday**  
December 6, 2019

**Location:** Flüela (lectures) Ducan/Altein (practicals)

### Humerus, scapula, and elbow

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00–09:30</td>
<td><strong>Practical exercise 1</strong>&lt;br&gt;Scapular fractures</td>
<td>All faculty</td>
</tr>
<tr>
<td></td>
<td><strong>Coffee break</strong></td>
<td>H Said, M Gardner</td>
</tr>
<tr>
<td>09:30–09:50</td>
<td><strong>Acute elbow instability</strong></td>
<td>S Al-Thani</td>
</tr>
<tr>
<td>10:05–10:20</td>
<td><strong>Chronic elbow instability</strong></td>
<td>G Bain</td>
</tr>
<tr>
<td>10:20–10:35</td>
<td><strong>The stiff elbow—analysis and treatment strategy</strong></td>
<td>J Jupiter</td>
</tr>
<tr>
<td>10:35–10:40</td>
<td><strong>Location change to discussion groups</strong></td>
<td></td>
</tr>
<tr>
<td>10:40–11:50</td>
<td><strong>Discussion group 1</strong>&lt;br&gt;Elbow injuries</td>
<td>G Bain, HK Oh</td>
</tr>
<tr>
<td></td>
<td>Group 1 – Landwasser 16</td>
<td>T Axelrod, Z El-Qirem</td>
</tr>
<tr>
<td></td>
<td>Group 2 – Landwasser 18</td>
<td>S Lambert, R Babst</td>
</tr>
<tr>
<td></td>
<td>Group 3 – Landwasser 20</td>
<td>H Hoyen, S Al-Thani</td>
</tr>
<tr>
<td></td>
<td>Group 4 – Flüela</td>
<td></td>
</tr>
<tr>
<td>11:50–12:25</td>
<td><strong>Sandwich break</strong></td>
<td></td>
</tr>
<tr>
<td>12:25–13:40</td>
<td><strong>Presentations of case-based discussions</strong></td>
<td>M Gardner</td>
</tr>
<tr>
<td></td>
<td>Each group presents their case, followed by a plenary discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group 1: presentation (5 mins)</td>
<td>R Babst</td>
</tr>
<tr>
<td></td>
<td>Faculty's real-life strategy (10 mins)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group 2: presentation (5 mins)</td>
<td>M Gardner</td>
</tr>
<tr>
<td></td>
<td>Faculty's real-life strategy (10 mins)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group 3: presentation (5 mins)</td>
<td>H Hoyen</td>
</tr>
<tr>
<td></td>
<td>Faculty's real-life strategy (10 mins)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group 4: presentation (5 mins)</td>
<td>S Lambert</td>
</tr>
<tr>
<td></td>
<td>Faculty's real-life strategy (10 mins)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group 5: presentation (5 mins)</td>
<td>R Babst</td>
</tr>
<tr>
<td></td>
<td>Faculty's real-life strategy (10 mins)</td>
<td></td>
</tr>
<tr>
<td>13:40–14:05</td>
<td><strong>Case-based panel discussion</strong>&lt;br&gt;Distal humerus and elbow</td>
<td>Moderator: S Lambert</td>
</tr>
<tr>
<td></td>
<td>Panel: Z El-Qirem, T Axelrod</td>
<td></td>
</tr>
<tr>
<td>14:05–14:20</td>
<td><strong>Summary of the day and the course, evaluation, and take-home messages</strong></td>
<td>H Said, M Gardner</td>
</tr>
</tbody>
</table>
Event organization

**AO Trauma Education**
Bettina Bolliger
Clavadelerstrasse 8
7270 Davos
Switzerland
Phone  +41 81 414 27 22
Fax +41 81 414 22 84
E-mail bbolliger@aotrauma.org

**AO funding sources**
Unrestricted educational grants from different sources are collected and pooled together centrally by the AO. All events are planned and scheduled by local and regional AO surgeon groups based on local needs assessments. We rely on industrial commercial partners for in-kind support to run simulations and/or skills training if educationally necessary.

Event venue and opening times

**Congress Centre Davos**
Talstrasse 49A
7270 Davos, Switzerland
Phone  +41 81 414 62 00
Fax +41 81 414 62 29

**General information**

<table>
<thead>
<tr>
<th>Day</th>
<th>Opening Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>12:00–19:00</td>
</tr>
<tr>
<td>Monday through Thursday</td>
<td>07:30–19:00</td>
</tr>
<tr>
<td>Friday</td>
<td>07:30–16:00</td>
</tr>
</tbody>
</table>

**The AO experience**

<table>
<thead>
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<tbody>
<tr>
<td>Sunday</td>
<td>14:00–17:00</td>
</tr>
<tr>
<td>Monday through Thursday</td>
<td>09:00–18:30 (Tuesday –20:30)</td>
</tr>
<tr>
<td>Friday</td>
<td>09:00–16:00</td>
</tr>
</tbody>
</table>

**Industry exhibition**

<table>
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<tbody>
<tr>
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</tr>
<tr>
<td>Friday</td>
<td>09:00–16:00</td>
</tr>
</tbody>
</table>
Exhibitions

The AO experience
The AO experience offers you the chance to view the latest publications in the AO library, see what benefits you are eligible for in the community and membership area and take a selfie with your new colleagues. Explore AO teaching and learning resources and find out about our new digital gateway myAO at the digital zone’s interactive stations. Visit the innovation in research and development zone, to take part in hands on demos featuring some of our newest innovations, and join the AO Technical Commission’s popular Meet the Experts sessions. Don’t forget to purchase any mementos at our store in the main entrance. Experience the AO spirit, walk the timeline of AO history, and mingle with other participants. AO staff will be on-hand to help you get the most out of this experience..

Exhibition partners
Visit the exhibitions of our trusted partner DePuy Synthes, Siemens, and other exhibitors: SPI, Invibio, Precision OS, Synoste, Rimasyis, AO Alliance.

Media exhibitors
Lehmanns Media is in the welcome area.

Sponsors

We thank our trusted partner DePuy Synthes, and Siemens, for contributing in-kind support (materials and logistics) without which this event would not be possible. A special thanks to DePuy Synthes and Siemens for providing an unrestricted educational grant for this event.

We also extend our thanks to the following co-sponsors (educational grants, in-kind support):
Business center

The business center facilities in the Congress Centre Davos are accessible to everyone.

**Services**
- Internet and e-mail access
- Printer access
- [www.aodavoscourses.org](http://www.aodavoscourses.org) AO Davos Courses website offering course-related information

**Opening hours**
The business center is open 30 minutes before the first course of the day starts until 30 minutes after the end of the last course of the day.

**Disclaimer**
The use of your own computer in the business center network is inherently not secure. We strongly recommend that you take appropriate actions to protect your computer against unauthorized use or theft (e.g., firewall, virtual private network [VPN] connection, virus scanner), AO cannot be held responsible for any data loss or theft.

For further information or support, please contact:
Phone +41 81 414 28 70
E-mail it.helpdesk@aofoundation.org

Wireless network

**How to connect to the AO wireless local area network (LAN)**

1. Open the Wireless Network Connection window
2. Choose the **AO Business** network as shown in the image below and click on the **Connect** button

![Wireless Network Connection](image)

3. Our **AO Business** wireless network requires a wireless protected access (WPA) network key:
   - Network key: **aowireless**

![Connect to Network](image)

4. Then click on the **OK** button
Event information

Event fee
AO Trauma Masters Course—Current concepts—Upper Extremity I: CHF 4,350
The event fee covers the conference bag, documentation, coffee breaks, lunches, participation in AO Davos Courses night, and the course certificate.

European CME Accreditation
For this course the UEMS-EACCME® in Brussels have granted 33 European CME credits (ECMEC).

Swiss CME Accreditation
Additionally, an application has been made to the following Swiss societies:
Schweizerische Gesellschaft für Chirurgie (SGC/SSC)
Schweizerische Gesellschaft für Orthopädie und Traumatologie (SGO/SSO).

Conflicts of Interest (COI)
All disclosure information can be viewed at the event webpage: http://AOTRAUMA10009581.aotrauma.org

Course certificate
Course certificates will be available at the end of the event at the general information desk.

Evaluation guidelines
All AO Trauma events apply the same evaluation process, which includes pre- and post-event online evaluation and on-site written questionnaires. These evaluation tools help ensure that AO Trauma continues to meet your training needs.

Use of social media
During the AO Davos Courses 2019, you can post about your experience using the #AODavosCourses2019 hashtag. While we encourage you to share your AO Davos Courses 2019 experience with your images or recordings from inside the course.

Intellectual property
Event materials, presentations, and case studies are the intellectual property of the event faculty. All rights are reserved. For more information, please see: www.aofoundation.org/legal.

Recording, photographing, or copying lectures, practical exercises, case discussions, or any event materials is strictly forbidden. Participants violating intellectual property will be dismissed.

The AO Foundation reserves the right to film, photograph, and audio record during its events. Participants must understand that in this context they may appear in these recorded materials. The AO Foundation assumes participants agree that these recorded materials may be used for the AO’s marketing and other purposes, and that they may be made available to the public.

Security
Security checks will be conducted at the building entrance. Wearing a name tag is compulsory at all times in the congress center and hospital.

Insurance
The event organization does not take out insurance to cover any individual against accident, theft, or other risks.

Use of mobile phones
Use of mobile phones is not permitted in the lecture halls or in other rooms during educational activities. Please be considerate of others by turning off your mobile phone.

Picture gallery
Check out aodavoscourses.org for a daily selection of pictures from the AO Davos Courses 2019, the best from last year’s courses, and a selection of photographs from the first-ever AO Davos Courses.

Dress code
Warm clothes and suitable shoes are recommended.
1. Academic independence
Development of all curricula, design of scientific event programs, and selection of faculty are the sole responsibilities of volunteer AO network surgeons. All education is planned based on needs assessment data, designed and evaluated using concepts and evidence from the most current medical education research, and reflects the expertise of the AO Education Institute (www.aofoundation.org). Industry participation is not allowed during the entire curriculum development and planning process to ensure academic independence and to keep content free from bias.

2. Compliance to accreditation and industry codes
All planning, organization, and execution of educational activities follow existing codes for accreditation of high-quality education:
- Accreditation Criteria of the Accreditation Council for Continuing Medical Education, US (www.accme.org)
- ACCME Standards for Commercial Support: Standards to Ensure Independence in CME Activities (www.accme.org)
- Criteria for Accreditation of Live Educational Events of the European Accreditation Council for Continuing Medical Education (www.uems.eu)

Events that receive direct or indirect unrestricted educational grants or in-kind support from industry also follow the ethical codes of the medical industry, such as:
- Eucomed Guidelines on Interactions with Healthcare Professionals (www.medtecheurope.org)
- AdvaMed Code of Ethics on Interactions with Health Care Professionals (advamed.org)
- Mecomed Guidelines on Interactions with Healthcare Professionals (www.mecomed.org)

3. Branding and advertising
No industry logos or advertising (apart from the AO Foundation and its clinical divisions) are permitted in the area where educational activities take place. Sponsors providing financial or in-kind support are allowed to have a promotional booth or run activities outside the educational area with approval from the event chairperson.

4. Use of technologies and products in simulations
In case simulations are chosen as an educational method to educate skills, we only use technology approved by the AO Technical Commission—a large independent group of volunteer surgeons developing and peer reviewing new technology. More information about the AO Technical Commission and its development and approval processes can be found on the AO’s website: www.aofoundation.org.

5. Personnel
Industry staff members are not permitted to interfere with the educational content or engage in educational activities during the event.
Mission
The AO mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

AO Research Institute Davos (ARI)
In its work to further the AO mission, ARI’s purpose is to advance patient care through innovative orthopedic research and development.

Orthopedics concerns musculoskeletal, spine and craniomaxillofacial trauma, degenerative musculoskeletal diseases, infections, and congenital disorders.

Goals
• Contribute high-quality, applied preclinical research and development focused toward clinical applications/solutions.
• Investigate and improve the performance of surgical procedures, devices and substances.
• Foster a close relationship with the AO medical community, academic societies, and universities.
• Provide research environment/support/training for AO clinicians.

Meet with our team including our ARI Medical Research Fellows, establish contacts, freely discuss your clinical problems and ideas, and learn about the latest results from ARI.

Collaborative research programs
• Annulus fibrosus rupture
• Acute cartilage injury
• Osteochondral defect

Craniomaxillofacial
• Imaging and planning of surgery, computer aided preoperative planning
• Medication-related osteonecrosis of the jaw
• Bone regeneration and 3D printing

Spine
• Degeneration and regeneration of the intervertebral disc
• Biomarkers and patient outcomes

Trauma
• Bone infection, including the development and testing of active anti-infective interventions
• Sensing implants for objective monitoring of fracture healing
• Development of smart surgical tools
• New implant concepts for optimized bone healing
• Prediction of subject-specific risk of proximal humeral fixation failure via computational tools
• Development of generic Asian pelvic bone model
• Patient outcomes and biomarkers

Veterinary medicine
• Improving osteosynthesis for small and large animals

Multidisciplinary
• 3R principles: refinement of preclinical studies
• Bioreactor culture systems and mechanobiology
• Development, standardization, optimization, and improvement of preclinical models and methods
• Ex vivo testing using advanced biomechanical models
• Gene transfer: non-viral and viral
• Implant design using the finite element methods
• Implant positioning assistance, C-arm guided implant placement
• In-vivo and in-vitro quantification of bone turnover and scaffold degradation
• Medical additive manufacturing and biofabrication
• Medical computed tomography (CT) image processing and analysis
• Polymers to deliver cells and biological factors, create potential space for tissue development, and guide the process of tissue regeneration
• Prototype development and production
• Stem cell therapies for the treatment of bone, intervertebral disc, and cartilage defects

For the AO Research Institute Davos Activity Report 2018 and recent publications, go to www.aofoundation.org/ari/publications.
Upcoming AO Davos Courses 2020

AO Davos Courses—November 29–December 4, 2020

- AO Trauma Course—Basic Principles of Fracture Management
- AO Trauma Course—Advances Principles of Fracture Management
- AO Trauma Course—Advanced Principles of Fracture Management for Swiss residents
- AO Trauma Masters Course—Current Concepts
- AO Trauma Course—Pelvic and Acetabular Fracture Management
- AO Trauma Masters Kurs (German speaking)
- AO Trauma Course—Managing Pediatric Musculoskeletal Injuries
- AO Trauma and AO Recon Course—Comprehensive Periprosthetic Fracture Management of the Hip and Knee

AO Davos Courses—December 6–9, 2020

- AO Trauma Course—Basic Principles of Fracture Management for Swiss Surgeons
- AO Spine Courses
- AO CMF Courses
- AO VET Masters Course—Small Animal
- AO VET Masters Course—Large Animal
- AO Recon Course—Principles in Shoulder Arthroplasty
- AO Recon Course—Complex Total Hip and Knee Arthroplasty
- AO PEER Course—Level 1 Principles of Clinical Research
- AO PEER Course—Level 2 Grant writing
- AO PEER Course—Level 2 GCP and study management
- AO PEER Course—Level 2 Publication writing course

This course list is subject to further change.
The final list of AO Davos Courses and worldwide courses will be available on www.aotrauma.org in January 2020.
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