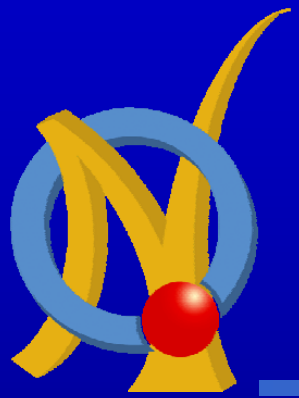

Complex tibial plateau fractures treated with Ilizarov fixation frames

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K. Kjær Petersen
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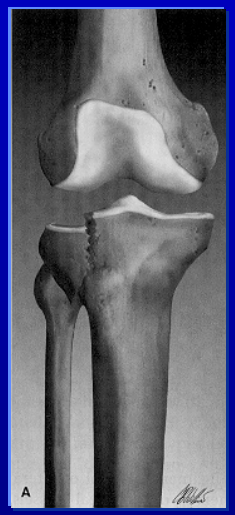
Aalborg University Hospital

Schatzker type 5 and 6

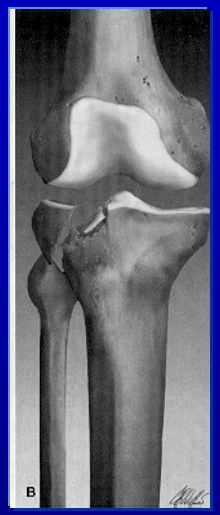
- Often high energy fractures
- Internal soft tissue degloving/open
- Condylar separation/articular depression
- Diaphyseal-metaphyseal dissociation


Treatment enigma?

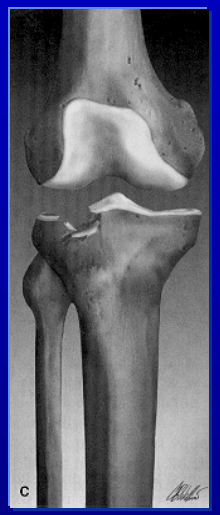
Schatzker's classification



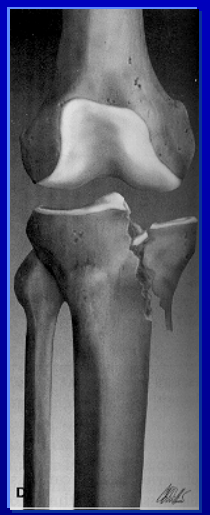
Type 1



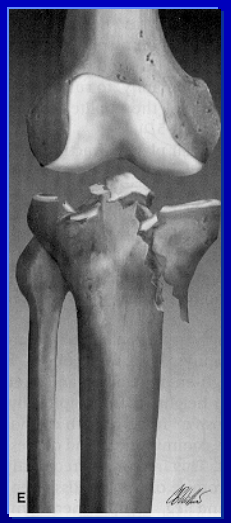
Type 2



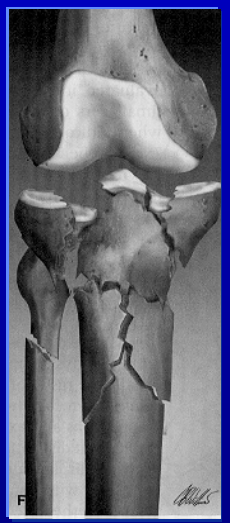
Type 3



Type 4



Type 5

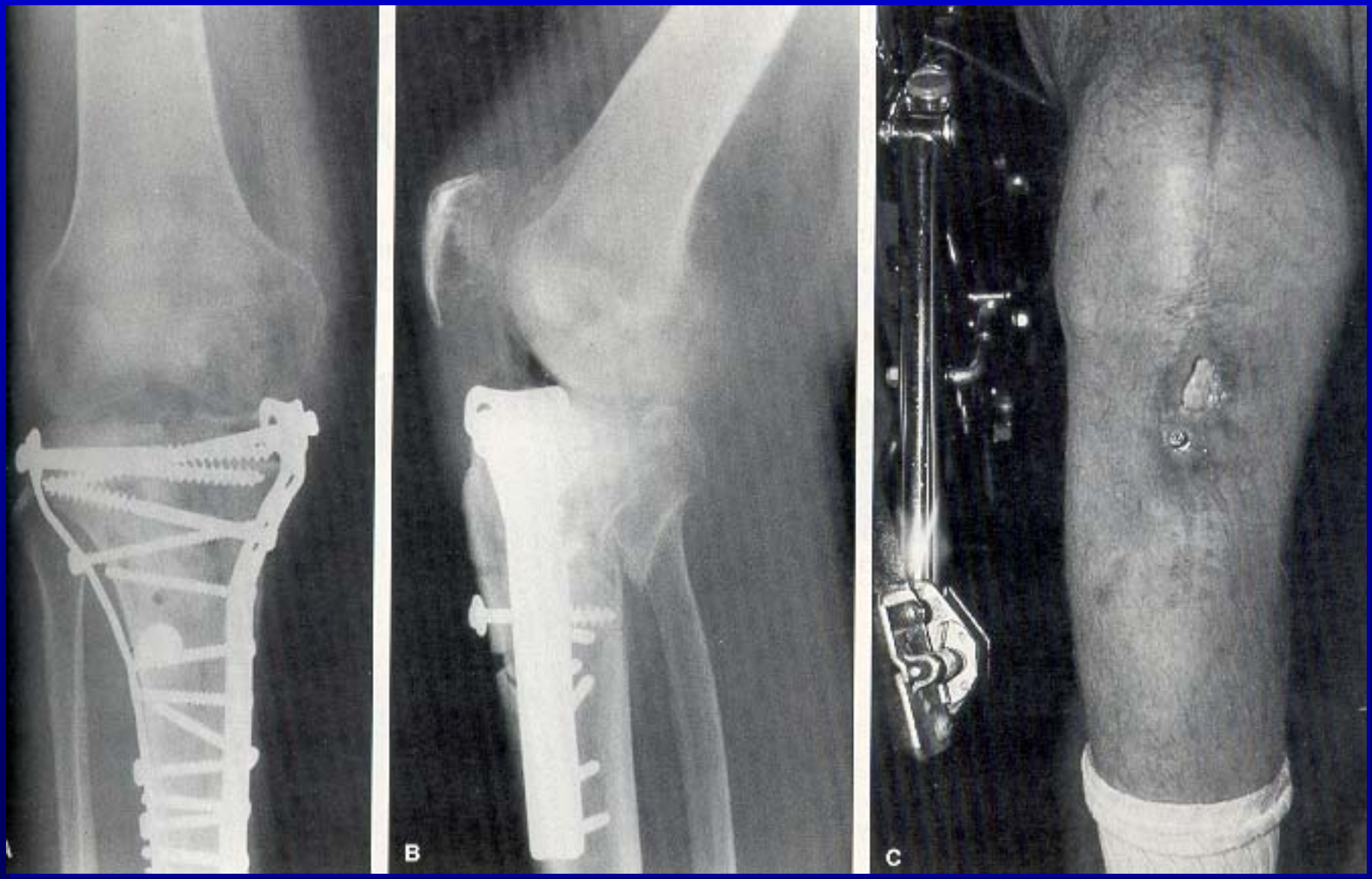


Type 6

Complication rates – dual plating Schatzker type 5 and 6

- Deep infection 40% (23-100)
- Skin necrosis 35%
- Loss of fixation/malunion 25%
- Amputation 8%

Dual plating



Treatment goals

- Avoid skin necrosis and infection
- Articular surface congruence
- Correct mechanical axis/joint stability
- Joint mobility
- Early weigth bearing

Ilizarov fixation – tibial plateau fractures Schatzker type 4, 5 and 6

- Period Jan. 95 - Dec. 01

- 59 patients 60 fractures
- Men 28 49 yr (32-82)
- Women 31 56 yr (24-89)

Schatzker type fracture

	4	5	6
• Men	1	13	14
• Women	0	17	15
	1	30	29

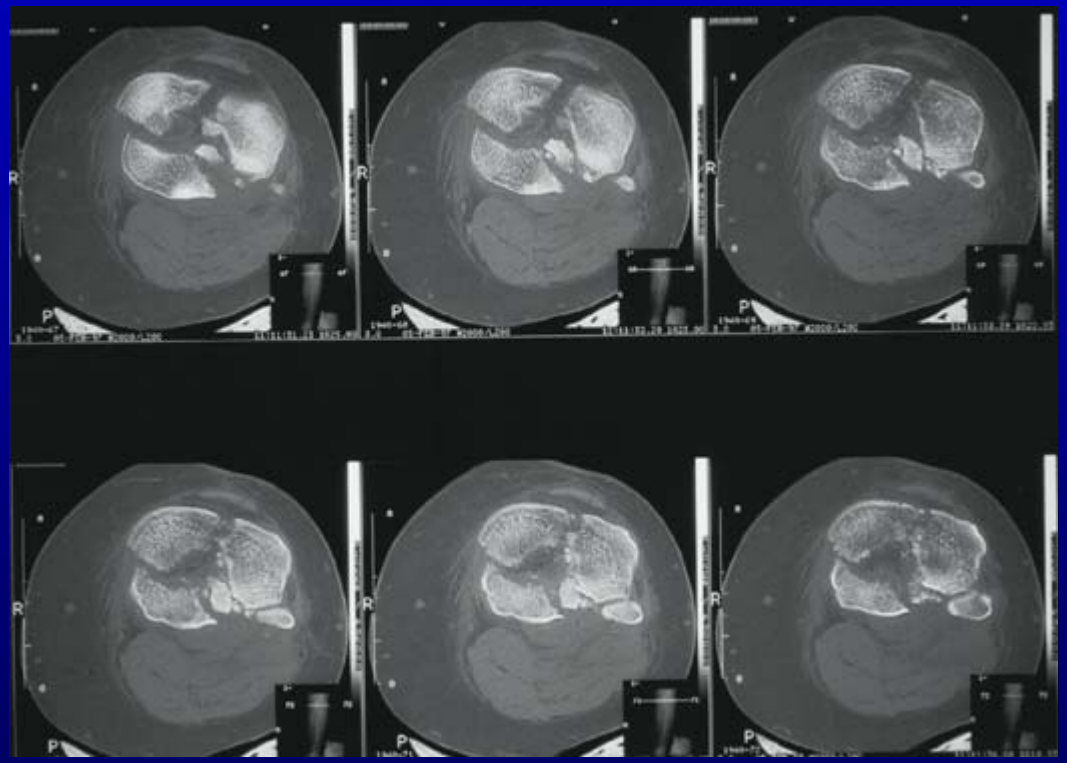
Soft tissue injuries

- Open fractures 13
- Closed (skin contusion) 47
- Peroneal nerve injury 5
- Compatment syndrome 6

Preoperative planing

- CT – scan
- CT – reconstruction – sagital and coronal plane
- Ring size and number
- Calcaneus traction – if surgery delayed

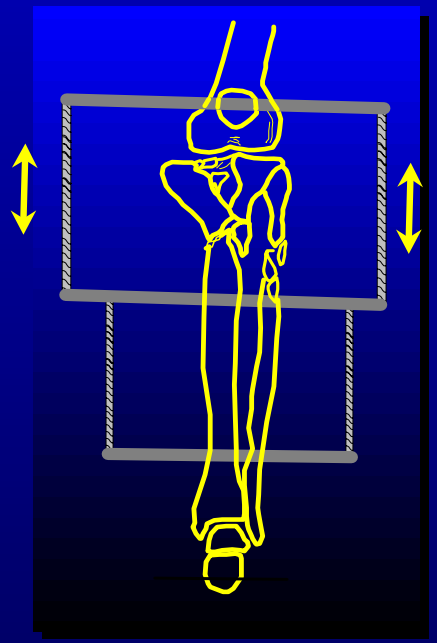
CT-scan is obligatory for planing



Ilizarov surgical strategy

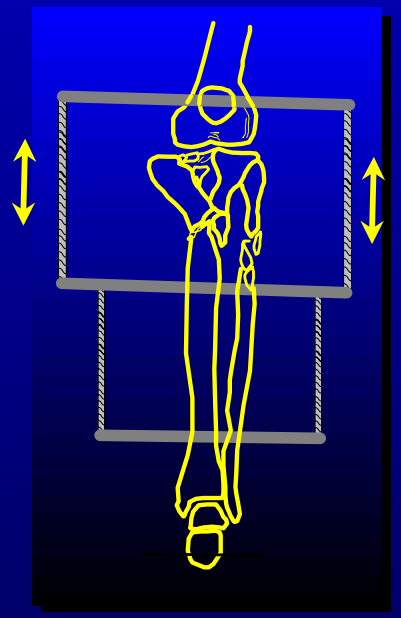
- Minimal invasive
- Initial reduction by ligamentotaxis
- Fine reduction (elevation, bonegraft supplementary cannulated screws)
- Neutralization by Ilizarov frame

Ilizarov-technique



- 3 rings
- 1 proximal for the knee joint
- 2 distal for shaft fracture
- trans knee distraction (ligamentotaxis)

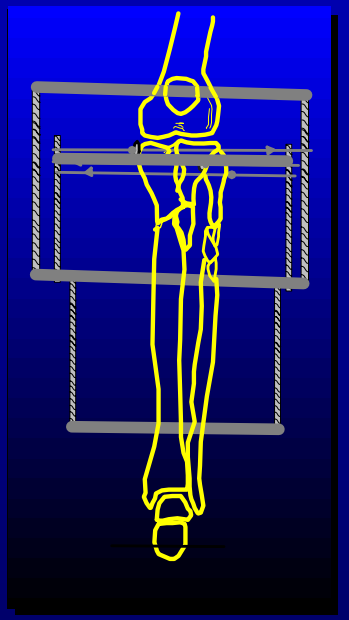
Ilizarov-technique



- Fine reduction

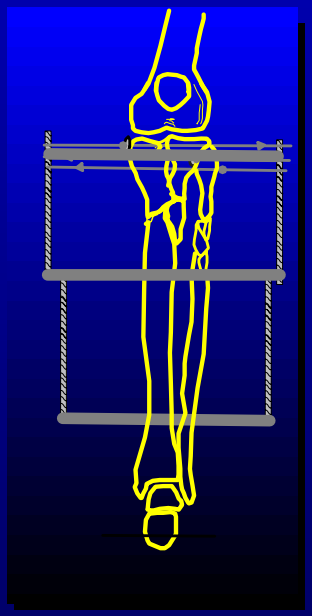
- Elevation
- Bone graaft
- Screws
- 4 olive wires

Ilizarov-technique



4 olive wires are fixed to a proximal ring

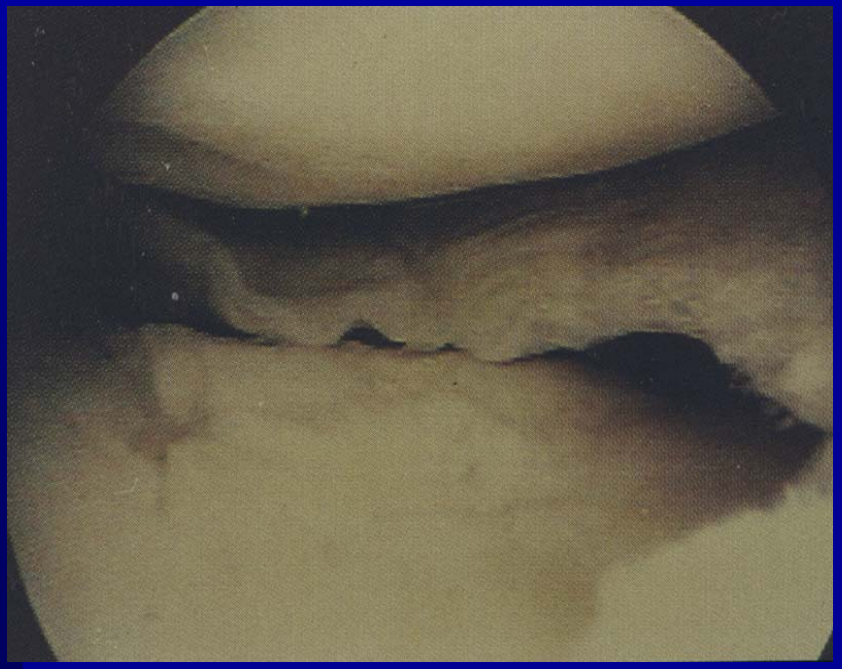
Ilizarov-technique



If knee joint is stable

remove femoral ring

Artroscopic assisted elevation
can be used



Schatzker type 5

Treatment a.m. Ilizarov

Before

After

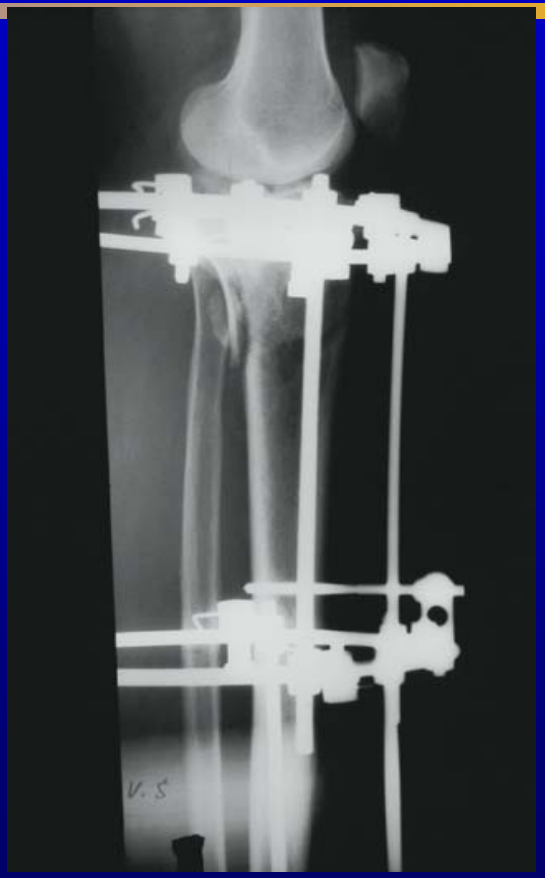
Before

After

Surgical procedures 60 Ilizarov frames

- Non bridging-knee 34
- Bridging-knee 26
- Supplementary cannulated screws 17
- Autograft 28
- Artroscopic assisted 11

Fracture dislocation Schatzker type 6



Before

After

Before

After

Results – 60 Ilizarov fixations

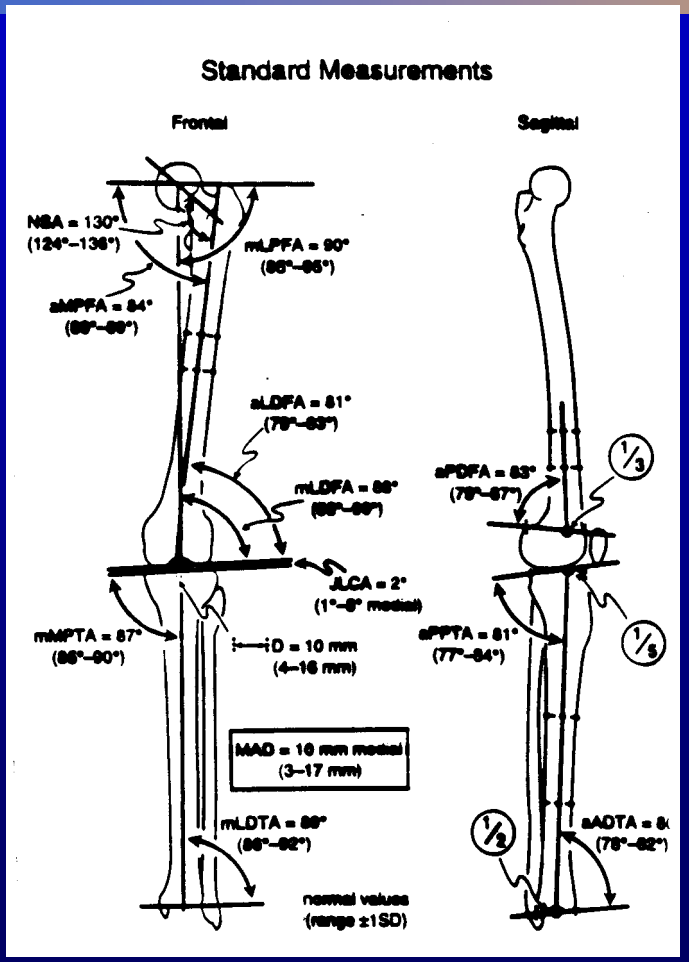
- Fractures united 59 (2 bonegrafts)
- Hospital stay 13 days(7-44)
- Weigth-bearing 3 weeks (0-8)
- Time in fixator = time to union
  14 weeks (10-32)

Complications 60 fractures

• Superficial pin infection	All
• Peroneal nerve/tib.post	3
• Compartment syndrome	6
• Amputation	1

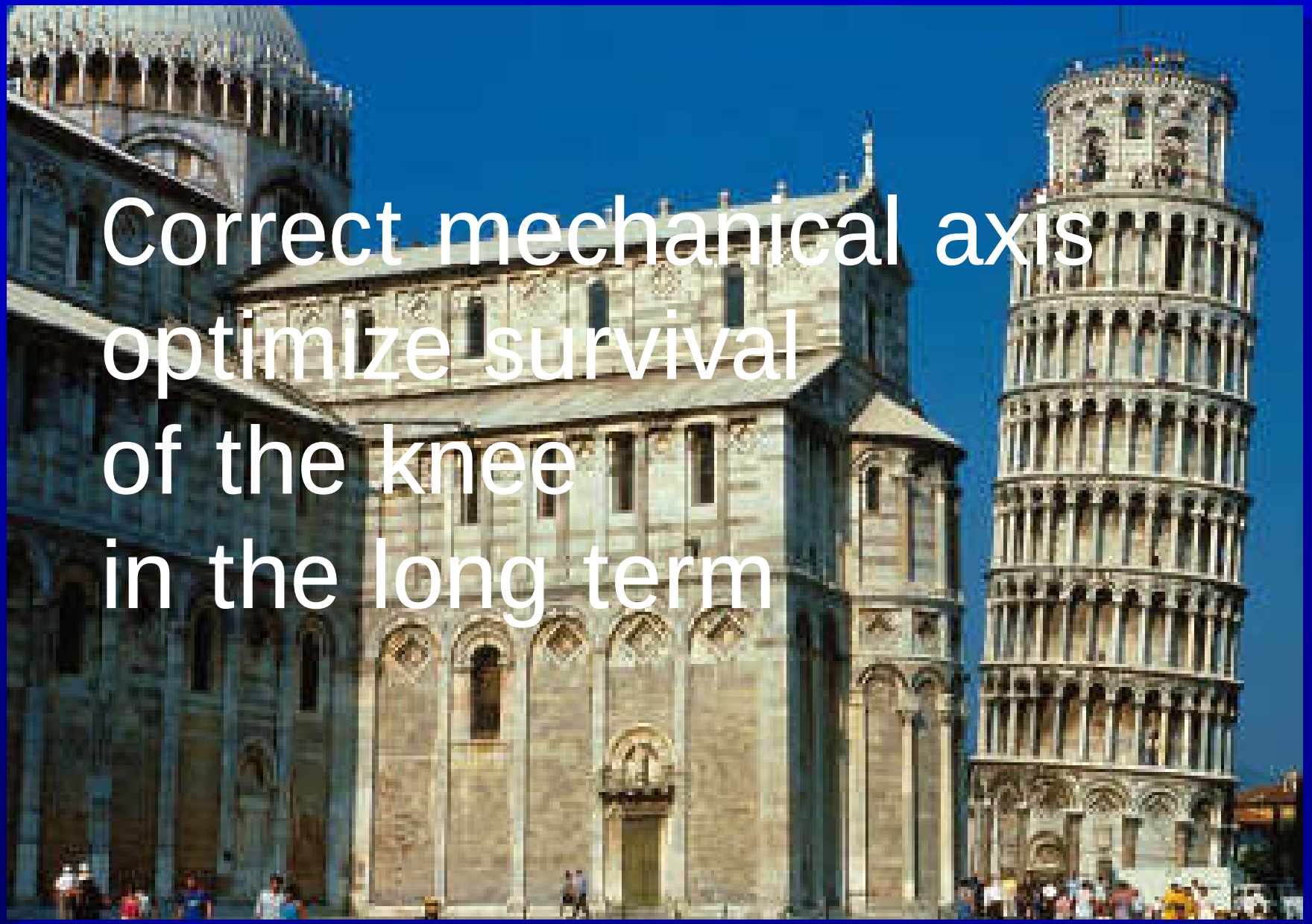
Re-operations 60 fractures

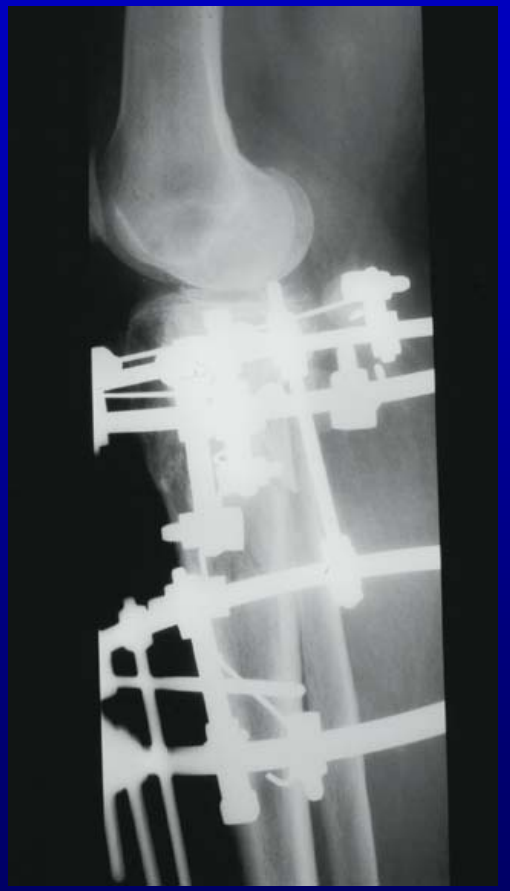
- Delayed union – autograft 2
- Pyartron – synovectomy 4
- Artroscopic release – buckethandle 4
- Secondary TKA + HTO 3
- Fixator adjustment 5


Standard Measurements
Frontal
Sagittal
NSA = 130°
(124°–136°)
mLPFA = 90°
(88°–95°)
aMPFA = 84°
(80°–89°)
aLDFA = 81°
(79°–83°)
mLDFA = 88°
(86°–90°)
JLCA = 2°
(1°–6° medial)
mMPTA = 87°
(86°–90°)
JLO = 10 mm
(4–16 mm)
MAD = 16 mm medial
(3–17 mm)
mLDTA = 89°
(86°–92°)
normal values
(range ±1SD)
aPDFA = 83°
(79°–87°)
1/3
aPPTA = 81°
(77°–84°)
1/5
1/2
aADTA = 8(
(78°–82°)

Mechanical axis at union

- Normal axis – in AP plane 56/59 = 95%
  (2 valgus, 1 varus – 10 degrees)
- Normal axis in LAT plane 57/59 = 96%
  (2 recurvatum – 10 degrees ext. deficit)


Correct mechanical axis
optimize survival
of the knee
in the long term



Before

After

Before

After

Summary

- Good and excellent 53/60 ~ 88%
  Poor results (7)
- 2 converted to TKA
- 1 HTO
- 1 pyartron (poor movement and pain)
- 1 varus malalignment and pain
- 1 early amputation (crush+nervedeficit)

Summary

- lizarov technique avoid skin necrosis and deep bone/implant infection
- Pyarthron is a serious complication, but can be treated
- Avoid pin placement nearer than 14-16 mm from articular surface
- The technique requires often use of oral antibiotics

Summary

- Good and excellent results in 88%
- Briding the knee means loss of flexion (20 degrees)
- Mechanical axis is perfect in majority
- Stable an minimal invasive
- Acute knee ligament injuries is not a problem – reconstruction if needed should be delayed

Conclusion

Ilizarov fine wire fixation of complex tibial plateau fractures gives better short term results

than

open traditional dual plating


КОЛЫМКИ
ЛУБЯНКА
АЛЖИР
КУРОПАТЫ
ВЛАГАМ НАРОДА-СМЕРТЬ!
НКВД


Thank
you