Intramedullary nailing tibial shaft

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10 12 2003


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Indications for operative management

- High energy fracture
- Moderate to severe soft tissue injury
- Unstable fracture pattern
- Open fracture
- Compartment syndrome
- Inability to maintain reduction
- Ipsilateral femoral fracture
- “ Intact fibula “

Closed nailing or cast treatment

- Prospective randomised trial
- 62 patients
- Entry criteria Skeletally mature
  Displaced more than 50%
  Angulated more than 10°
  5cm away from either joint

Hooper JBJS Br 1991

Closed nailing or cast treatment

	POP	IM Nail
Number	33	29
Varus/Valgus	9	0
Pro/Recurv	3	0
Shortening	15	2
Time to Union	18	15
Off work	23	13
Hospital stay	8	11

Hooper JBJS Br 1991

Closed nailing or cast treatment

- 99 patients 2 groups
- Matched for age, displacement, smoking

Nail better

- IOWA,
- Ankle score,
- SF36

	Nail	Cast
Union in weeks	18	26
Non-union	1	5

Bone JBJS Am 1997

Cast vs. IM Nailing

Bone L. et al. JBJS 79-A, 1997

Unilateral displaced isolated tibial shaft fracture

	Cast	IM Nail
Union (wks)	26	18
Non union (%)	10	2
Knee score	89	96
Ankle score	84	97
SF 36	74	85
Nail removal (%)	0	48

Intramedullary nailing tibial shaft

Don’t Nail

- **Immature tibia**
- **IM canal 7mm or less**
- **Previous TKR**
- **Canal deformity**
- **Arthrodesed knee**

Intramedullary nailing tibial shaft

Knee pain after tibial nailing

Retrospective

107 consecutive patients 110 tibiae

Pts contacted and interviewed

Incidence of knee pain

Position of nail

Insertion site

Nail removal

Keating J Orthop Trauma 1997

Intramedullary nailing tibial shaft

Knee pain after tibial nailing

Mean follow up 32 months

Transpatellar approach pain 77%

Medial parapatellar approach pain 50%

80% nail removed

Patients reappraised 16 months later

Keating J Orthop Trauma 1997

Intramedullary nailing tibial shaft

Knee pain after tibial nailing

Completely pain free	45%
Pain partially relieved	34%
Pain unchanged	21%

Keating J Orthop Trauma 1997

Intramedullary nailing tibial shaft

Knee pain after tibial nailing

Prospective study Reamed GK nail

36 patients US of patellar tendon

2.5 years after nailing

12 patients had no anterior knee pain

24 patients had anterior knee pain

Measurement of proximal and distal diameter

Comparison with uninjured patellar tendon

Vaisto J Orthop Trauma 2005

Intramedullary nailing tibial shaft

Knee pain after tibial nailing

There was no difference in :

Blood circulation to the tendon

Blood circulation at entry point

Calcification of patellar tendon

Thickness of patellar tendon

Echo characteristics of tendon

Conclusion: Approach makes no difference

Vaisto J Orthop Trauma 2005

Current practice in Intramedullary nailing

- Cross sectional survey of OTA,AAOS,AOI
- 444 surgeons
- Tourniquet use in tibial nailing
- Tendon split or paratendinous
- High or low pressure lavage

Bhandari J Trauma -Injury 2000

Current practice in Intramedullary nailing

- Tourniquet use in tibial nailing 52%
- Tendon split or paratendinous 30:70
- High or low pressure lavage 39:61
- Tourniquet Asia/Africa:USA::10:1
- Tendon Split Australia, Europe, South Am
- Consensus on IV antibiotics

  Wound irrigation

Bhandari J Trauma -Injury 2000

Errors and Potential hazards

TIBIA

Courtesy Reynders, P

Proximal tibial fractures

What is the problem?

- 12-37% have a malunion

Freedman Clin Orthop 1995

Williams J Orthop Trauma 1995

- Proximal tibial malunion causes significant disability

Kyro Ann Chir Gyn 1997

Proximal tibial fractures

What is the problem?

- Malreduction
- Consequence of surgical technique

Typical deformity

Valgus in coronal plane

Flexion in sagittal plane

Post translation of distal fragment

Proximal tibial fractures

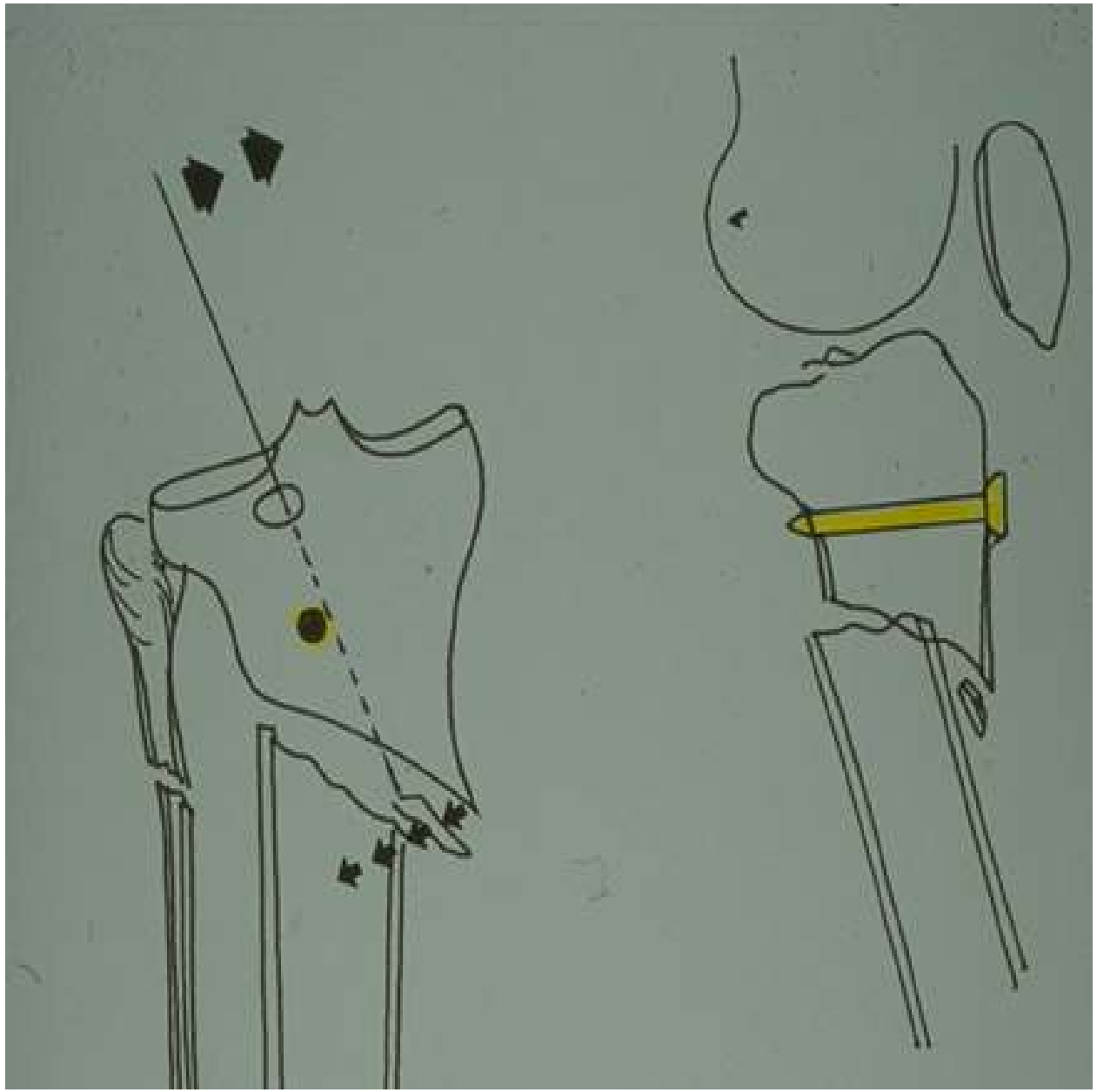
- Too medial Entry
- Loss lateral cortex
- Shape prox tibia
- AP diam more lateral
- Muscle tug laterally

Proximal tibial fractures

- Entry point collinear with medullary canal
- Use a lateral portal
- Use a tendon split or extend the knee
- Use edge of articular surface anterior entry
- Entry 3mm lateral to centre of tibial tubercle

McConnell J Orthop Trauma 2001

Poller screws or blocking screws

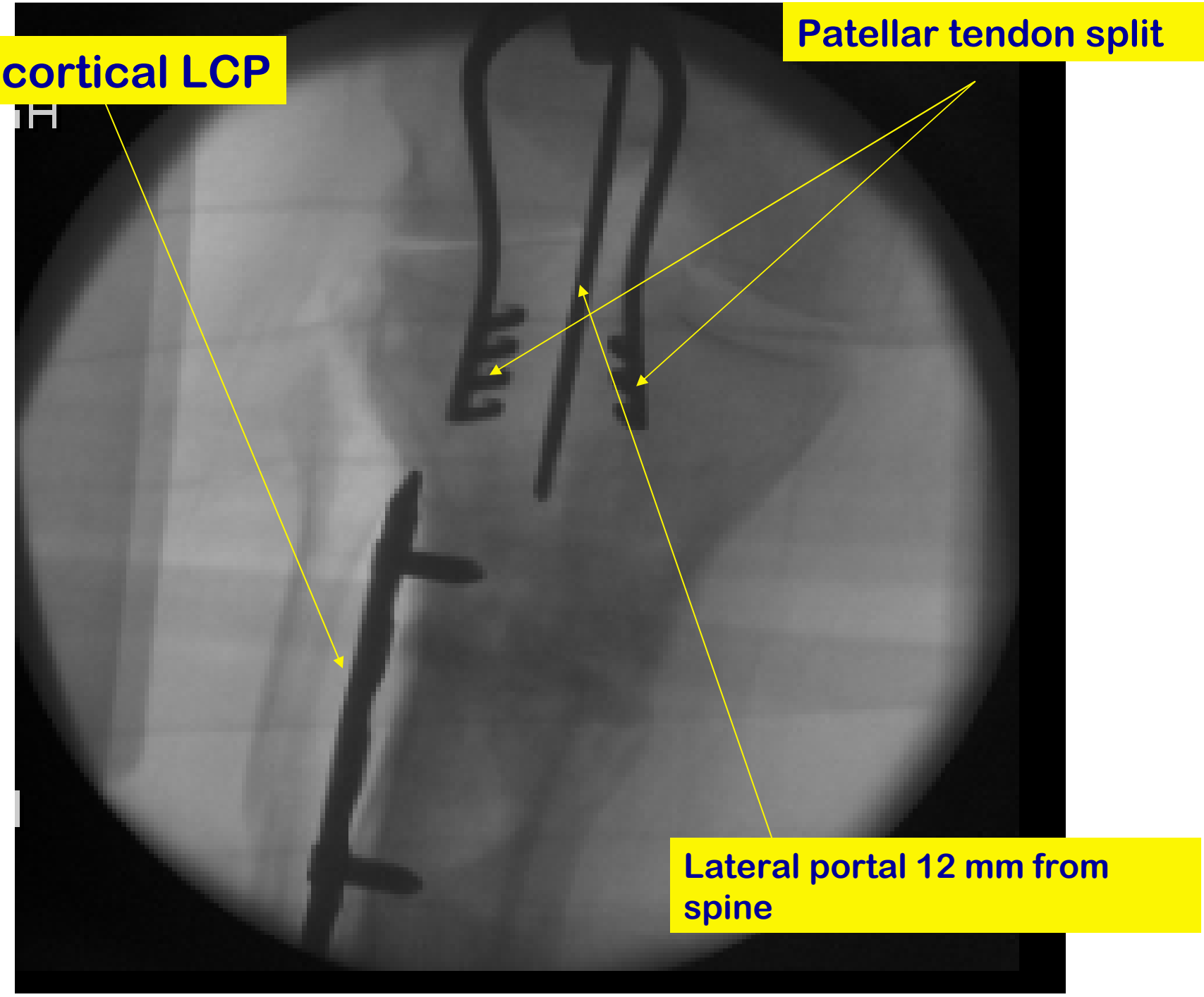


Poller screws or blocking screws

Proximal tibial fractures

- Poller screws
- Bicortical screws prior to introduction of nail
- Med-lat screw into post half of prox tibia
- AP screw acts as lateral cortex
- Use proximal locking screws from the nailing set

Krettek et al MHH Hannover


Unicortical LCP
Patellar tendon split
Lateral portal 12 mm from spine

Question

In open tibial #s, what is the effectiveness of
ExFx, Plating, UTN,RTN on:
Non-union
re-operation
Infection

Tibial shaft fractures

Outcome	UTN	ExFx
Re-operation	20%	37%
Non-union	16%	24%
Deep infection	10%	16%

Bhandari JBJS Am 2001

Review of open tibial fractures

- Literature from the last 2 decades
- ExFx 13 papers 536 patients
- UTN 17 papers 666 patients
- RTN 4 papers 187 patients
- ExFx Vs UTN 4 papers RCT 296 patients

Giannoudis JBJS Br 2006

Methd	Union	Del U	Mal U	Infect	Re-op	BGraft
ExFx	94	24	20	16	68	46
UTN	95	22	10	7	33	14
RTN	97		6	6	32	15
ExFx+ RTN	92	14	11	17	23	17
Plate	100	38	4	35	69	42

Giannoudis JBJS Br 2006

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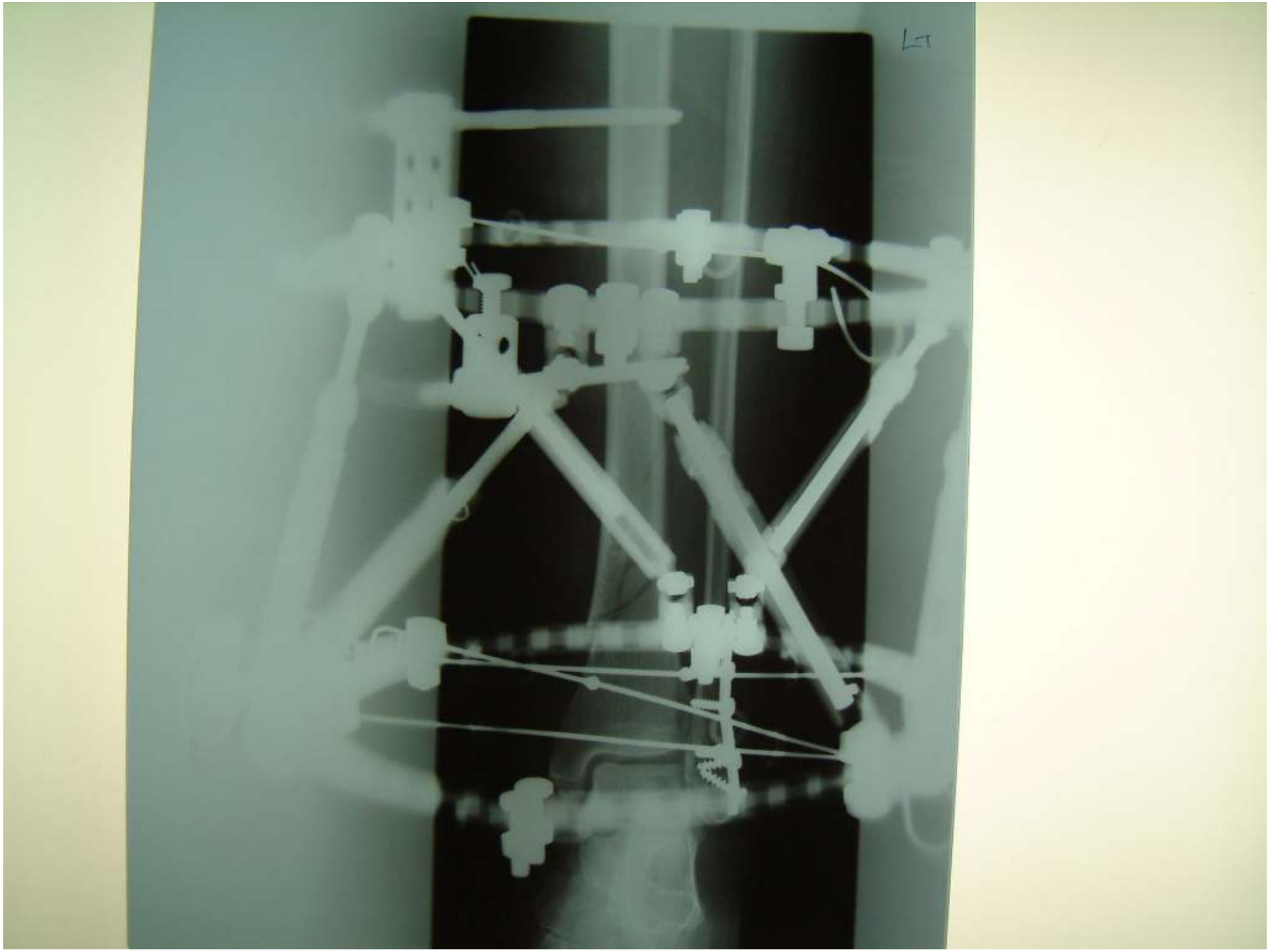


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