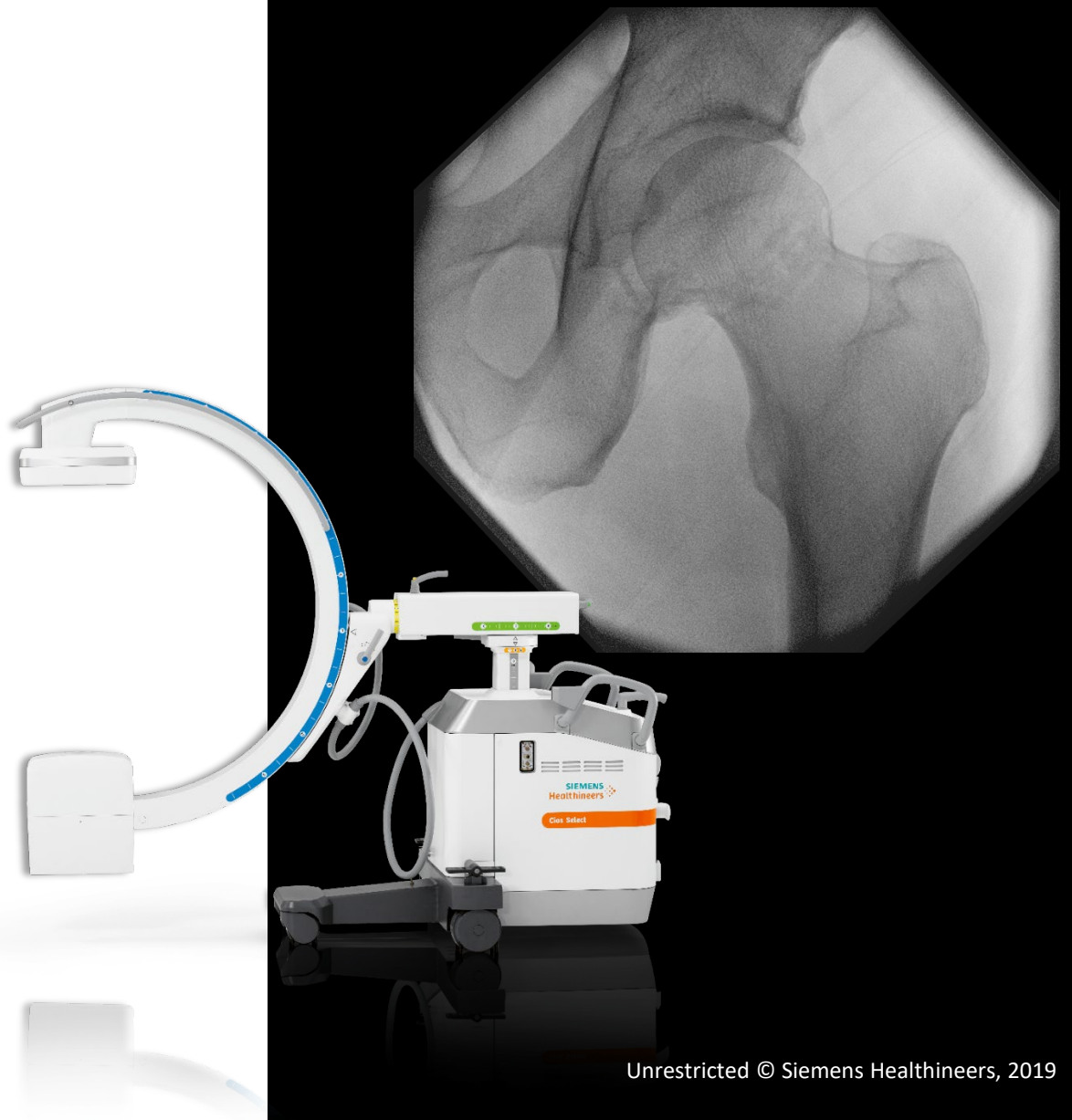
SIEMENS Healthineers

Intraoperative Imaging with Cios Select FD

Clinical Cases – Ortho Trauma



BG Trauma Center Ludwigshafen, Germany

Clinical Cases

- **Acetabulum**
- **Clavicula**
- **Femur**
- **Humerus distal**
- **Tibia**
- **Tibia plateau**

- **Conclusion**

Clinical Case

Acetabulum

Back to content slide clinical cases

Intraoperative imaging with Cios Select FD
Clinical case – Acetabulum

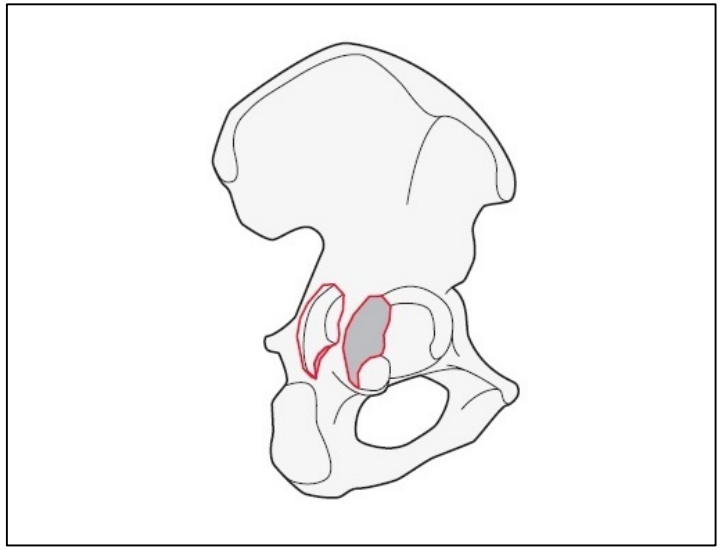
- **Background pathology**
- **Background therapy**
- **Patient history**
- **Preoperative findings**
- **Surgical procedure**

  AP view
  Alar/oblique view

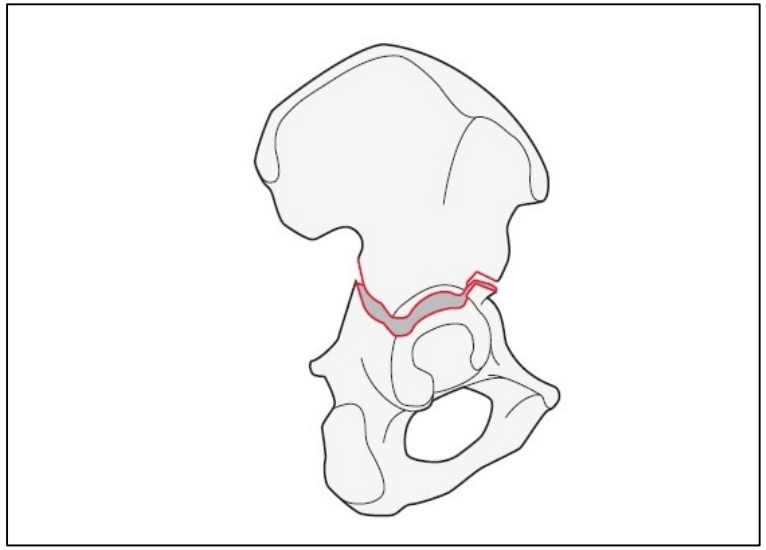
Background pathology

AO Classification
Acetabular fractures
Types:

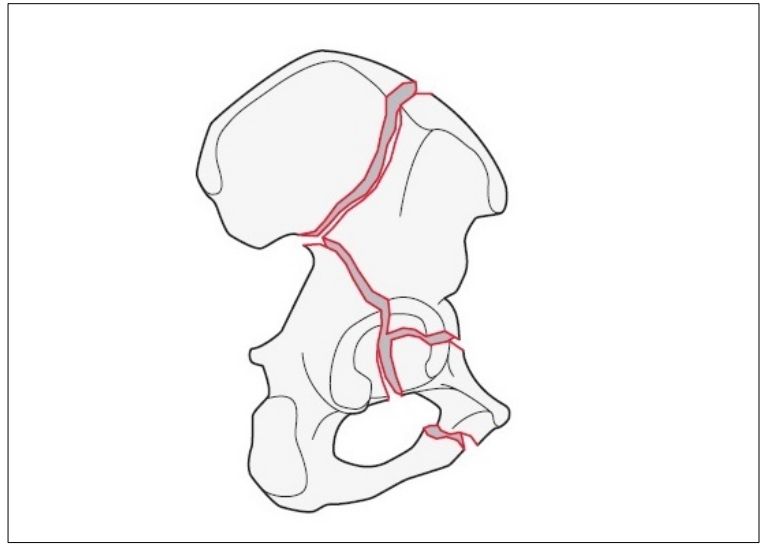
Pelvis, acetabulum, **partial articular, isolated column and/or wall fracture**
62A



Pelvis, acetabulum, **partial articular, transverse type fracture**
62B



Pelvis, acetabulum, **complete articular, associated both column fracture**
62C



Background therapy

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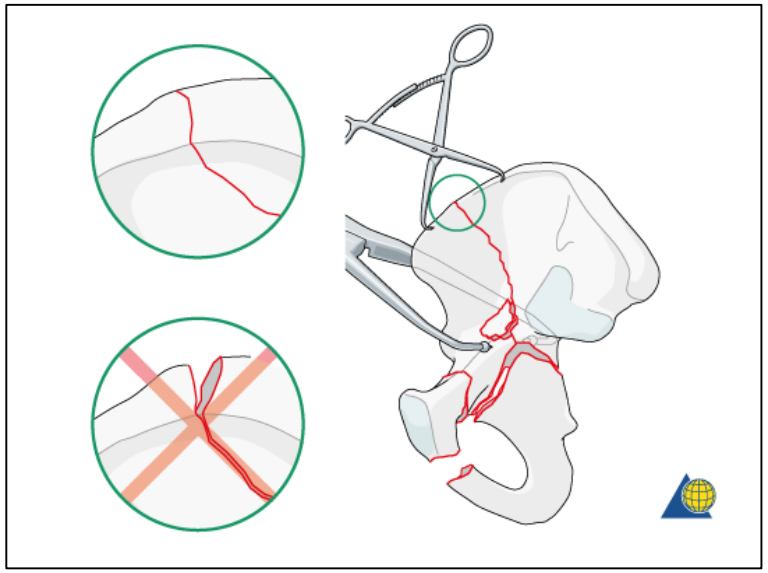
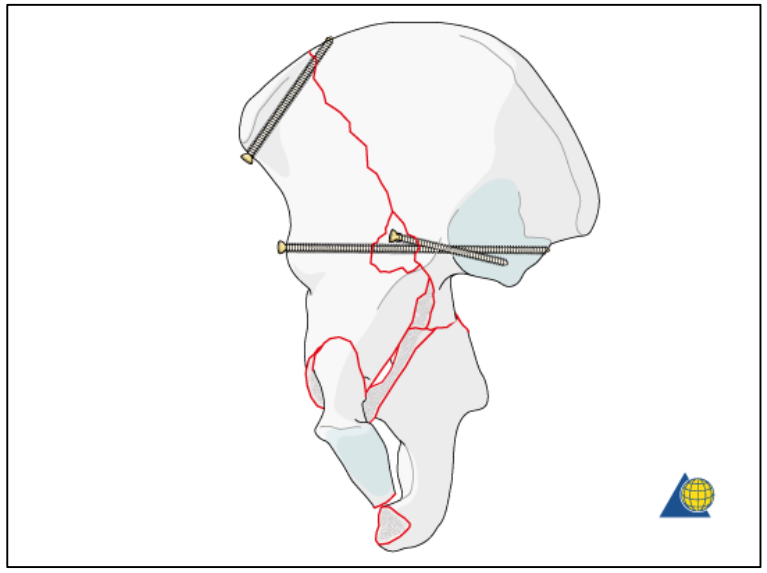
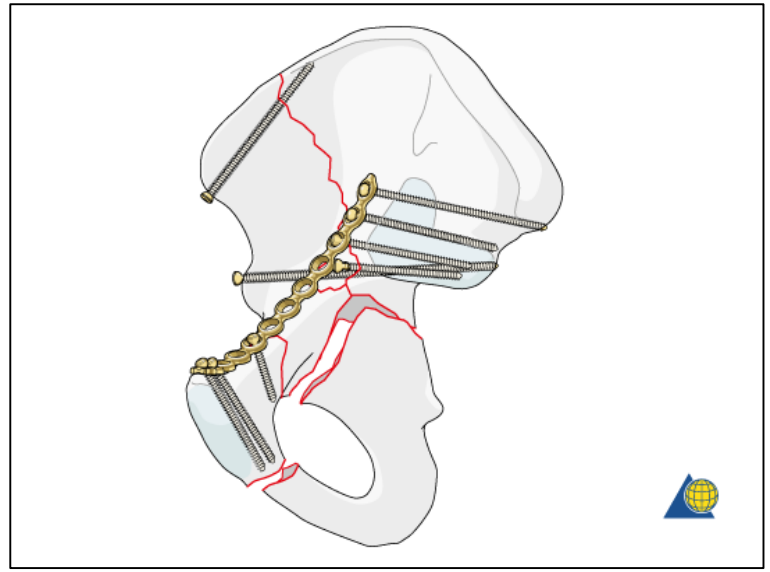
ORIF

Fixation of the iliac wing and plate fixation of the anterior column







Patient history

Classification:
Complex acetabular fracture with central hip protrusion and pelvic fracture

Remarks:
- Skiing accident
- Initial extension treatment
- Pain in right pelvic region
- No peripheral motorical or neurological deficits

Gender	male
Age	46 - 60

Preoperative findings

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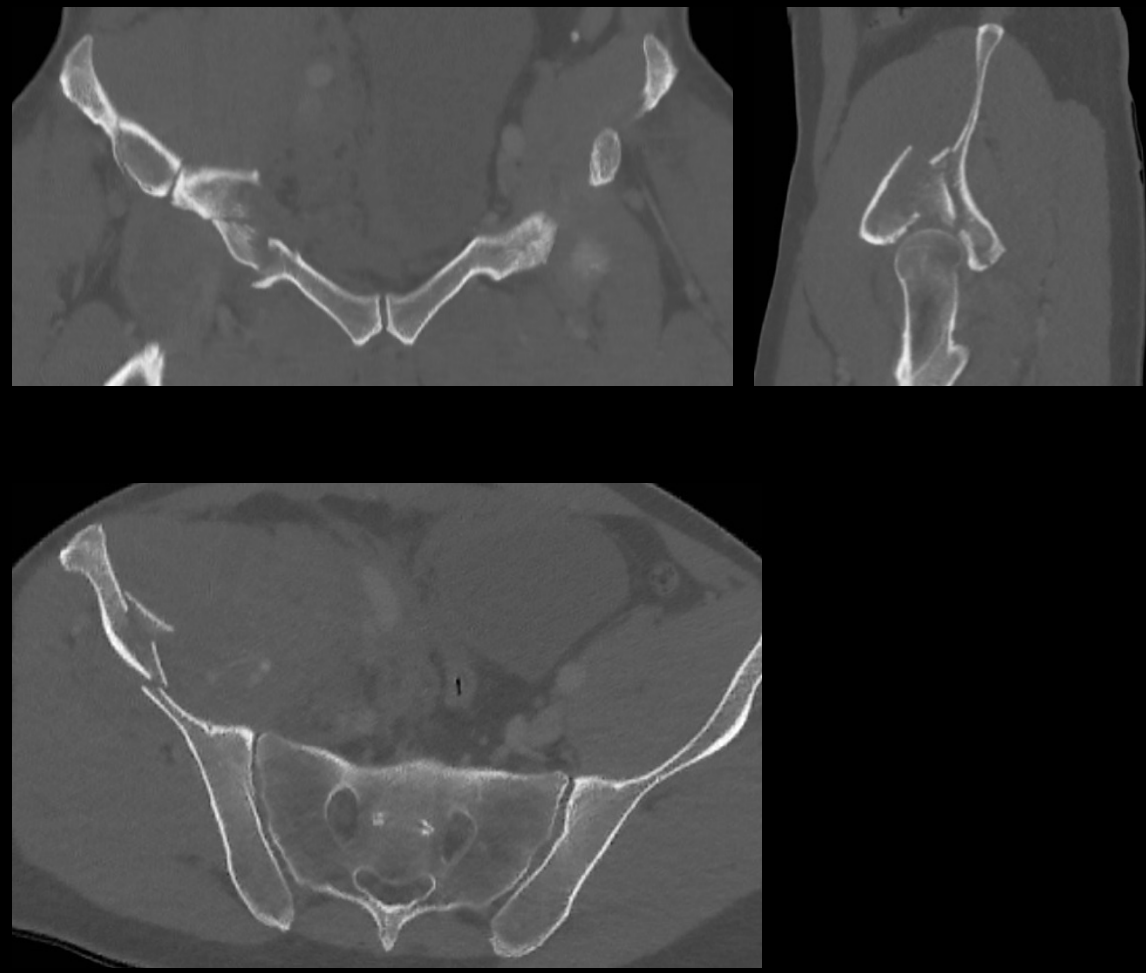
Preoperative CT
Axial, sagittal and coronal view of pelvis

- Complex acetabular fracture with central hip protrusion and pelvic fracture on the right



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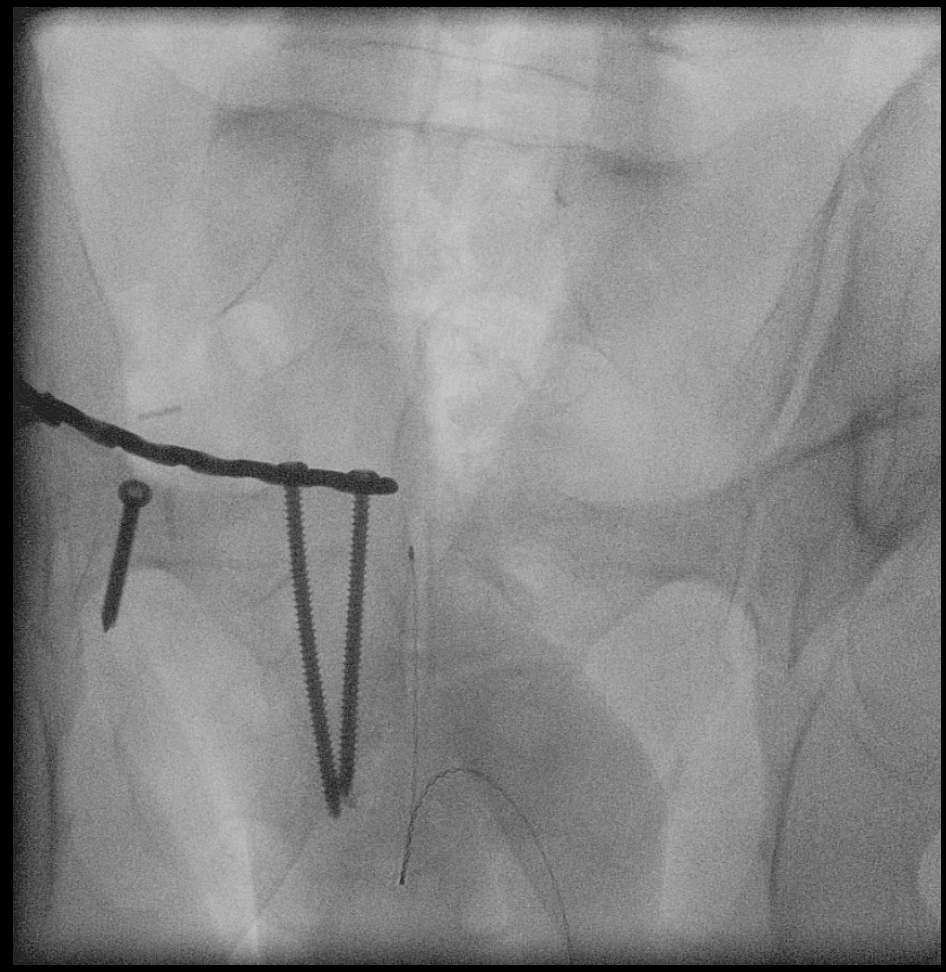
Surgical procedure
AP view

SIEMENS Healthineers

Intraoperative imaging
Pelvis and right hip in AP view

- Regular articulation of the hip joint
- Symphysis and right ISG joint are in anatomically regular position



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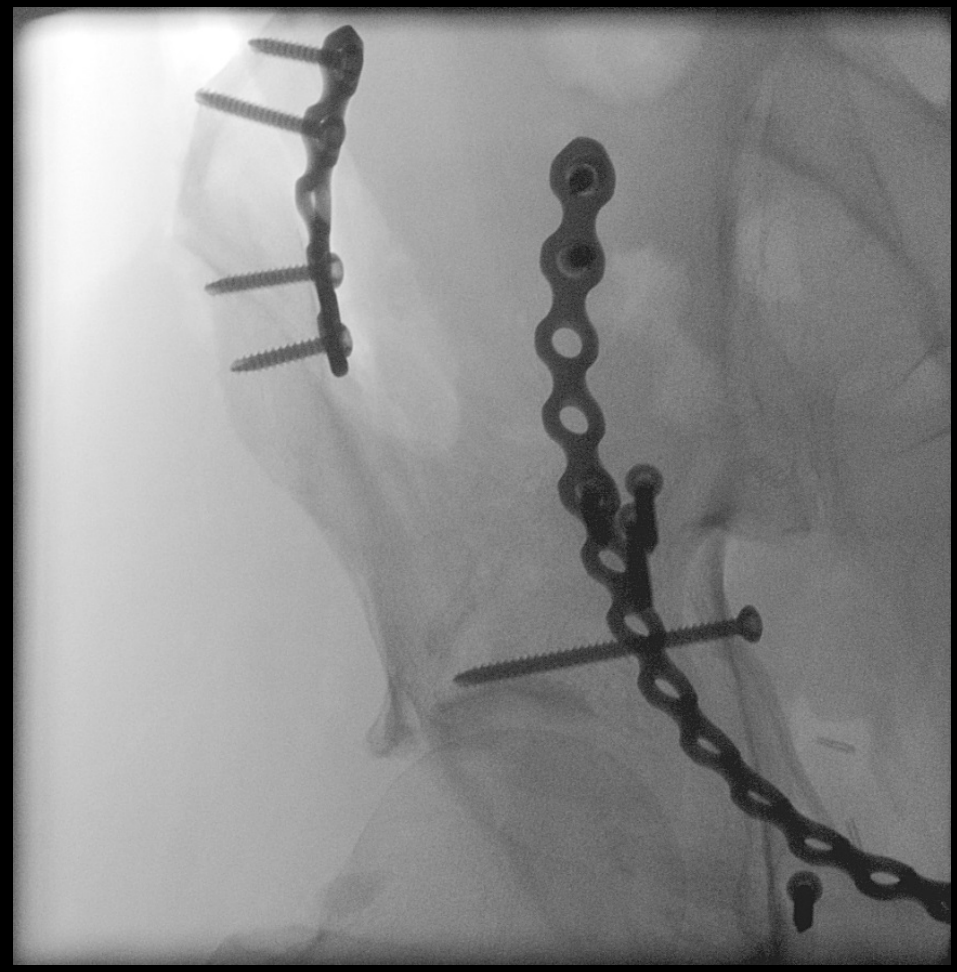
Surgical procedure
AP view

Intraoperative imaging
Pelvis and right hip in AP view

- Correct implant positioning
- Good bony contrast in spite of metal objects
- No intra-articular fragments or screw penetration



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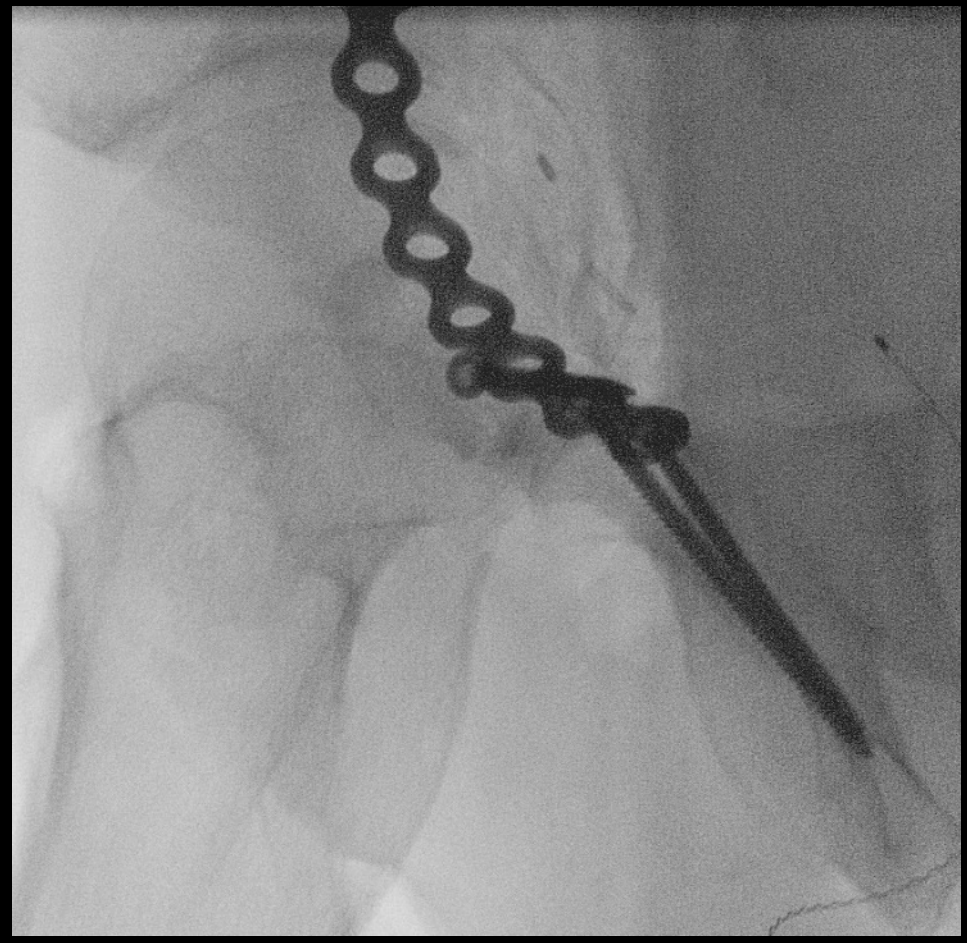
Surgical procedure
Alar/ oblique view

SIEMENS Healthineers

Intraoperative imaging
Pelvis and right hip in alar/oblique view

- Correct implant positioning
- Regular articulation of the hip joint



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Surgical procedure
Alar view

Intraoperative imaging
Pelvis and right hip in alar/oblique view

- Correct implant positioning
- No intra-articular fragments or screw penetration

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Clinical Case

Clavicula

Back to content slide clinical cases

Intraoperative imaging with Cios Select FD
Clinical case – Clavicula

- **Background pathology**
- **Background therapy**
- **Patient history**
- **Preoperative findings**
- **Surgical procedure**

  AP view
  Axial view

Background pathology

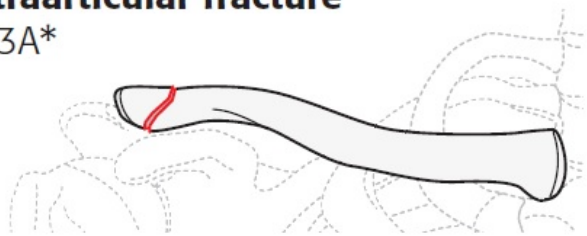
AO Classification

Types of distal (lateral) end segment fractures of the clavicle

Location: Clavicle, **distal (lateral) end segment** 15.3

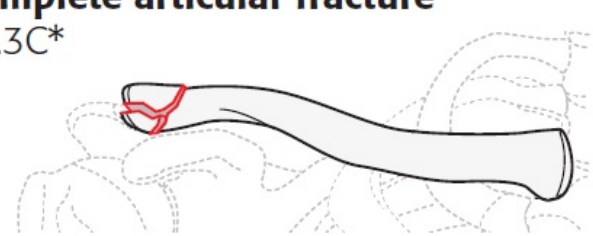
Types:

Clavicle, distal (lateral) end segment,
extraarticular fracture
15.3A*



Clavicle, distal (lateral) end segment,
partial articular fracture
15.3B*

Clavicle, distal (lateral) end segment,
complete articular fracture
15.3C*



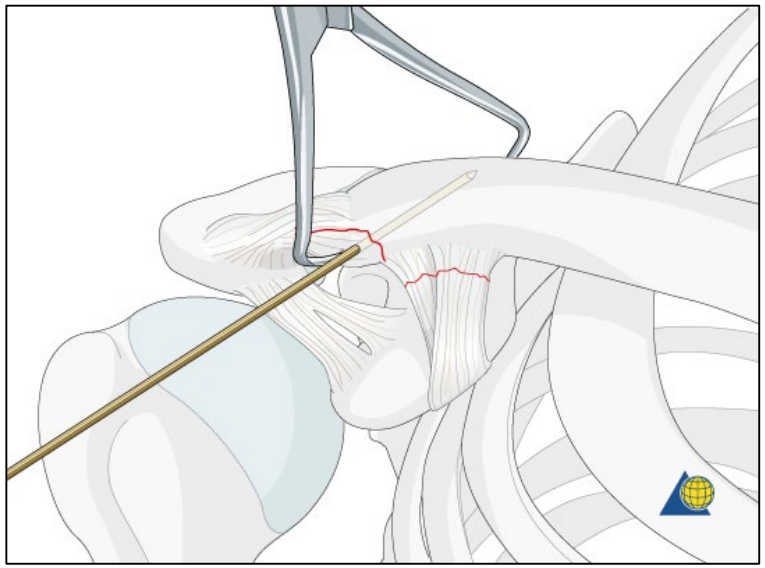
*Qualifications:

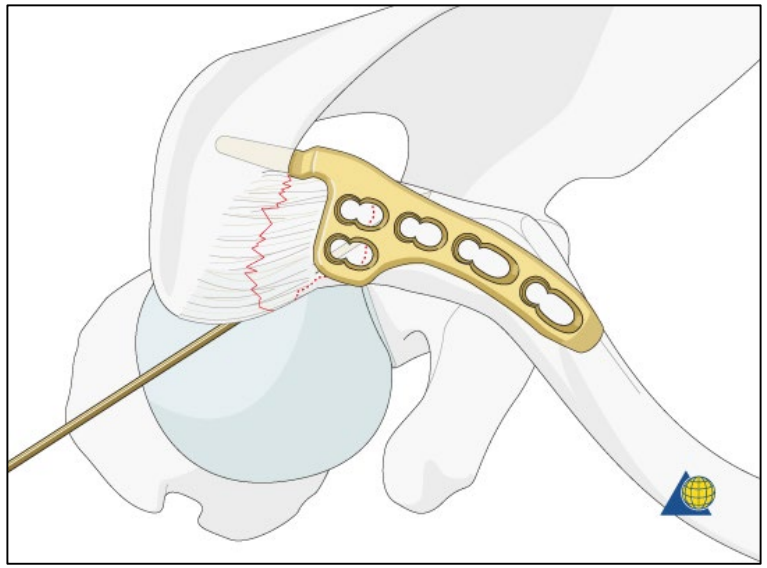
a CC ligament complex intact
b CC ligament complex, partial disruption
c CC ligament complex, complete disruption

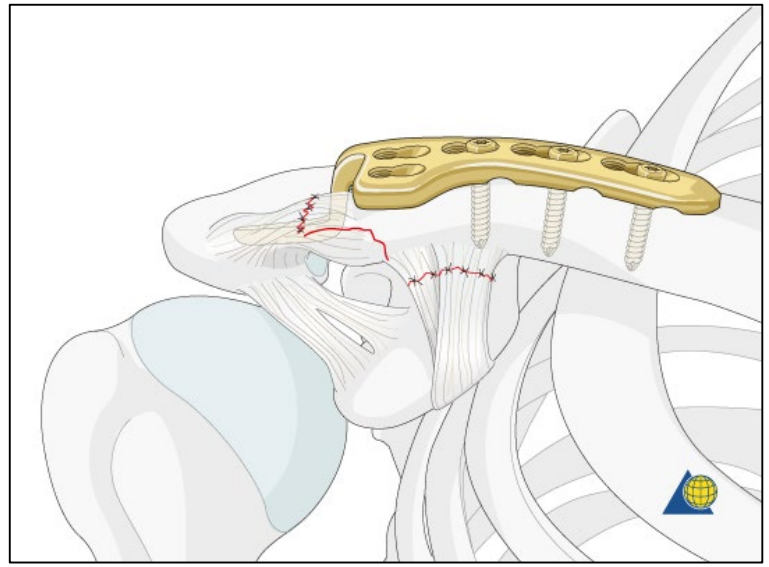
Background therapy

ORIF – Hook plate

Open reduction, temporary fixation with K-wire, plate application and ligament repair







Patient history

Classification:
Lateral fracture of the left clavicle of type 15.3 C1 (AO)

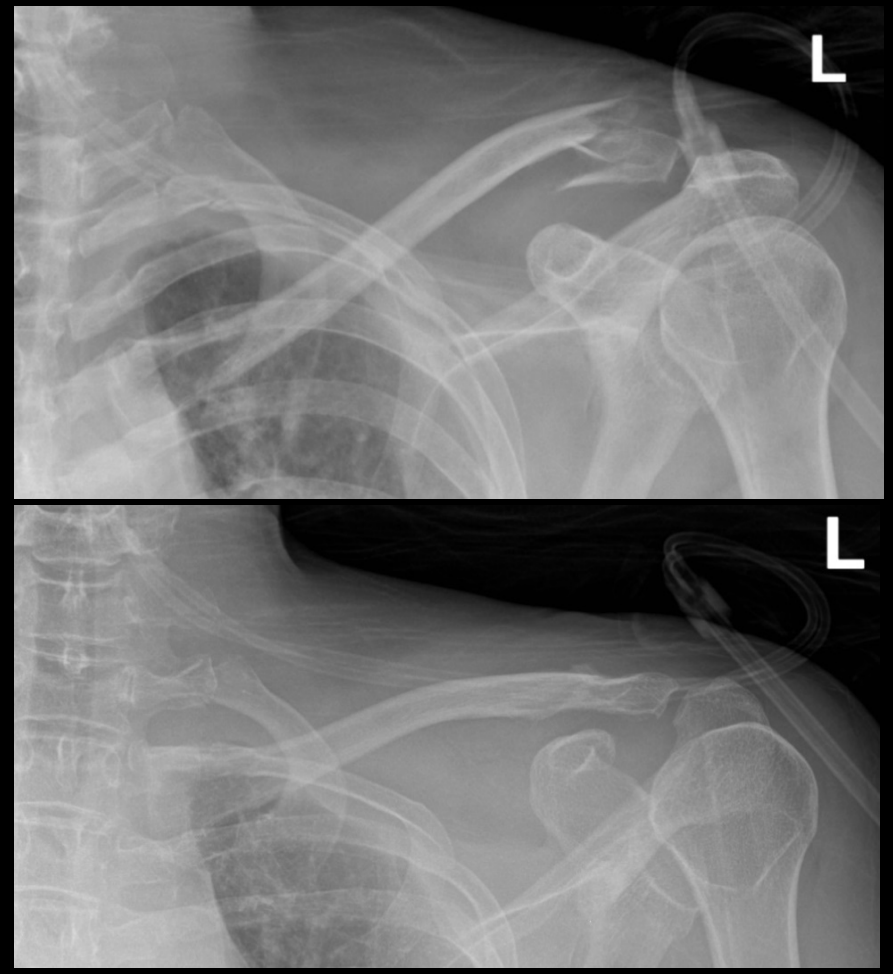
Remarks:
- Fell off a horse
- Gilchrist-bandage
- Hematoma, swelling and pain in AC joint region
- No peripheral motorical or neurological deficits

Gender	female
Age	46 - 60

Preoperative findings

Preoperative X-ray images
AP and tangential view of left clavicle

- Lateral clavicle fracture
- Fracture dislocation of more than one shaft width in AP view



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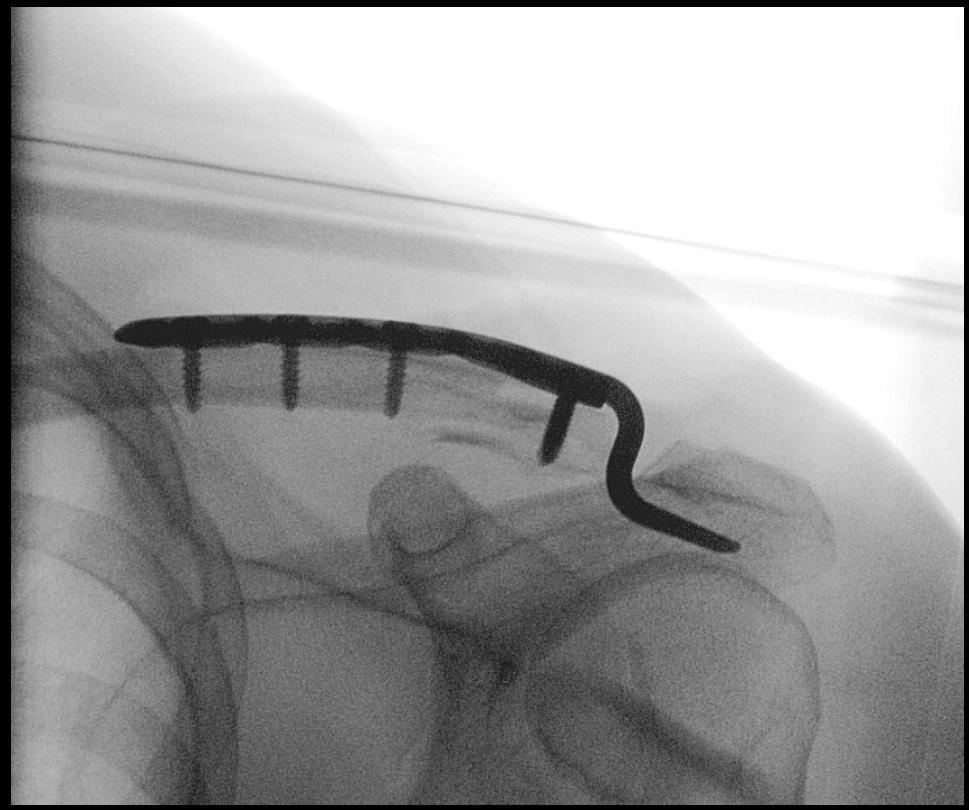
Surgical procedure
AP view

Intraoperative imaging
AP view of left clavicle

- Correct anatomic reduction of AC joint
- Correct position of the hook plate
- No vertical dislocation
- Good bony contrast in spite of metal objects
- Good field of view



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Surgical procedure
Axial view

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Intraoperative imaging
Axial view of left clavicle

- Correct anatomic reduction of AC joint
- Correct position of the hook plate
- No sagittal dislocation

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Clinical Case

Femur

Back to content slide clinical cases

Intraoperative imaging with Cios Select FD
Clinical case – Femur

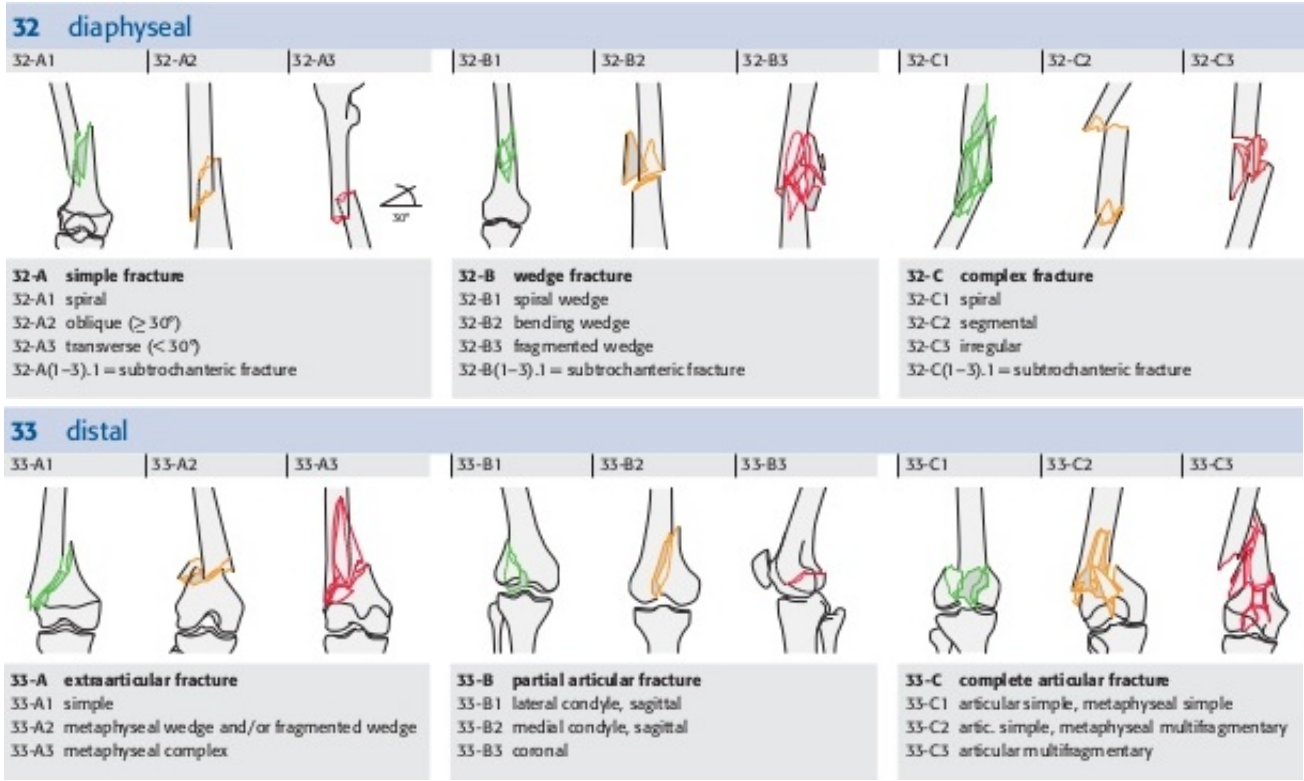
- **Background pathology**
- **Background therapy**
- **Patient history**
- **Preoperative findings**
- **Surgical procedure**

  Anterior view
  Lateral view

Background pathology

AO Classification

Diaphyseal and distal femur fractures



Background therapy

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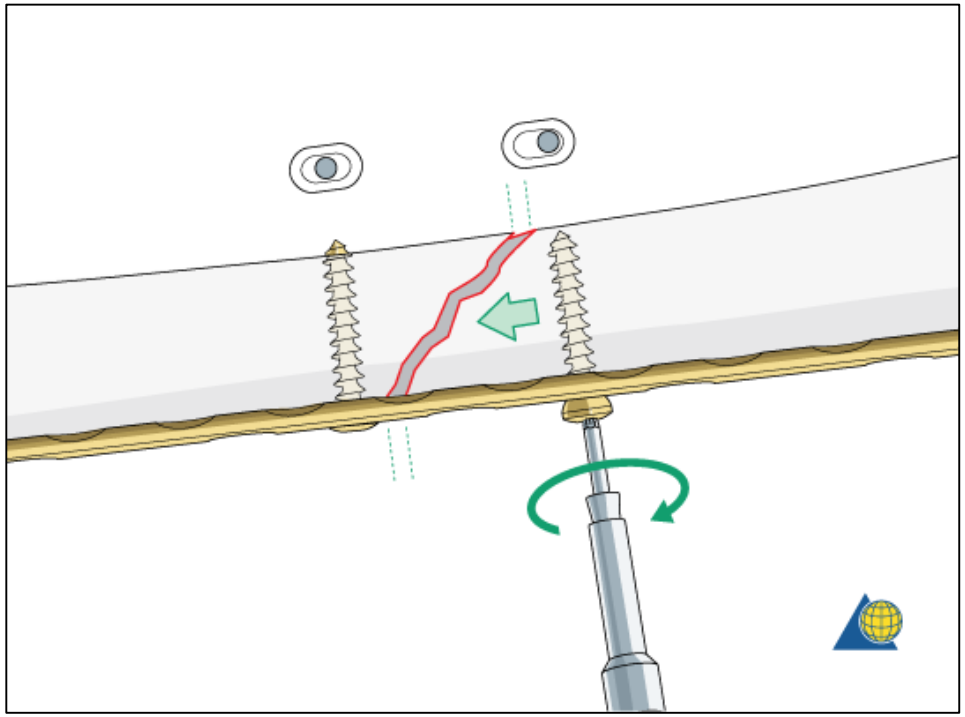
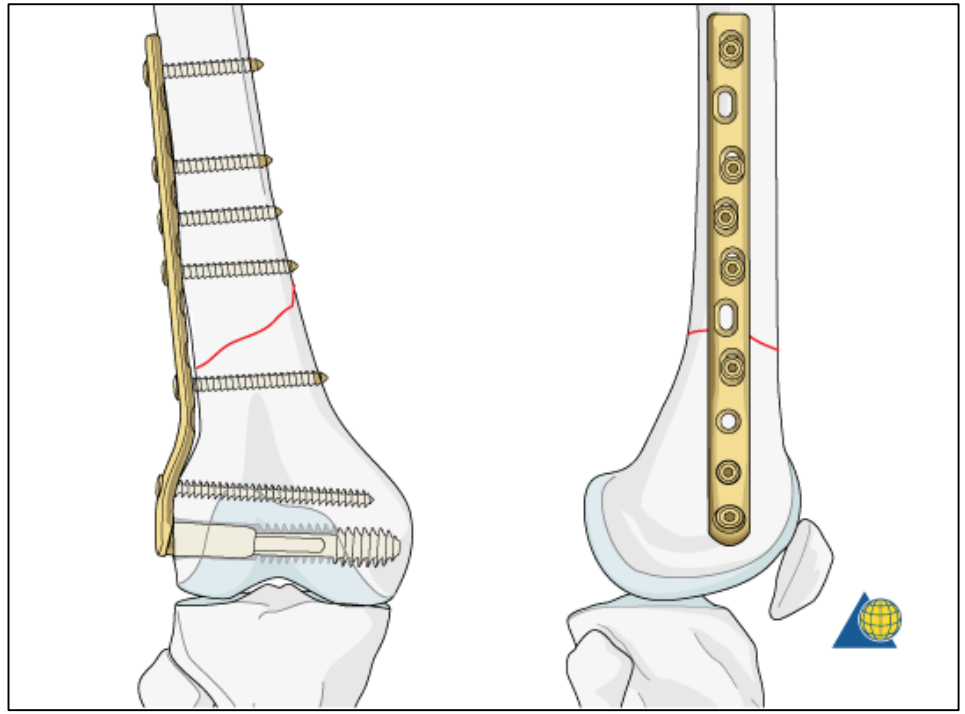
ORIF – Compression plating

Dynamic compression and plate fixation





Patient history

Classification:
Complex multi-segmental dislocated femur fracture

Remarks:
- Motorcycle accident, hit by car
- Analgosedation, no neurological status
- Initial reduction via external fixator

Gender	male
Age	46 - 60

Preoperative findings

Preoperative X-ray images
AP view of left upper leg

- Fracture of the left femur with dislocated proximal femoral shaft fracture and comminuted fracture of the distal femur

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Surgical procedure
AP view

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Intraoperative imaging
AP view of left upper leg

- Anatomical reduction via plating
- Correct implant position

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Surgical procedure
AP view

Intraoperative imaging
AP view of left upper leg

- Good bony contrast in spite of metal objects
- Good field of view

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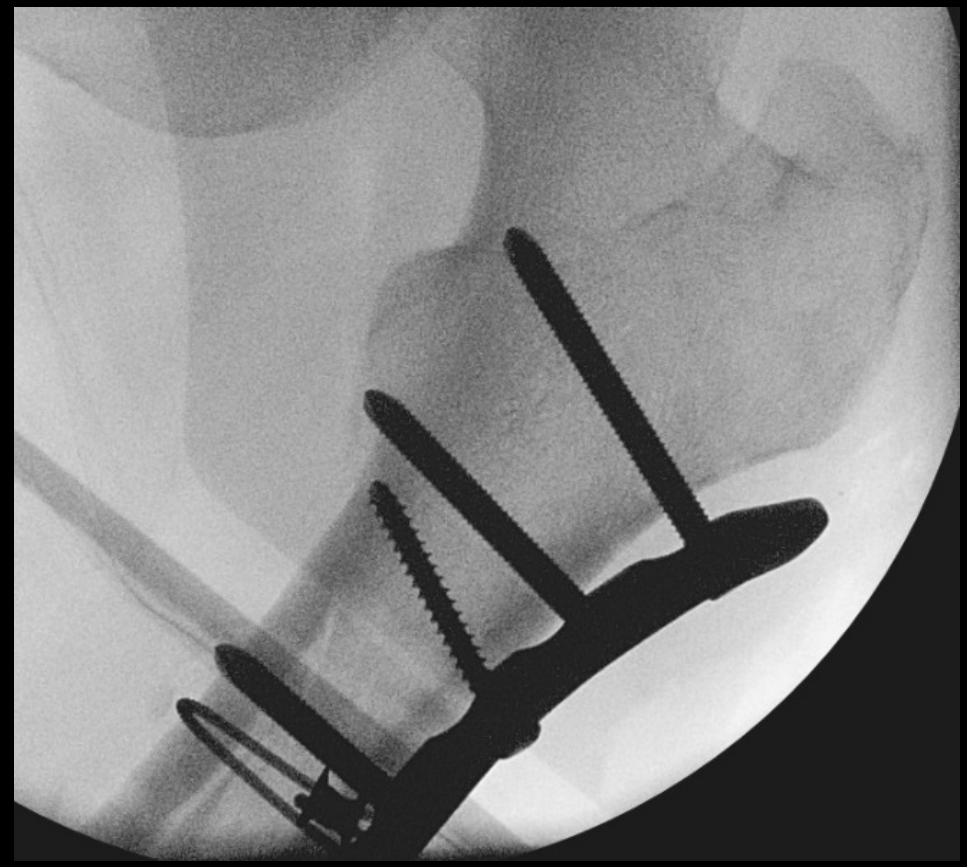
Surgical procedure
AP view

Intraoperative imaging
AP view of left upper leg

- No intra-articular screw penetration
- Plate not completely shown



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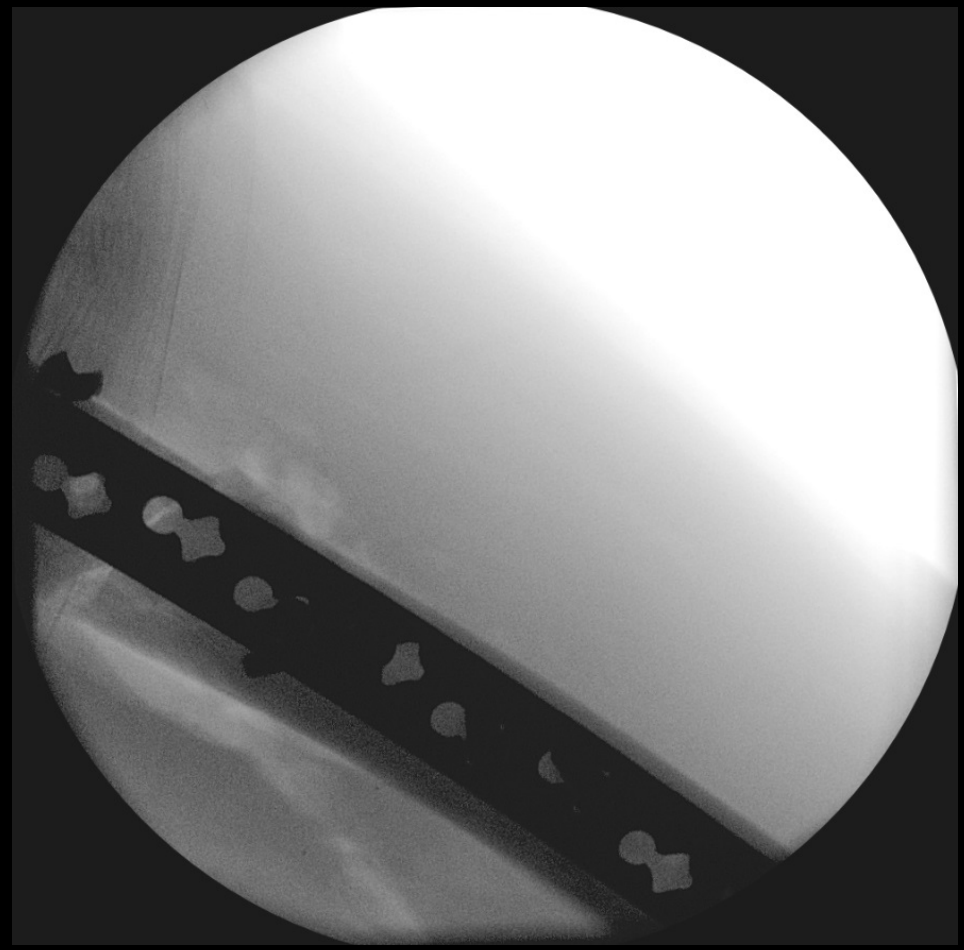
Surgical procedure
Lateral view

Intraoperative imaging
Lateral view of left upper leg

- Small dorsal fracture gap of the proximal femur



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Surgical procedure
Lateral view

Intraoperative imaging
Lateral view of left upper leg

- Correct plate position
- No intra-articular screw penetration

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Clinical Case

Humerus distal

Back to content slide clinical cases

Intraoperative imaging with Cios Select FD
Clinical case – Humerus distal

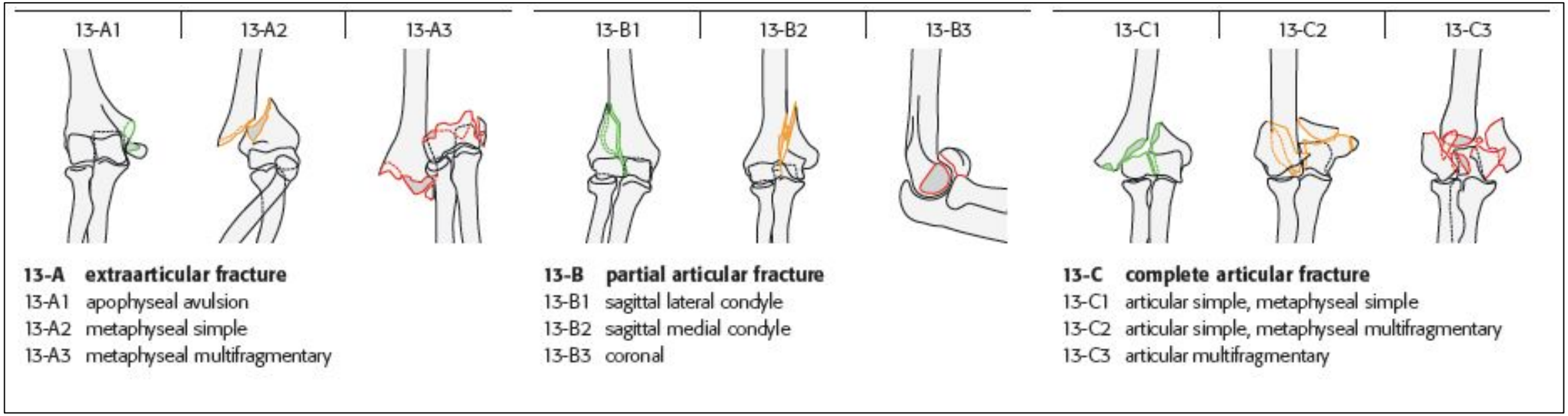
- **Background pathology**
- **Background therapy**
- **Patient history**
- **Preoperative findings**
- **Surgical procedure**

Anterior view
Lateral view

Background pathology

AO Classification

Fractures of the distal humerus



13-A extraarticular fracture
13-A1 apophyseal avulsion
13-A2 metaphyseal simple
13-A3 metaphyseal multifragmentary

13-B partial articular fracture
13-B1 sagittal lateral condyle
13-B2 sagittal medial condyle
13-B3 coronal

13-C complete articular fracture
13-C1 articular simple, metaphyseal simple
13-C2 articular simple, metaphyseal multifragmentary
13-C3 articular multifragmentary

Background therapy

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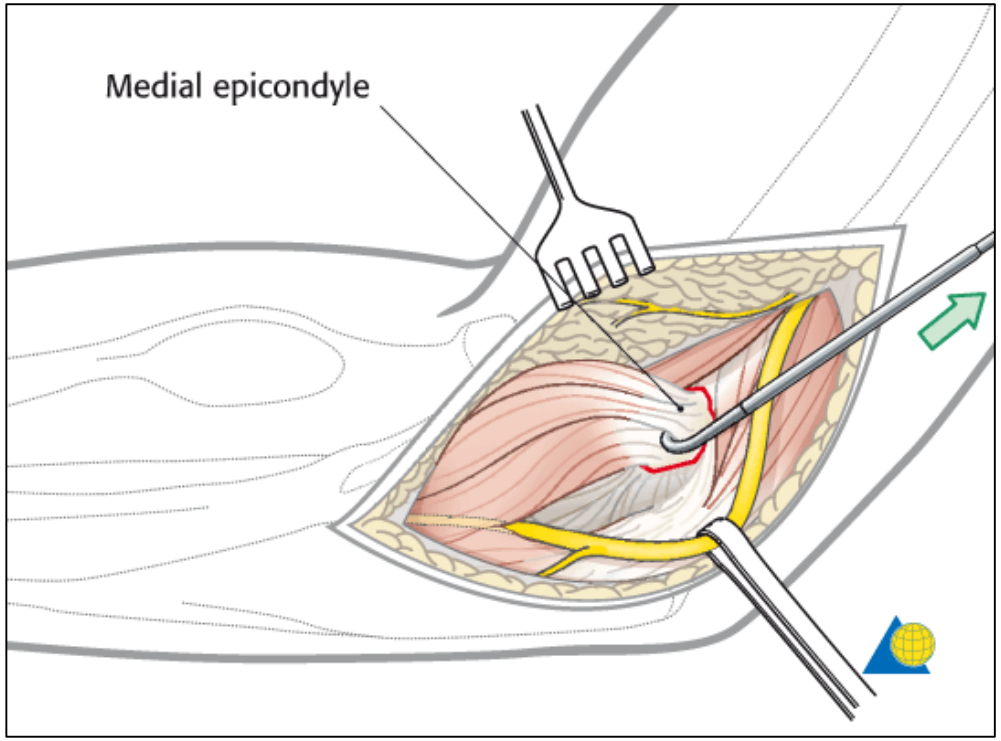
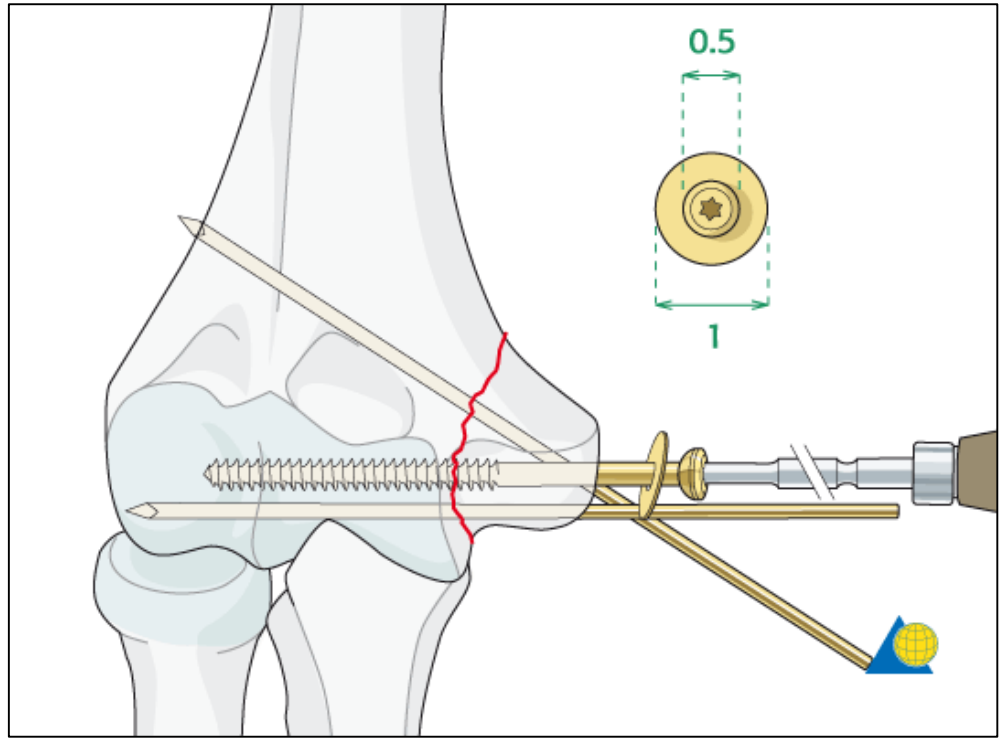
ORIF – Screw fixation

Open reduction and K-Wire navigated screw fixation





Patient history

Classification:
Type 13-C3 (AO)

Remarks:
- Stumbling fall
- Initial immobilization via upper arm plaster cast
- Pain and bony crepitation of the left elbow joint
- No peripheral motorical or neurological deficits

Gender	female
Age	61 - 75

Preoperative findings

Preoperative X-ray picture
Left elbow

1. AP in extension

2. Lateral in flexion

1.

2.

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Preoperative findings

Preoperative CT
Left elbow

- Plaster cast

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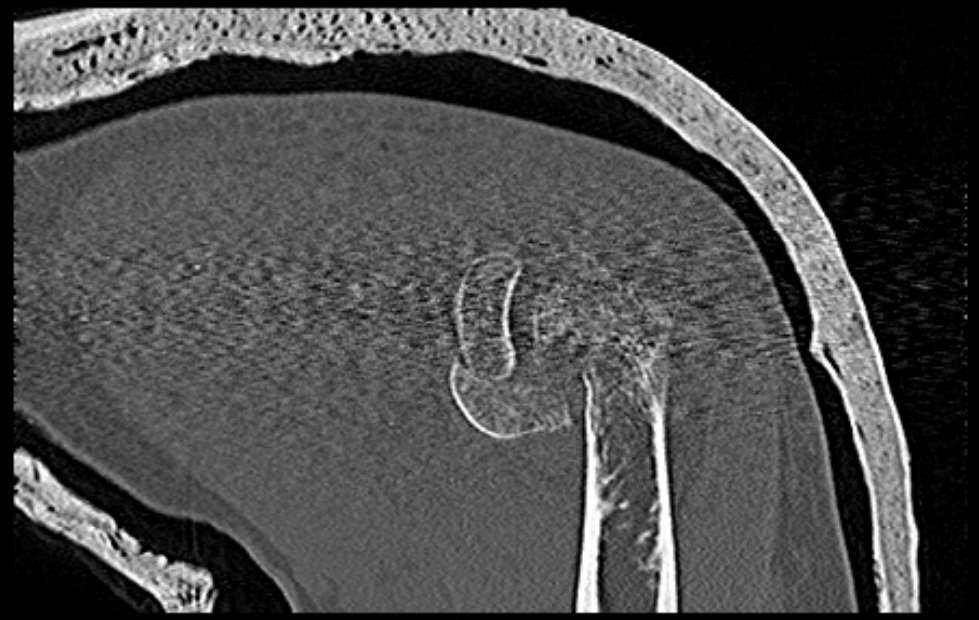
Preoperative findings

Preoperative CT
Left elbow

- Fracture of the distal humerus with multi-fragmentary trochlea and capitulum fracture



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Surgical procedure
AP view

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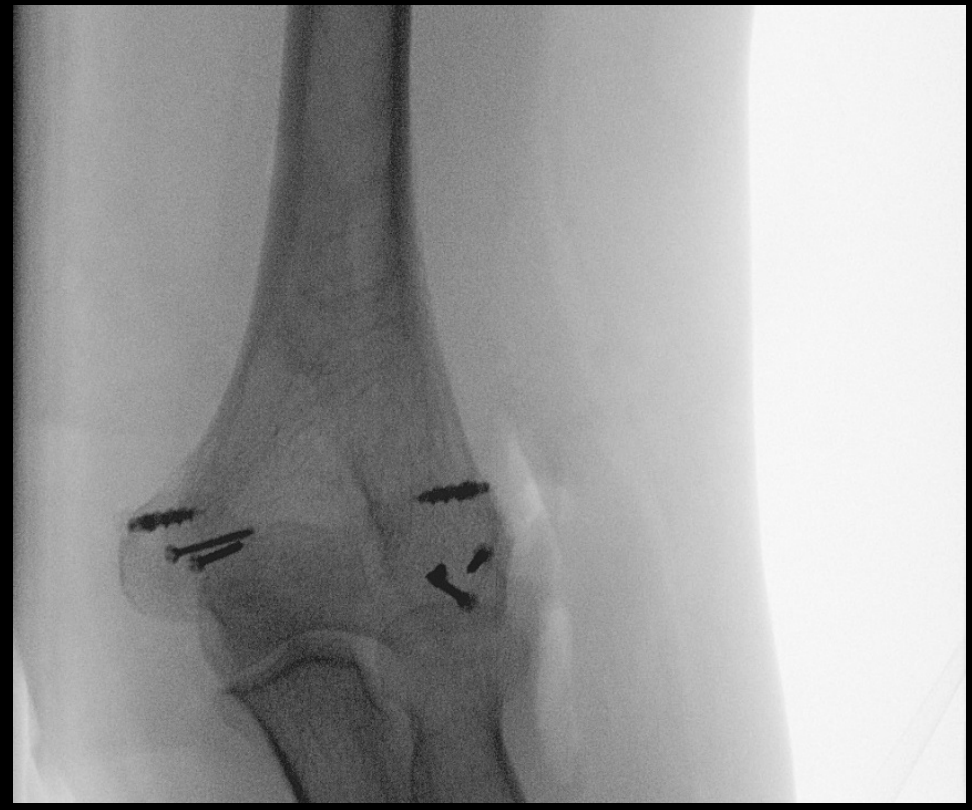
Intraoperative imaging
AP view of left elbow

- Anatomical reduction
- Fixation of ulnar and radial ligaments via 2 FASTak-Anchors
- Good bony contrast in spite of metal objects



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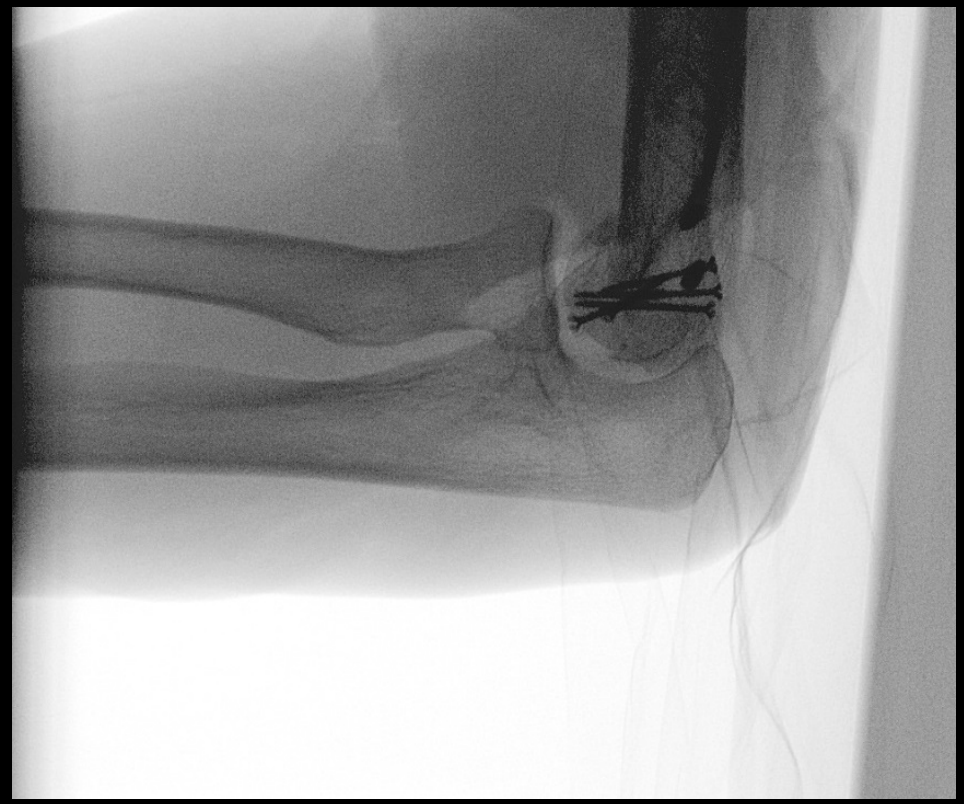
Surgical procedure
Lateral view

Intraoperative imaging
Lateral view of left elbow

- Anatomical reduction
- No intra-articular screw penetration



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Clinical Case

Tibia

Back to content slide clinical cases

Intraoperative imaging with Cios Select FD
Clinical case – Tibia

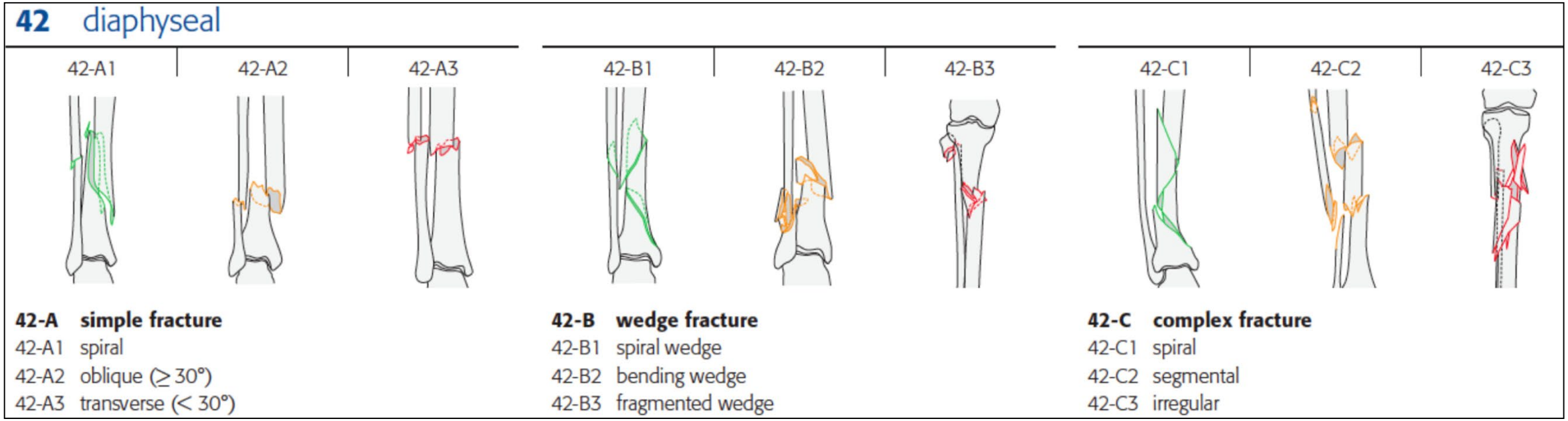
- **Background pathology**
- **Background therapy**
- **Patient history**
- **Preoperative findings**
- **Surgical procedure**

Anterior view
Lateral view

Background pathology

AO Classification

Diaphyseal fractures of the lower leg



Background therapy

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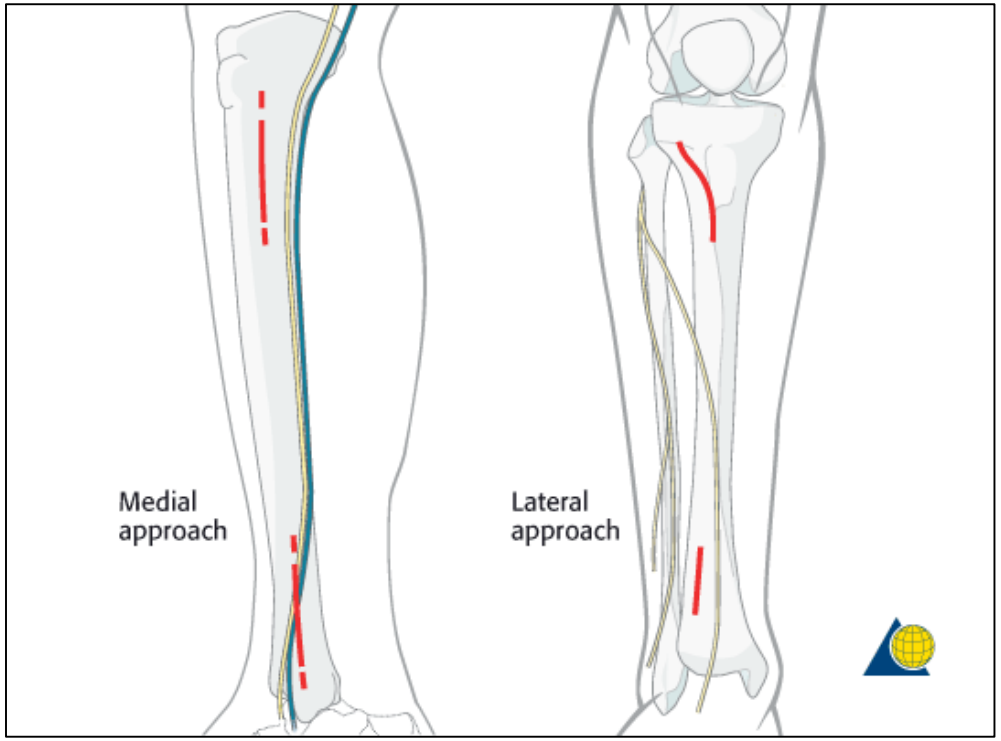
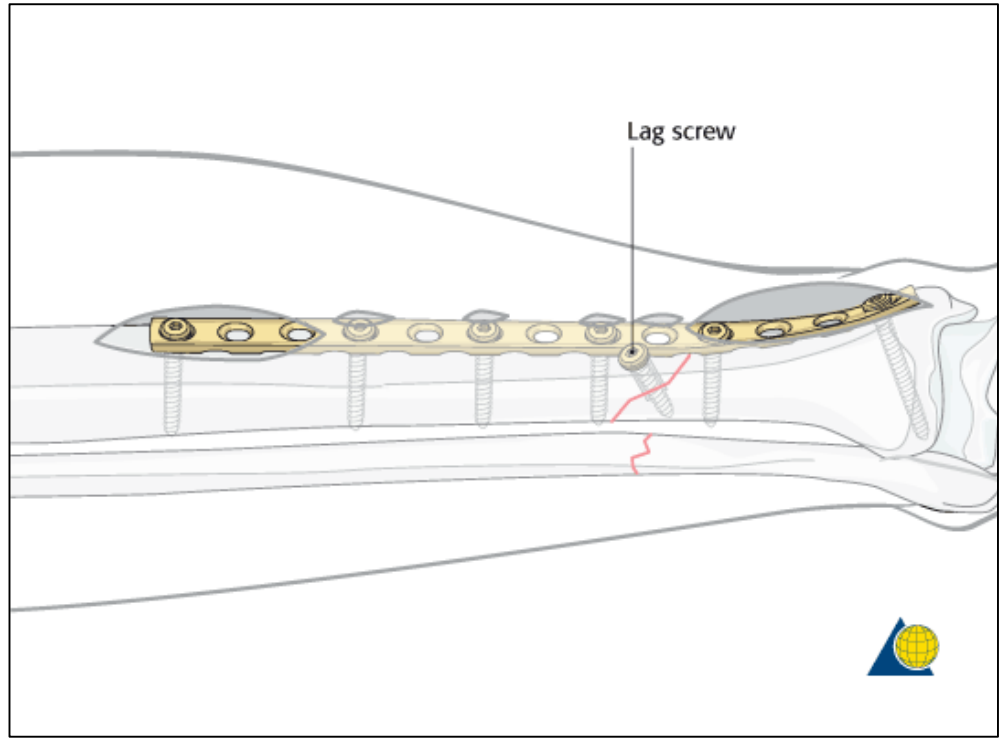
MIO – Compression plating

Approaches and Reduction (plate + interfragmentary lag screw)





Patient history

Classification:
Type 42 A1 (AO)

Remarks:
- Skating accident
- Closed fracture of right lower leg
- Closed reduction by emergency doctor
- Pain and deformity of lower leg
- No peripheral neurological and motorical deficits

Gender	female
Age	13 - 17

Preoperative findings

Preoperative X-ray images
Right lower leg in AP and Lateral view

- Simple spiral fracture of the lower leg
- Minimally displaced

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Surgical procedure
AP view

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Intraoperative imaging
AP view of lower leg

- Anatomical reduction
- Correct implant position
- Good bony contrast in spite of metal objects
- Sufficient field of view

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Surgical procedure
Lateral view

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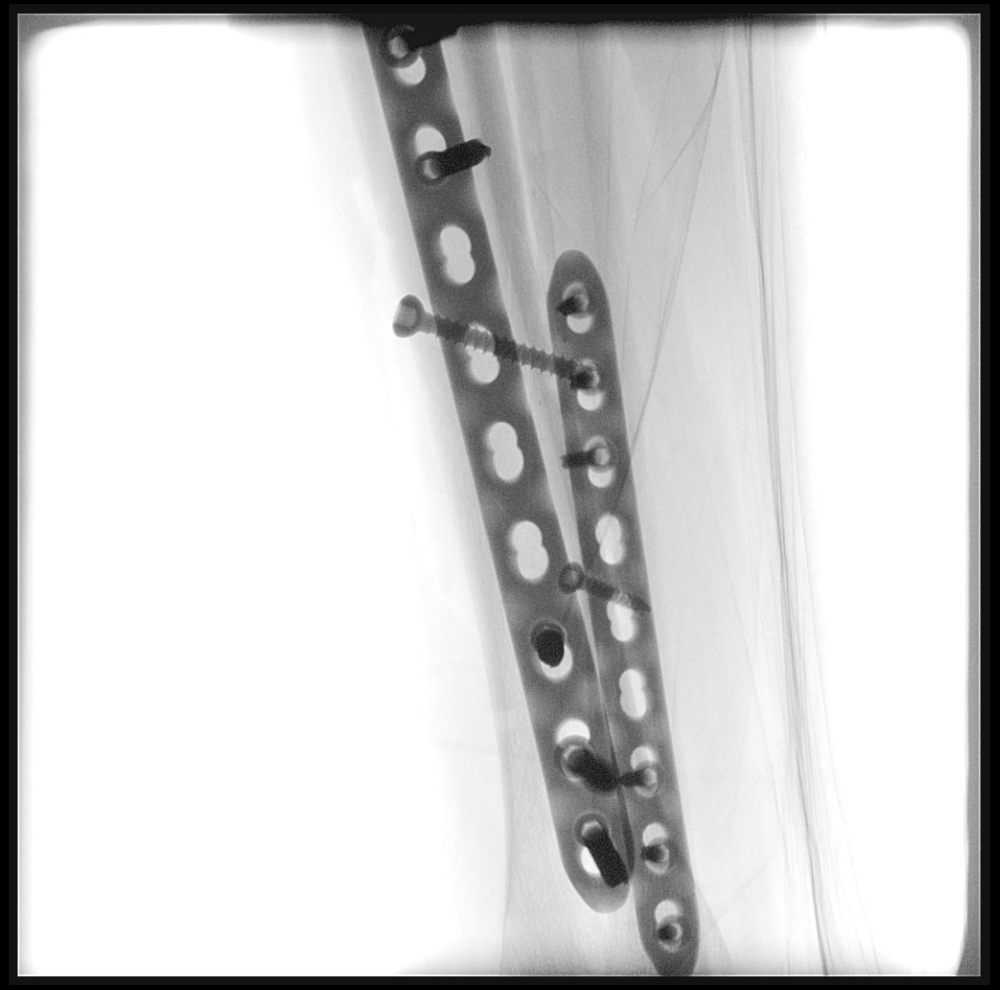
Intraoperative imaging
Lateral view of lower leg

- Anatomical reduction
- Correct implant placement
- Plates not completely displayed



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Clinical Case

Tibia plateau

Back to content slide clinical cases

Intraoperative imaging with Cios Select FD
Clinical case – Tibia plateau

- **Background pathology**
- **Background therapy**
- **Patient history**
- **Preoperative findings**
- **Surgical procedure**

  Anterior view
  Lateral view

Background pathology

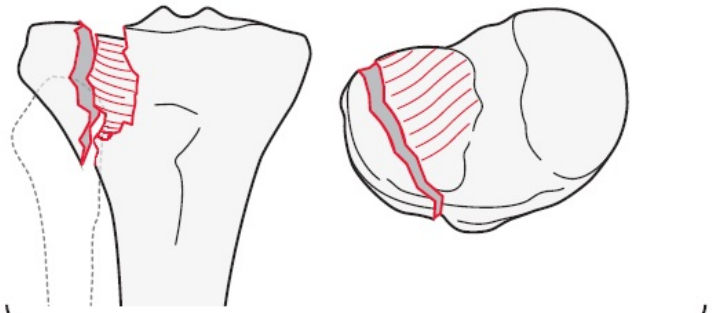
AO Classification

Tibia plateau fractures

Group: Tibia, proximal end segment, partial articular, **split-depression fracture** 41B3

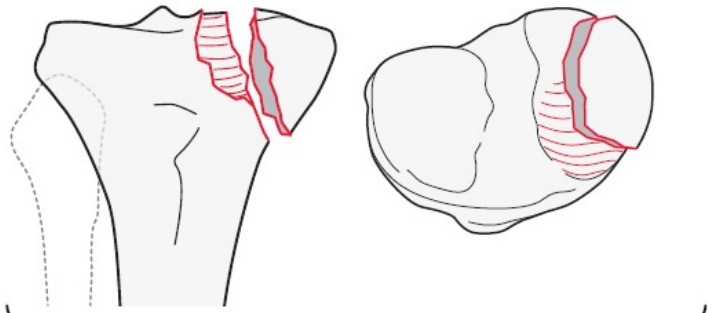
Subgroups:

Lateral plateau fracture
41B3.1*



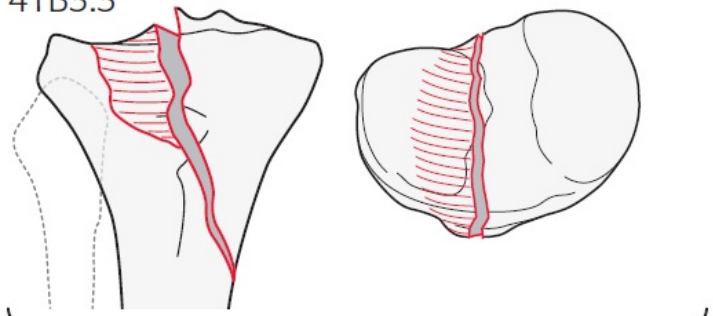
*Qualifications:
- t Anterolateral (AL)
- u **Posterolateral (PL)**
- x Central

Medial plateau fracture
41B3.2*



*Qualifications:
- v **Anteromedial (AM)**
- w Posteromedial (PM)
- x Central

Involving the tibial spines and 1 of the tibial plateaus
41B3.3*



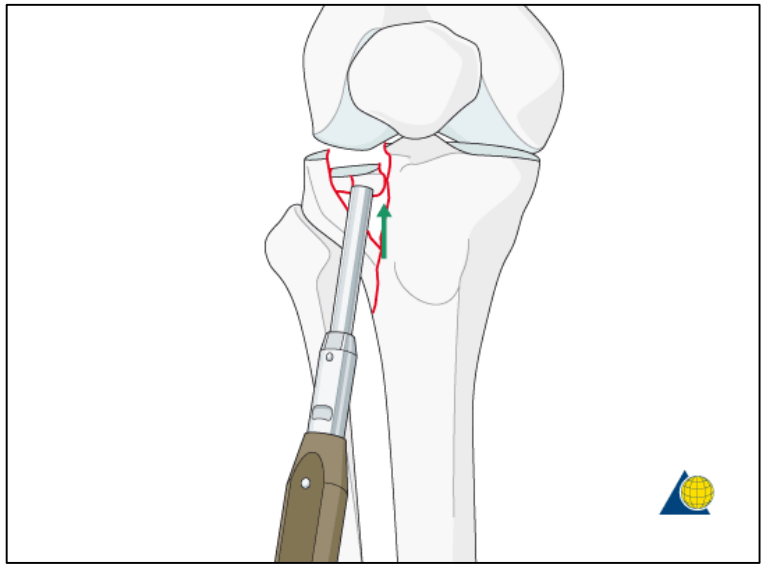
*Qualifications:
- f **Lateral**
- h Medial

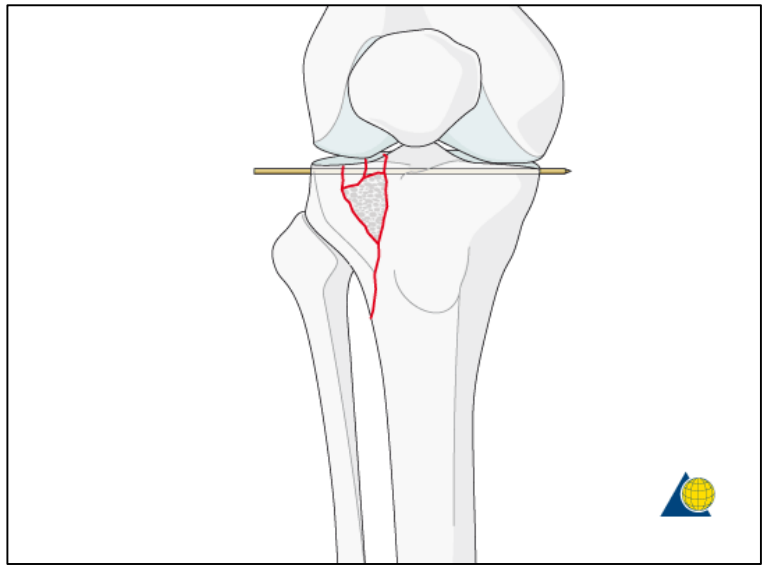
Background therapy

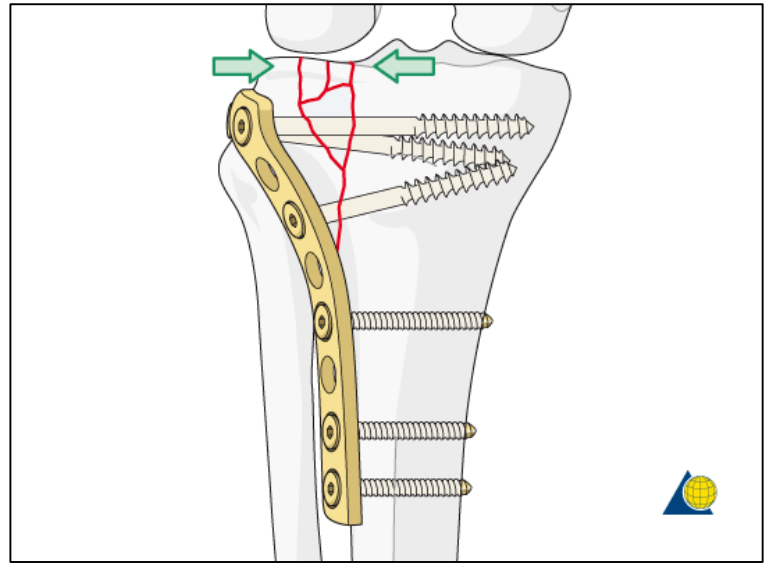
SIEMENS Healthineers

ORIF – Plates with angular stability

Reduction of articular surface, filling of defect or adjustment osteotomy, plate fixation







Patient history

Classification:
Lateral fracture of the left tibia plateau type 41-B3 (AO)

Remarks:
- Direct impact trauma of the left knee during handball
- Persistent pain symptoms and joint effusion despite relief by forearm crutches
- MR diagnostics
- Pressure pain in lateral joint segment and restricted range of motion (Ex/Flex 0-20-50°)
- No peripheral motorical and neurological deficits

Gender	female
Age	18 - 30

Preoperative findings

Preoperative CT
Axial and coronal view of left knee joint

- Ventrolateral impression fracture of the tibia plateau with lateral articular depression of 8 mm

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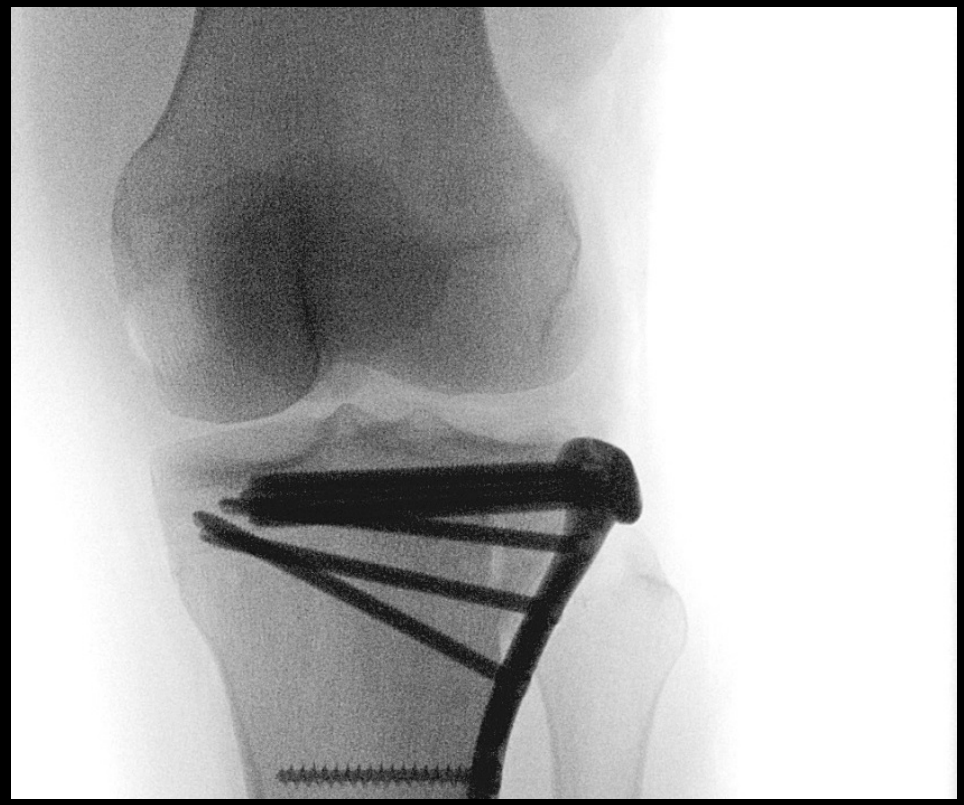
Surgical procedure
AP view

Intraoperative imaging
AP view of left knee joint

- Anatomical reduction of tibia plateau alignment
- No fragment dislocation after adjustment osteotomy
- Correct plate position
- No intra-articular screw penetration
- Good bony contrast in spite of metal objects



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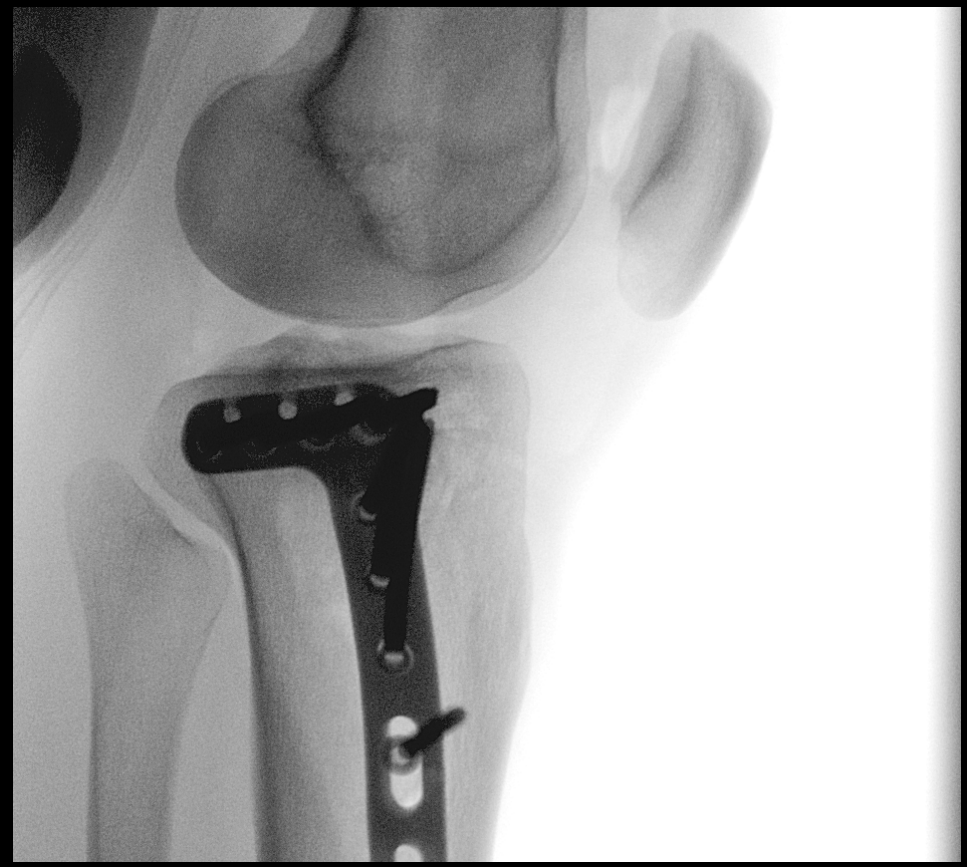
Surgical procedure
Lateral view

Intraoperative imaging
Lateral view of left knee joint

- Correct plate position
- No sagittal fragment dislocation
- No intra-articular fragments or screw penetration



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Cios Select FD

Conclusion

Back to content slide clinical cases

„In my opinion, Cios Select FD can be used for every procedure in orthopedic trauma. This C-arm is easy to handle and with a few minutes of introduction the improved user interface can be operated by everyone. But most important for me: Cios Select FD provides a new level of two-dimensional intraoperative imaging in terms of image quality!“

Dr. med. Jochen Franke,
Head – Division of Trauma
Department for Orthopedic and Trauma Surgery
BG Trauma Center Ludwigshafen at Heidelberg University Hospital Germany

The statements by Siemens' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

Cios Select FD
Select smart surgical imaging

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* Option

Thank you
for your enthusiasm!

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