Primary and revision ACL reconstruction using the quad tendon

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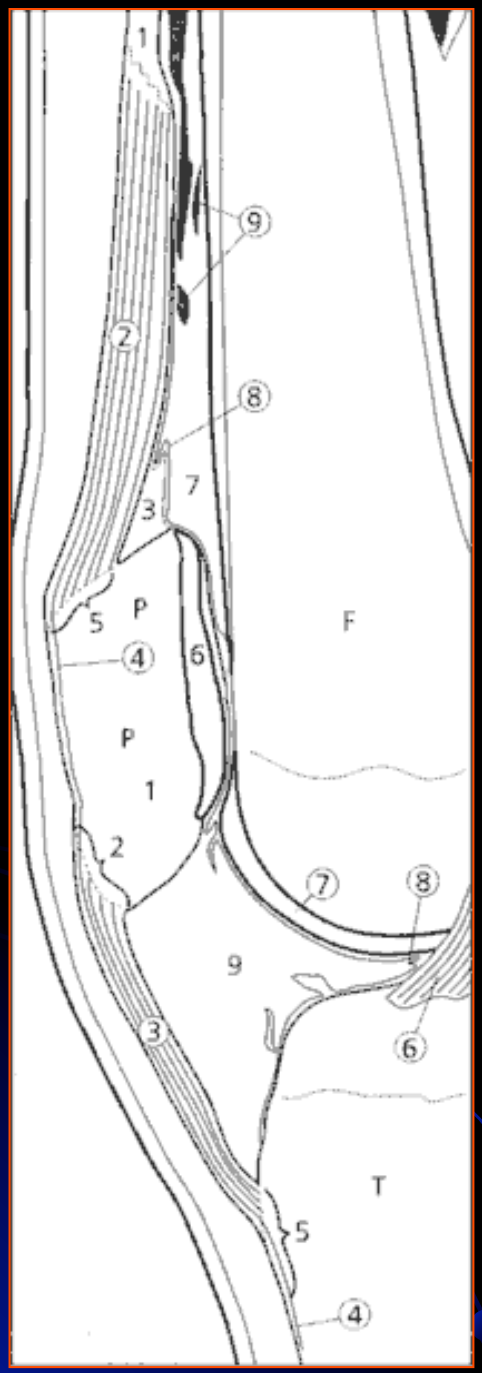
Graft Options in ACL Reconstruction

- ✓ Autograft – BPTB, QHT, Quadriceps
- ✓ Allograft – BPTB, Achilles Tendon
- ✓ Xenograft – Bovine
- ✓ Synthetic Grafts – Prosthetic Ligament, Ligament Augmentation Device, Scaffold
- ✓ Tissue Engineering– Future of ACL reconstruction



The Quadriceps Tendon

- ✓ consists of four leaves
- ✓ the anterior most layer coalesces to form prepatellar retinaculum
- ✓ inserts into anterior half of patellar base

STÄUBLI H.U. et al., Quadriceps tendon and patellar ligament : cryosectional anatomy and structural properties in young adults. *Knee Surg Sports Traumatol Arthrosc*, 1996,*4 :* 100-110

The Quadriceps Tendon Autograft

	Quadriceps	Patellar Tendon
Mean CSA	64 mm^2	37 mm^2
	50% more collagen	
UTF	2173±618 N	1953±325 N

The Quadriceps Tendon Autograft

- Thicker
- Stronger
- Stiffer

- Unknown morbidity
- No fixation method biomechanical studies
- A few published studies


The quad tendon for
primary ACL reconstruction

Time period: *March 2004 – March 2005*

Patients: 38, *male, aged 19-34 years*

Reason for reconstruction: *chronic ACL deficiency*

Procedure: *Arthroscopic ACL reconstruction*

Graft type:	QTA without (27) and with (11) patellar bone block
Mean follow-up:	*28 months*
Rating scales:	*IKDC,* *Lysholm-Tegner*
Knee laxity evaluation:	*KT-1000*

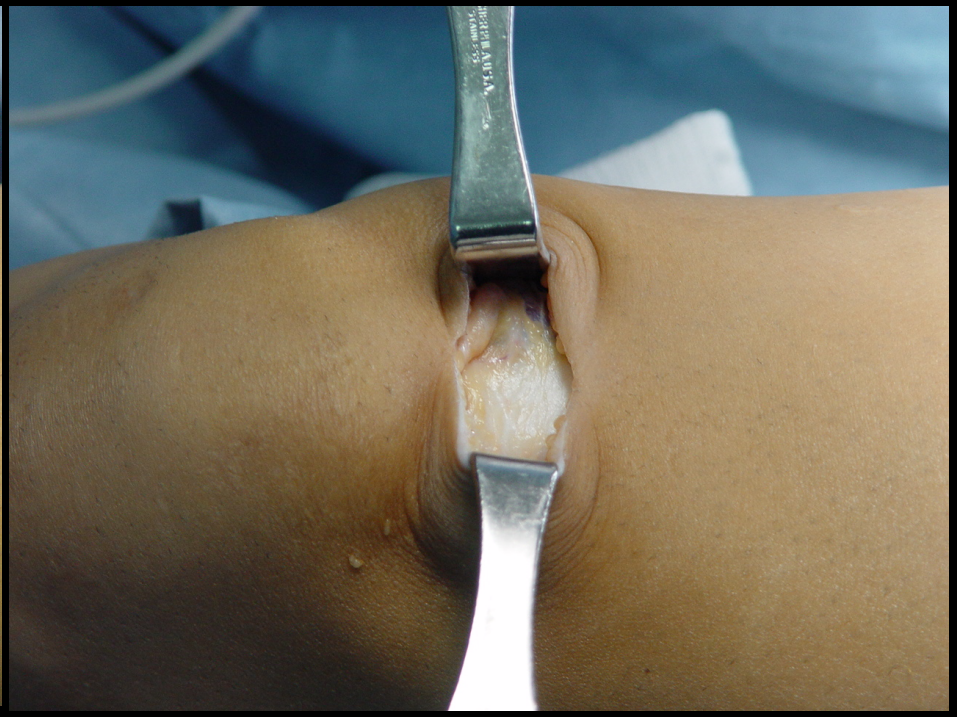
Surgical Technique

E. Antonogiannakis, C.K. Yiannakopoulos et al.

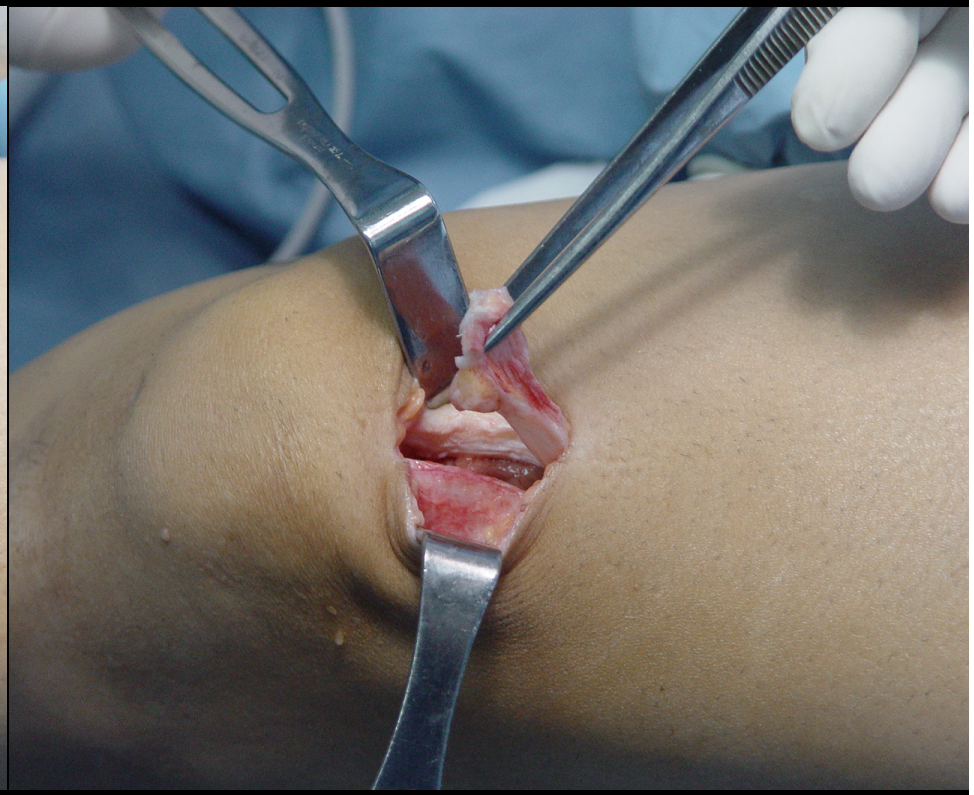
Arthroscopic anterior cruciate ligament reconstruction using the quadriceps tendon autograft and bioabsorbable cross-pin fixation

Arthroscopy, 2005 Jul;21(7):894

Q Tendon Harvesting



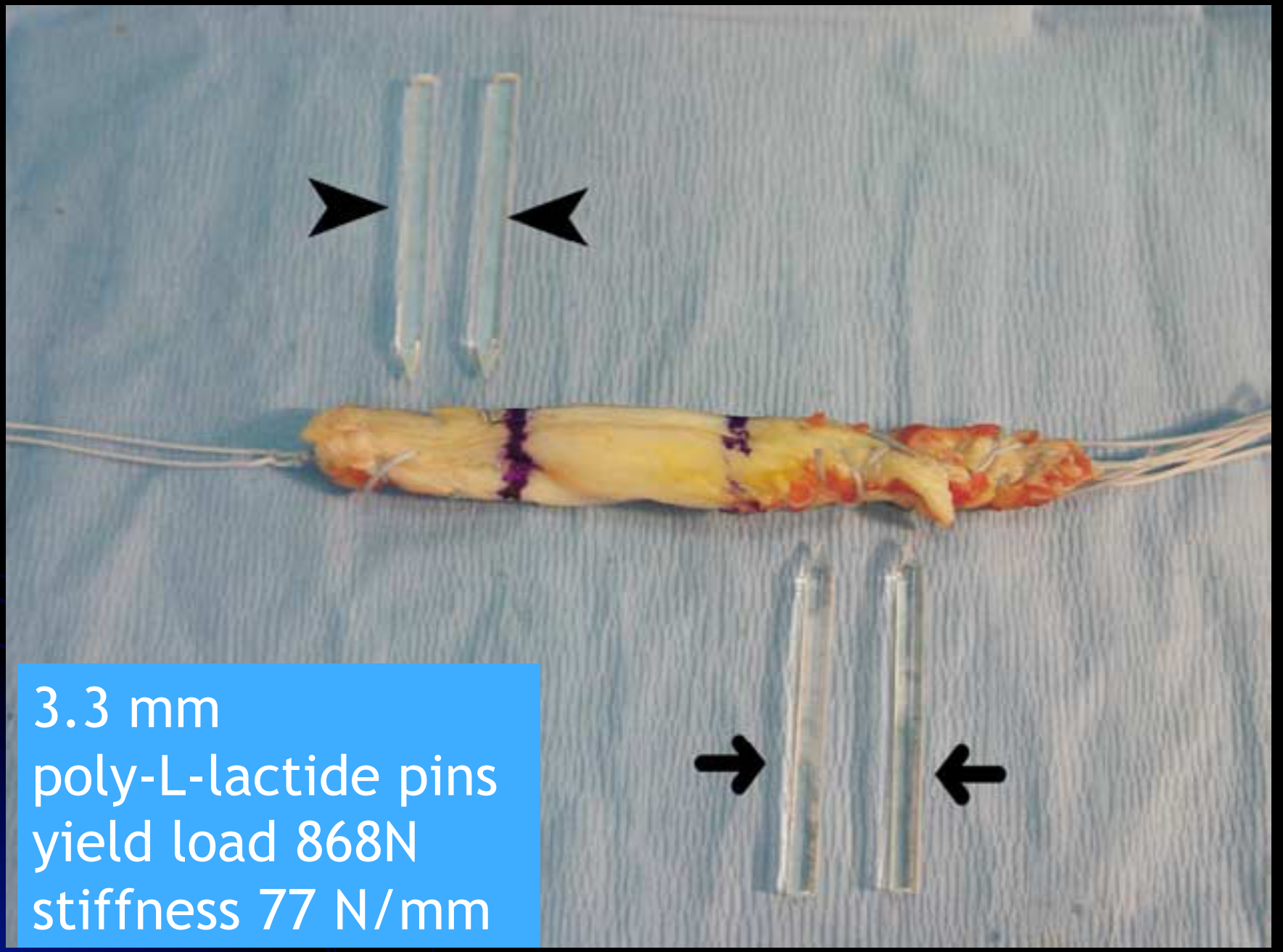
Q Tendon Harvesting

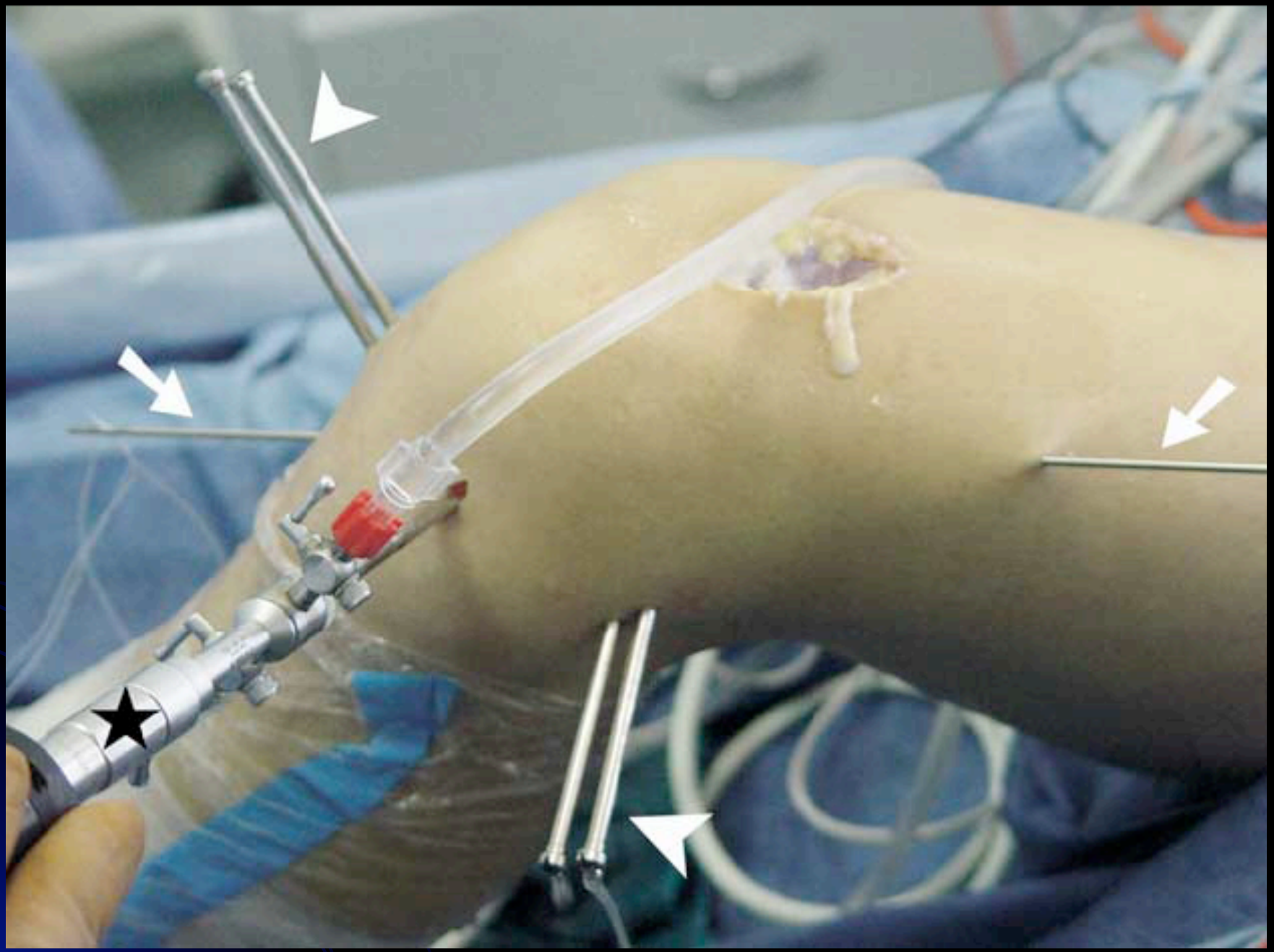


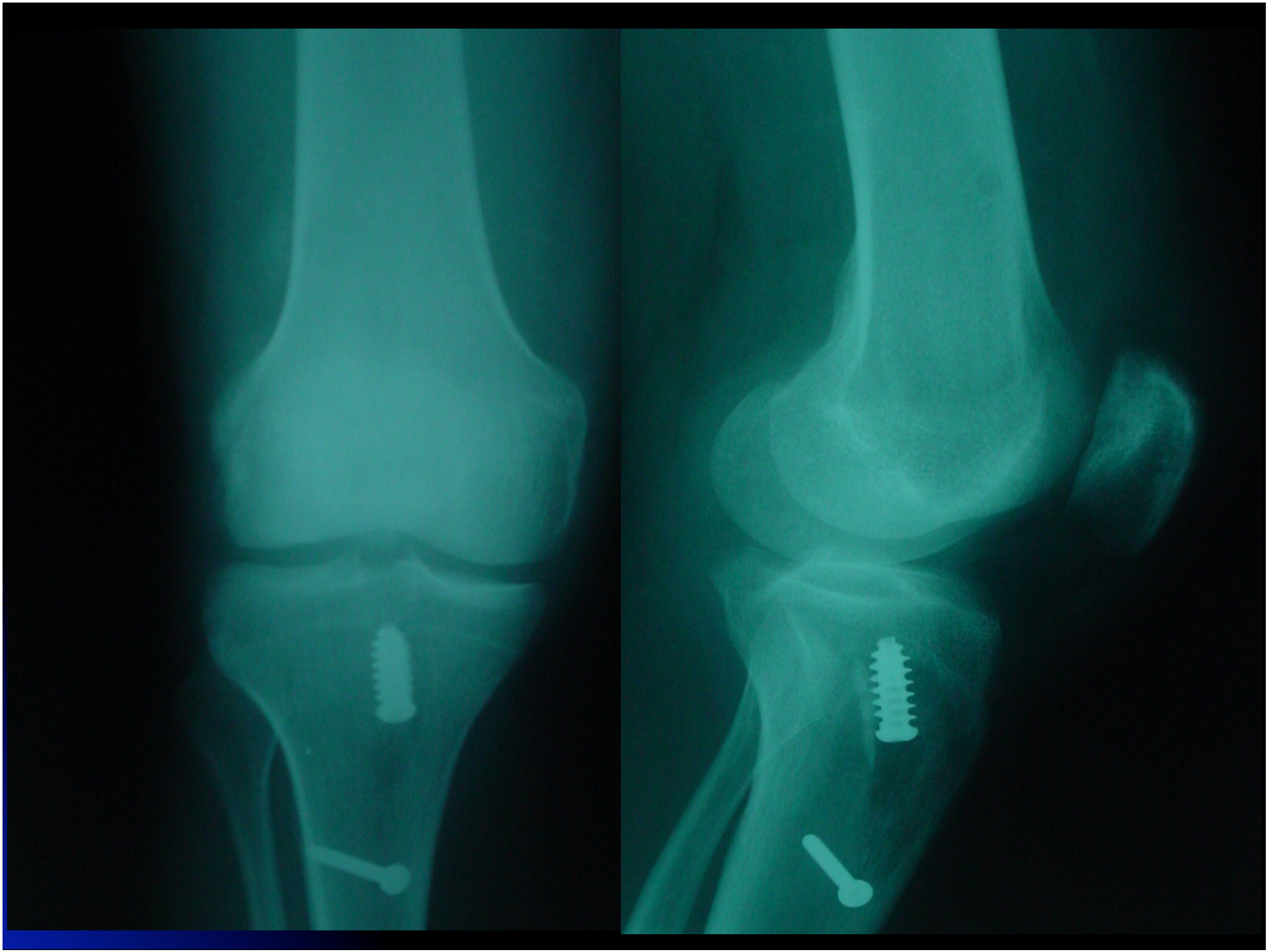
Q Tendon Dimensions

- 10 mm wide
- 8 mm thick
- 8-9 cm long

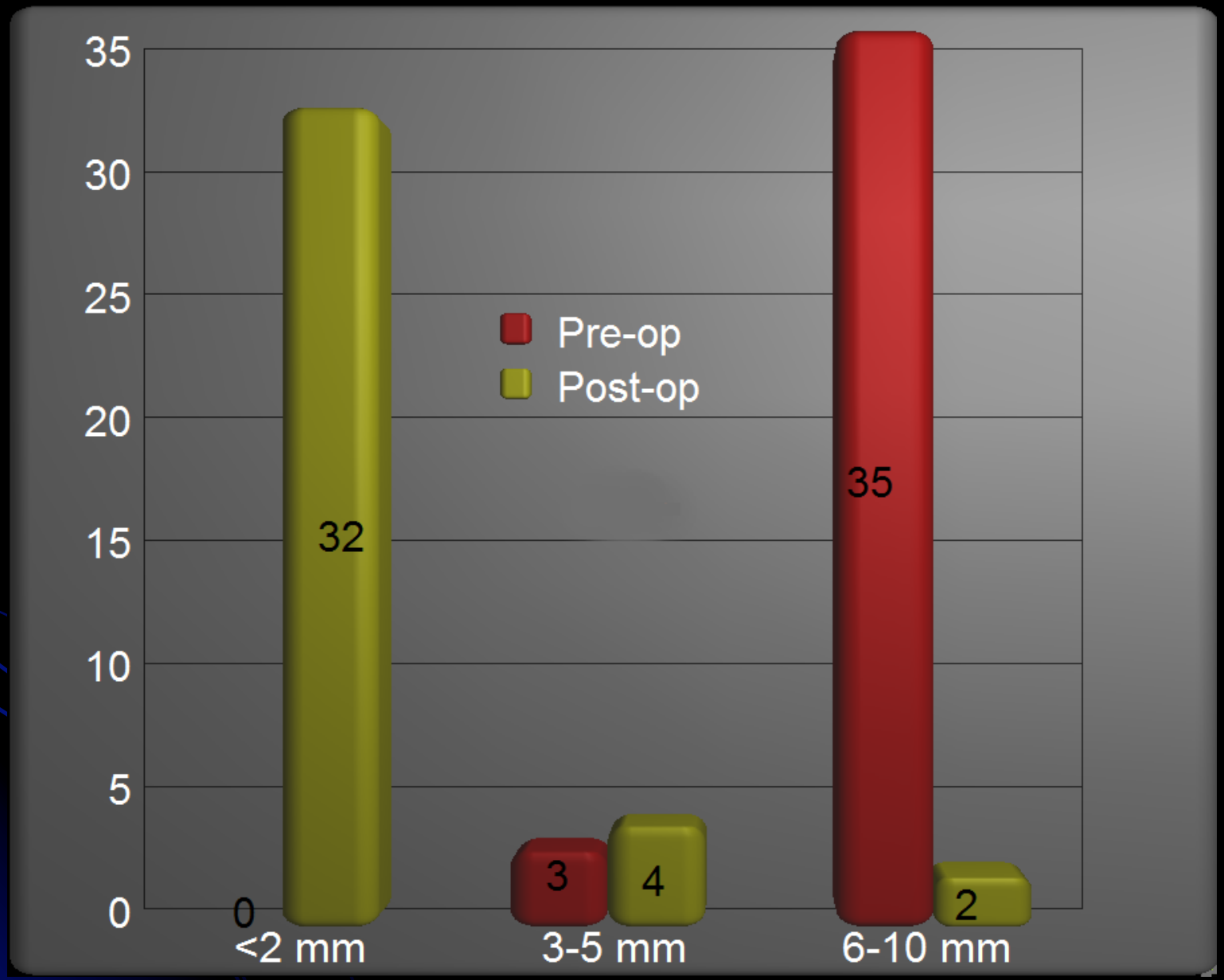
Closure of the Defect


3.3 mm
poly-L-lactide pins
yield load 868N
stiffness 77 N/mm

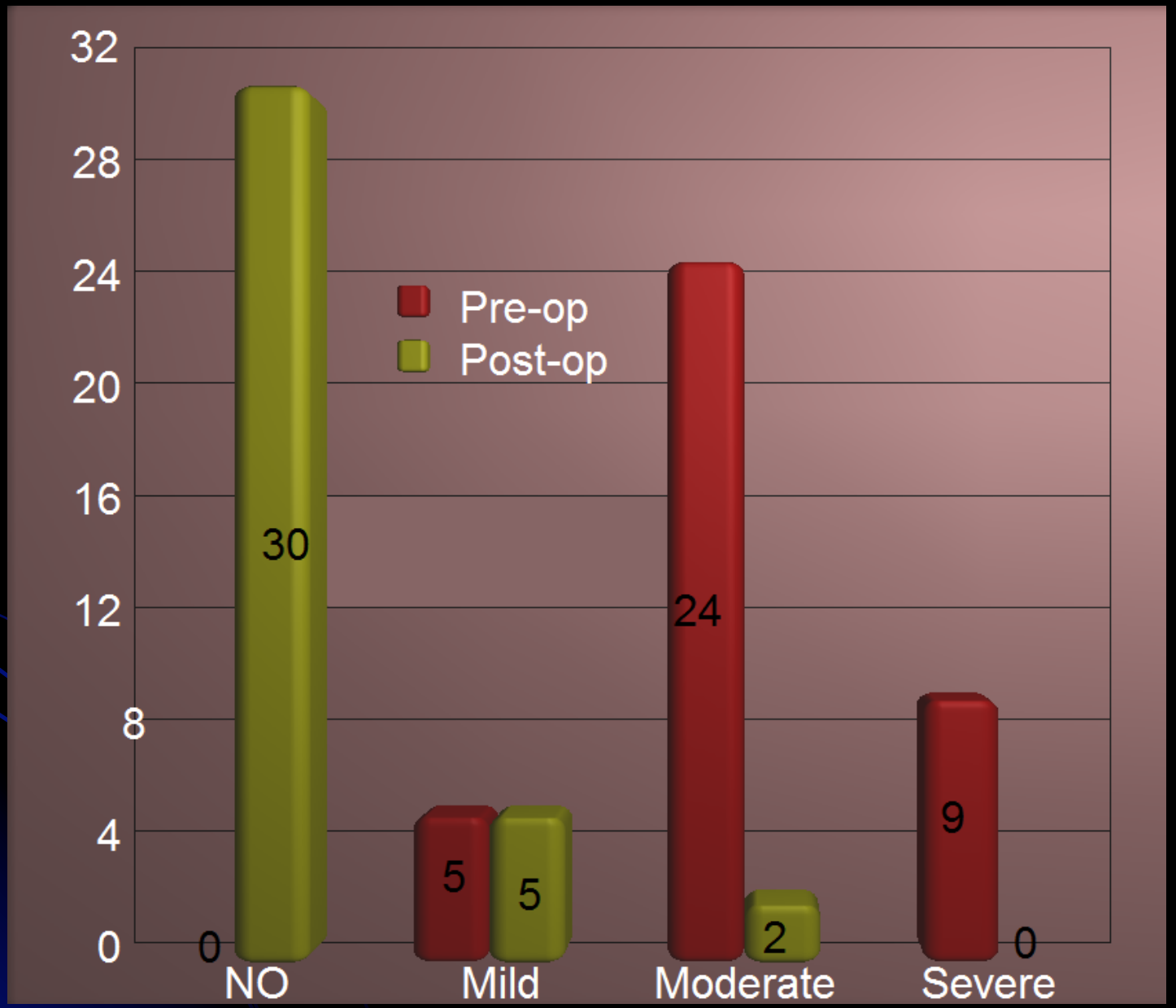




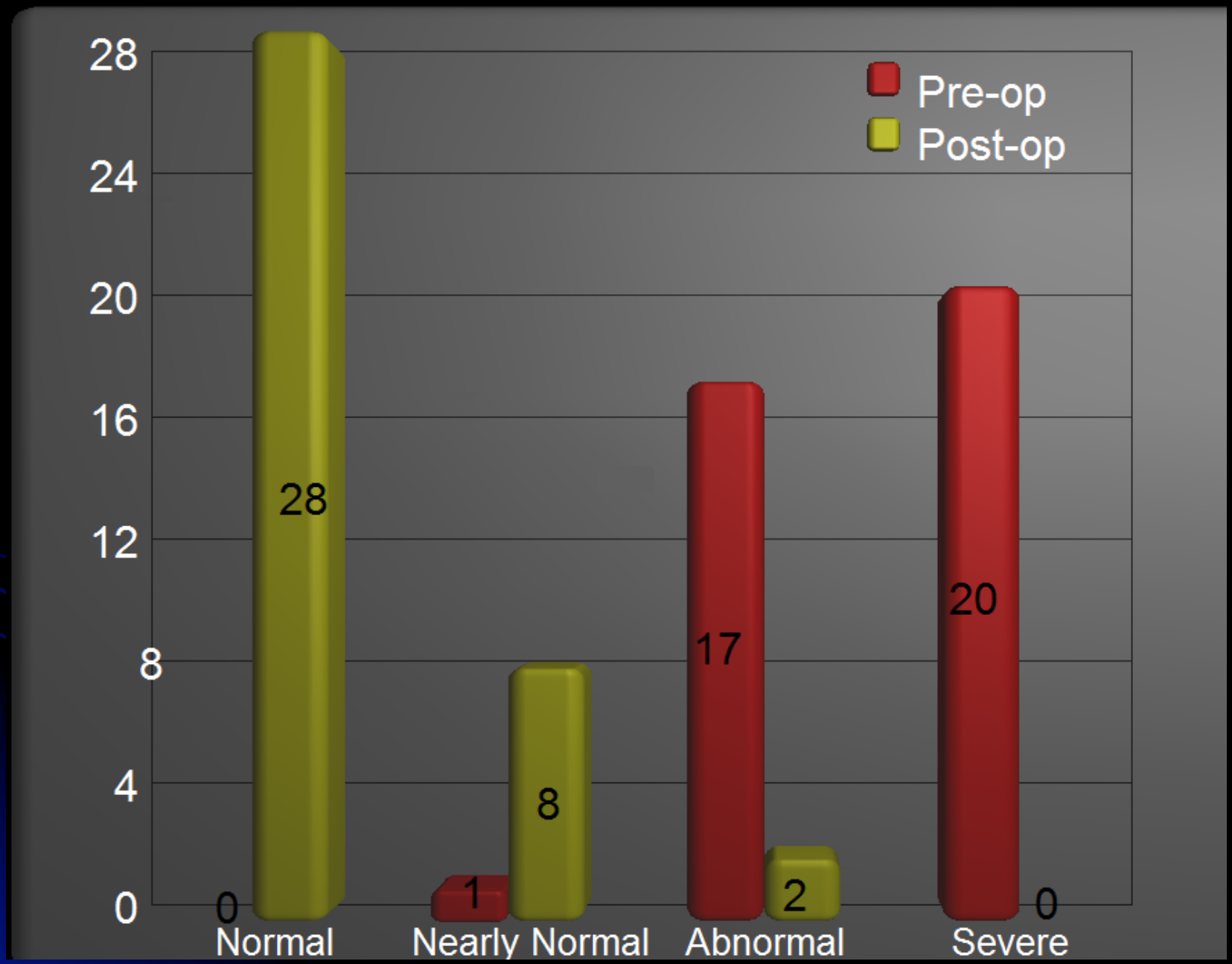
KT-1000 Data



Pivot Shift


32
28
24
20
16
12
8
4
0
Pre-op
Post-op
30
0
5
5
24
2
9
0
NO
Mild
Moderate
Severe

Knee Function Assessment and Overall Score




The quad tendon for
revision ACL reconstruction

Revision ACL Surgery

C.K. Yiannakopoulos et al.

Revision anterior cruciate ligament surgery using the over-the-top femoral route.

Arthroscopy, 2005 Feb;21(2):243-7

Problems at Revision ACL Replacement

- poor placement of the graft leading to impingement
- anteriorly placed femoral tunnel
- inappropriate graft length with loss of motion
- tunnel enlargement needing bone grafting
- removal of metal fixation devices ± bone grafting
- staged procedures

- 22 young male patients
- Av. Age at follow up: 32 years
- recurrent symptomatic knee instability following primary ACL surgery
- 3 types of soft tissue grafts were used at the index operation

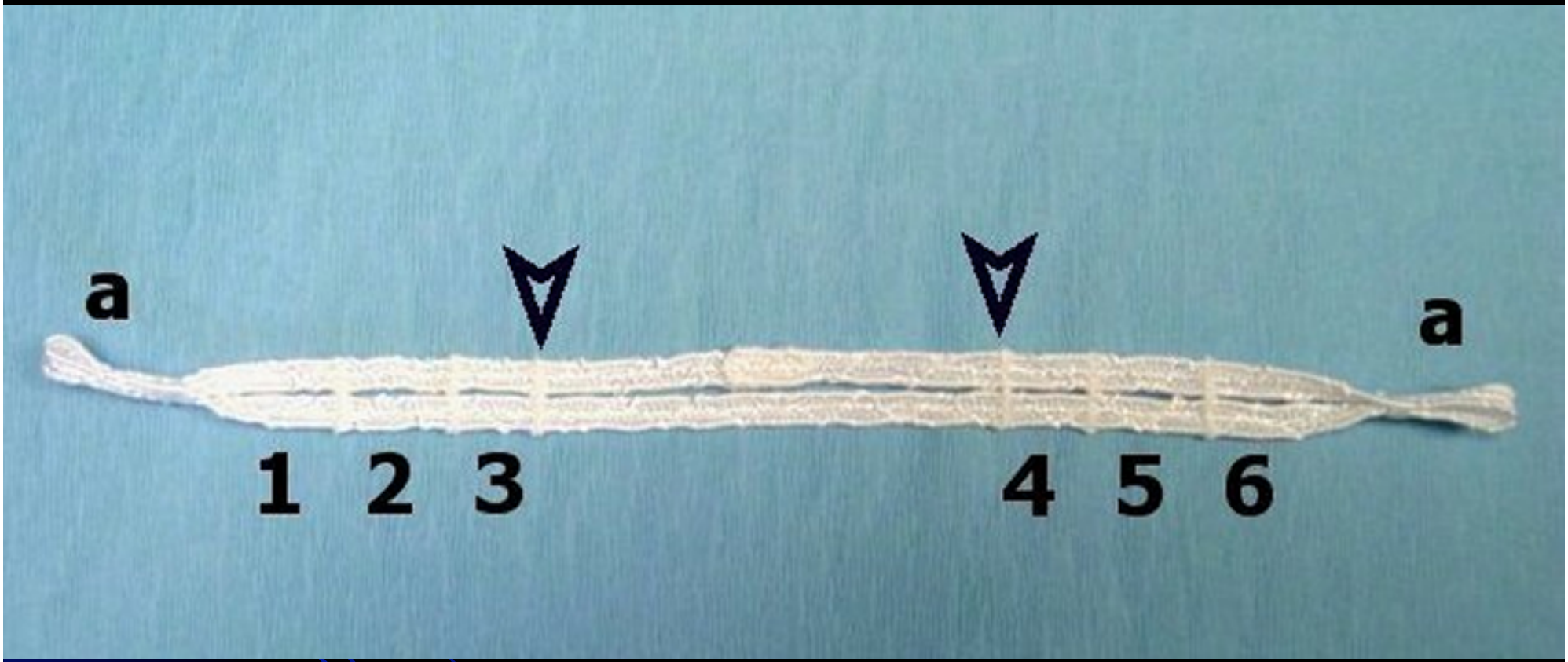
  (hamstrings, BPTB, Synthetic ligament)

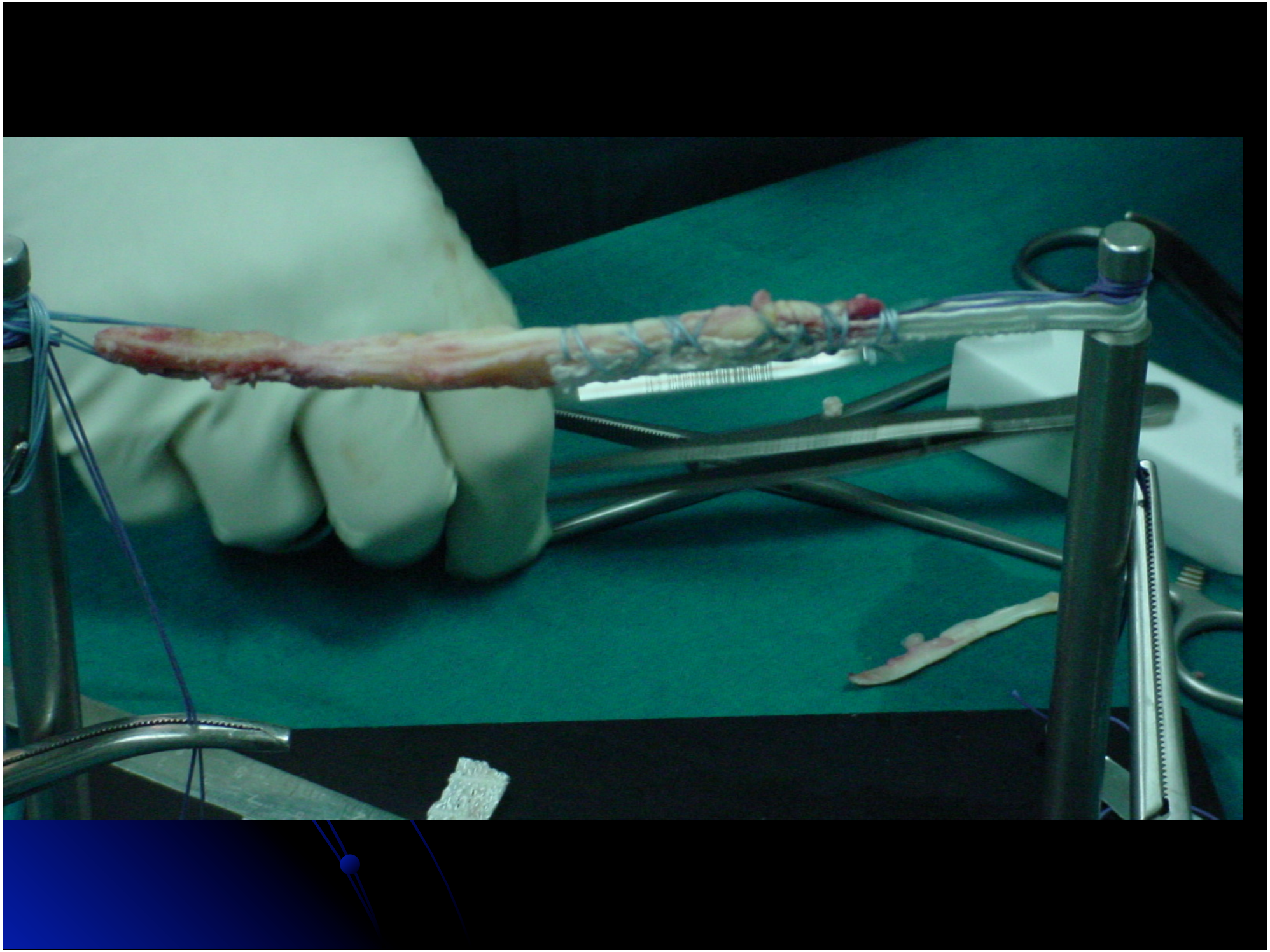
Surgical Technique

- Quad tendon autograft with a bone block
- double Incision arthroscopically guided operation
- polyester Soffix Complex
- impingement-free tibial tunnel with Mayday Jig
- over the top femoral route

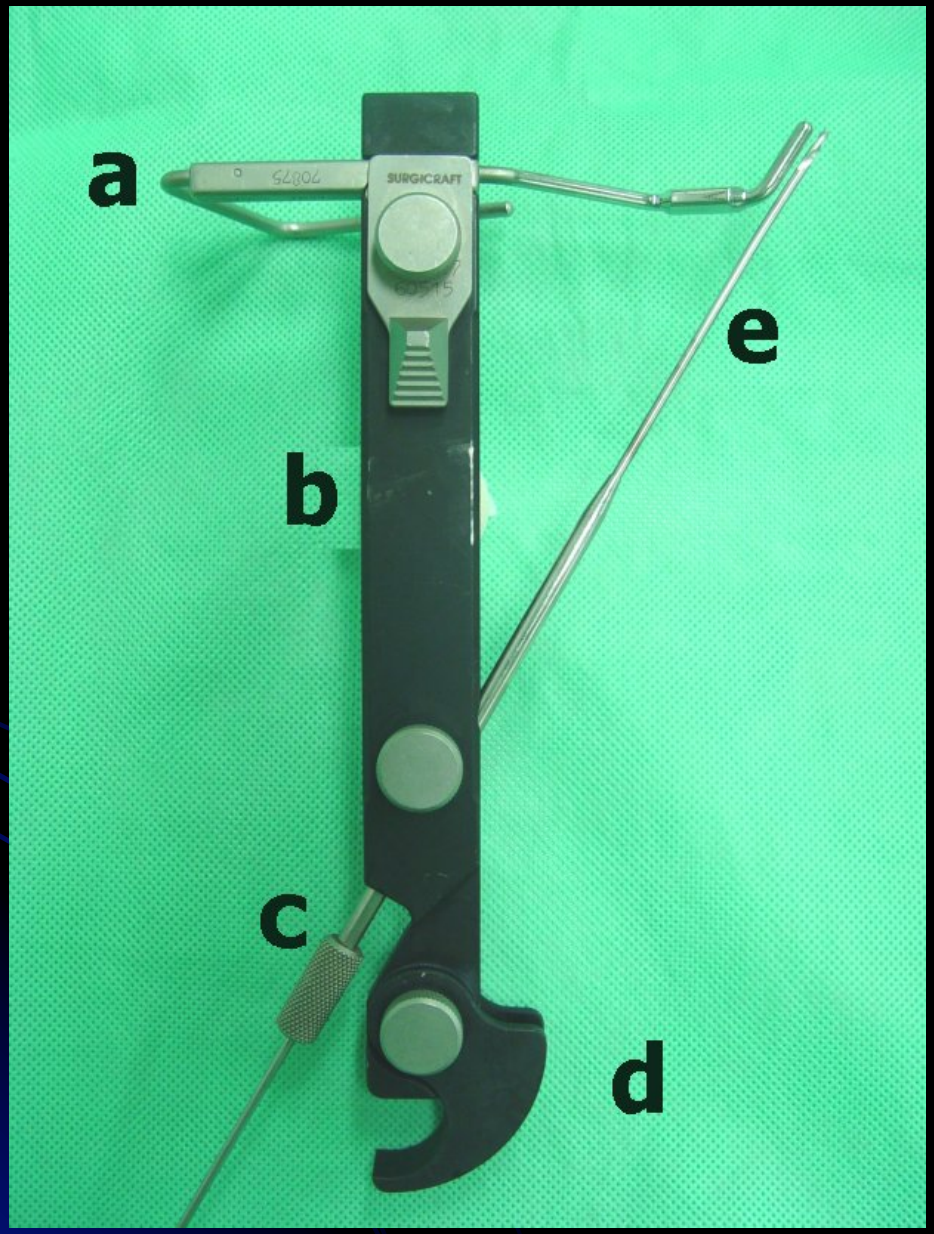
Failed Synthetic ABC Ligament

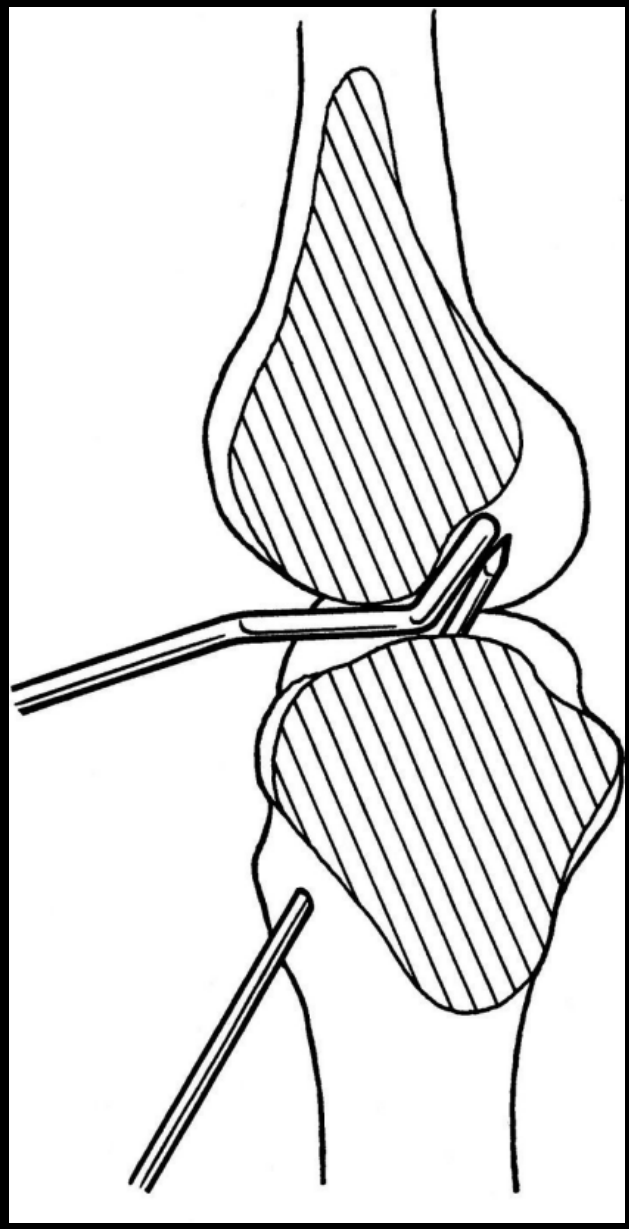
Buttonhole Soffix



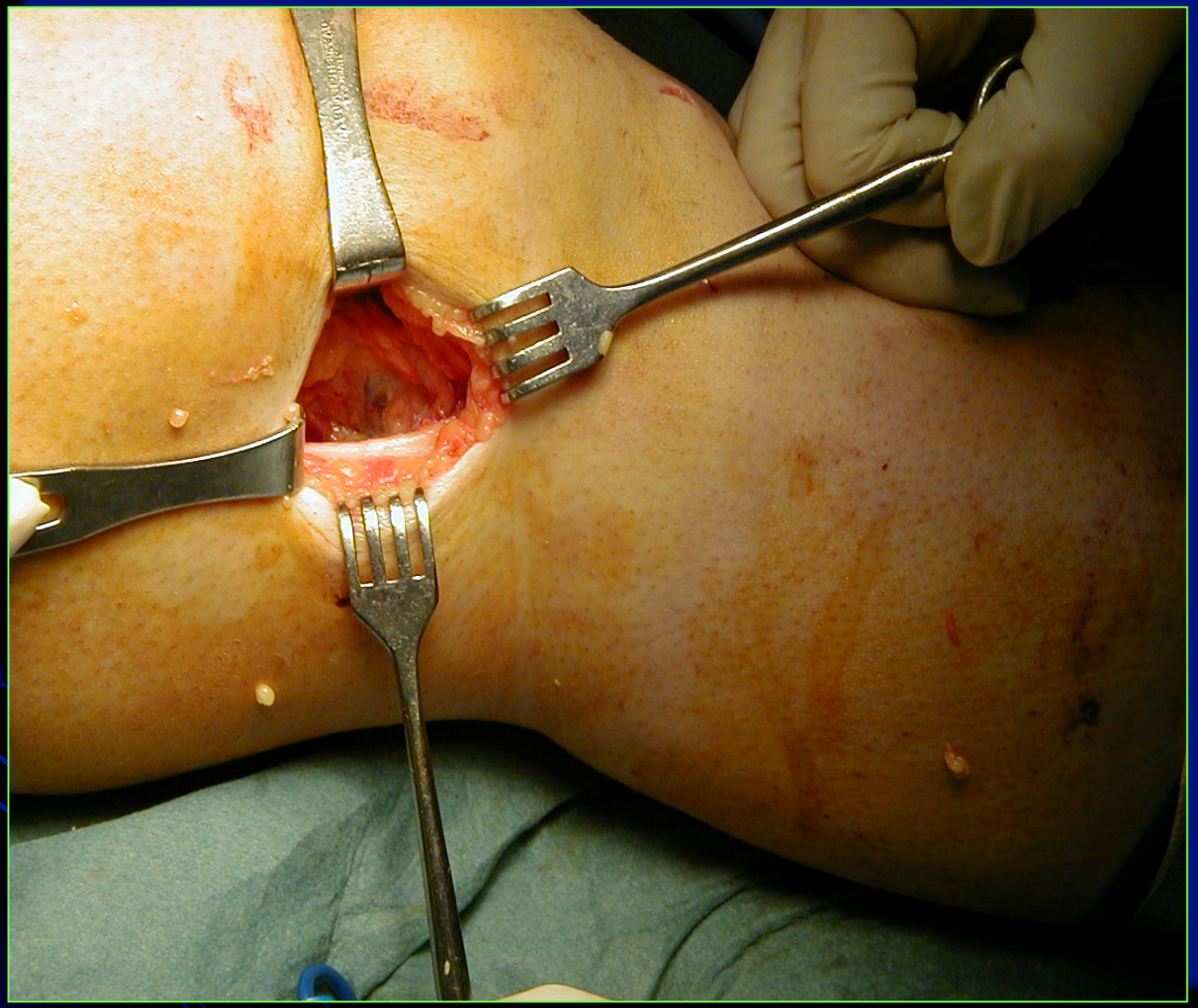


The Mayday Rhinohorn Jig





The Over-the-Top Femoral Route

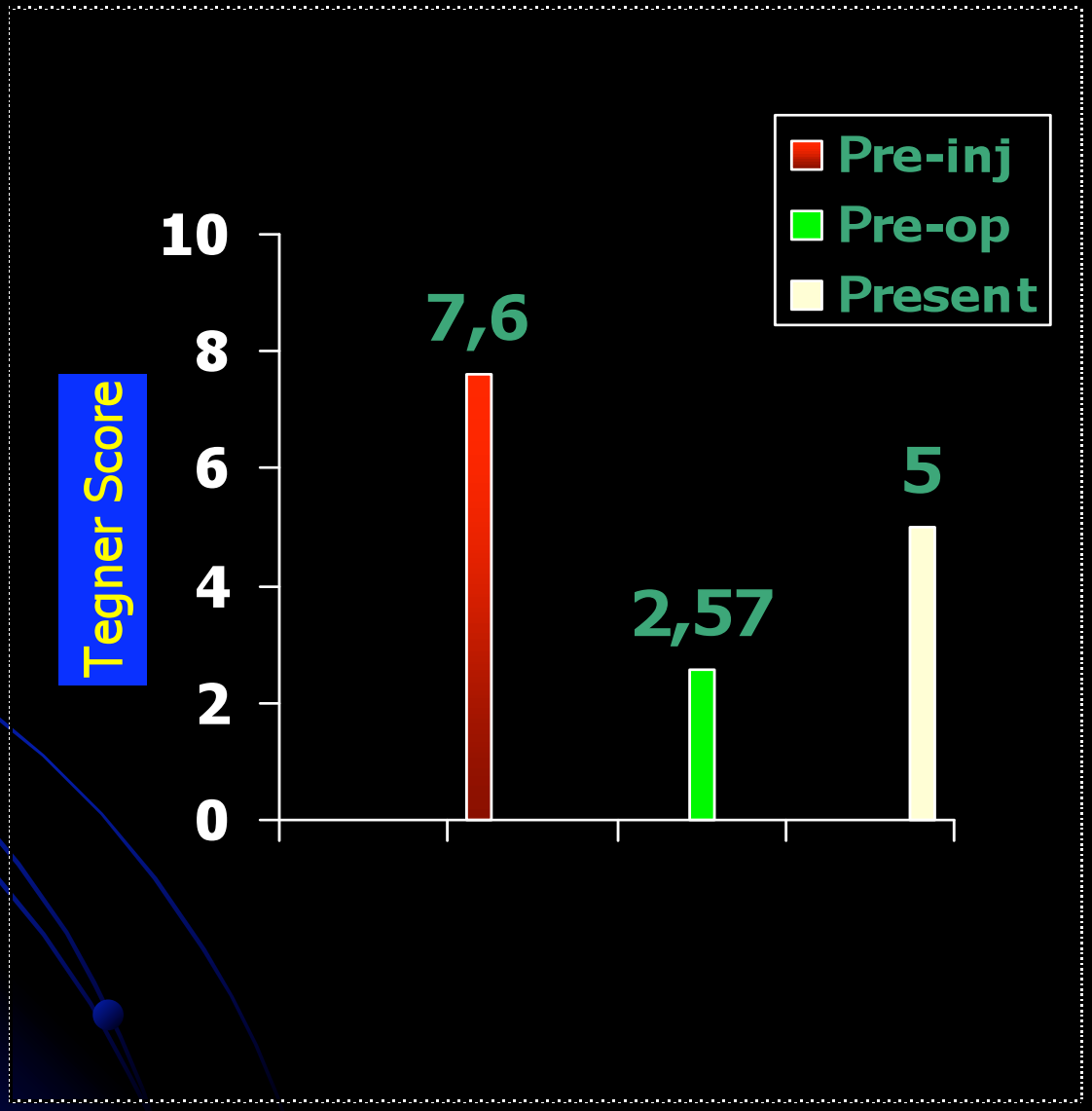


Range of Knee Motion

- ✓ loss of flexion >10° — 5 patients
- ✓ loss of extension >5° — 2 patients
- ✓ deep infection — 1 patient

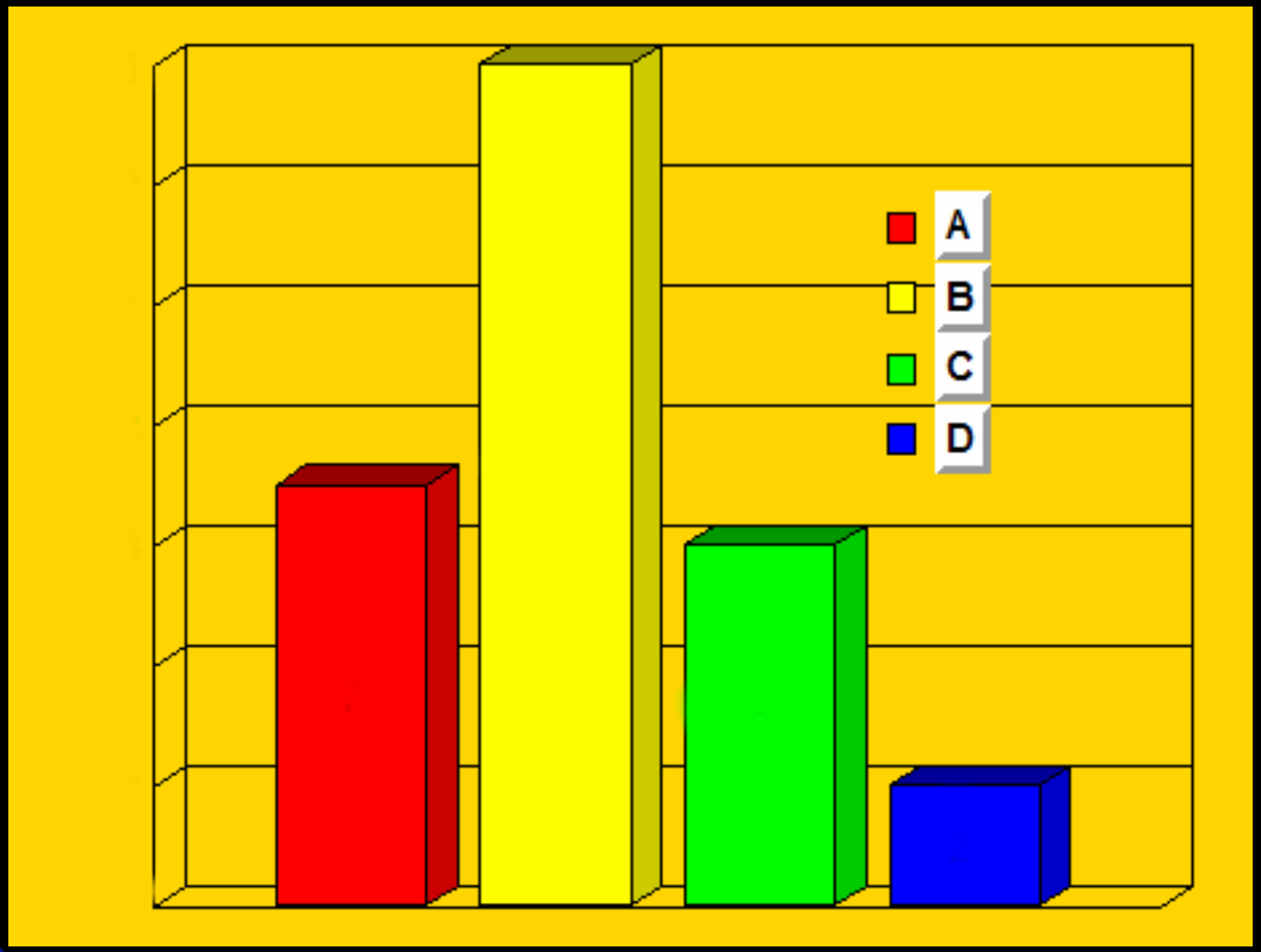
Follow Up: 19 - 33 months

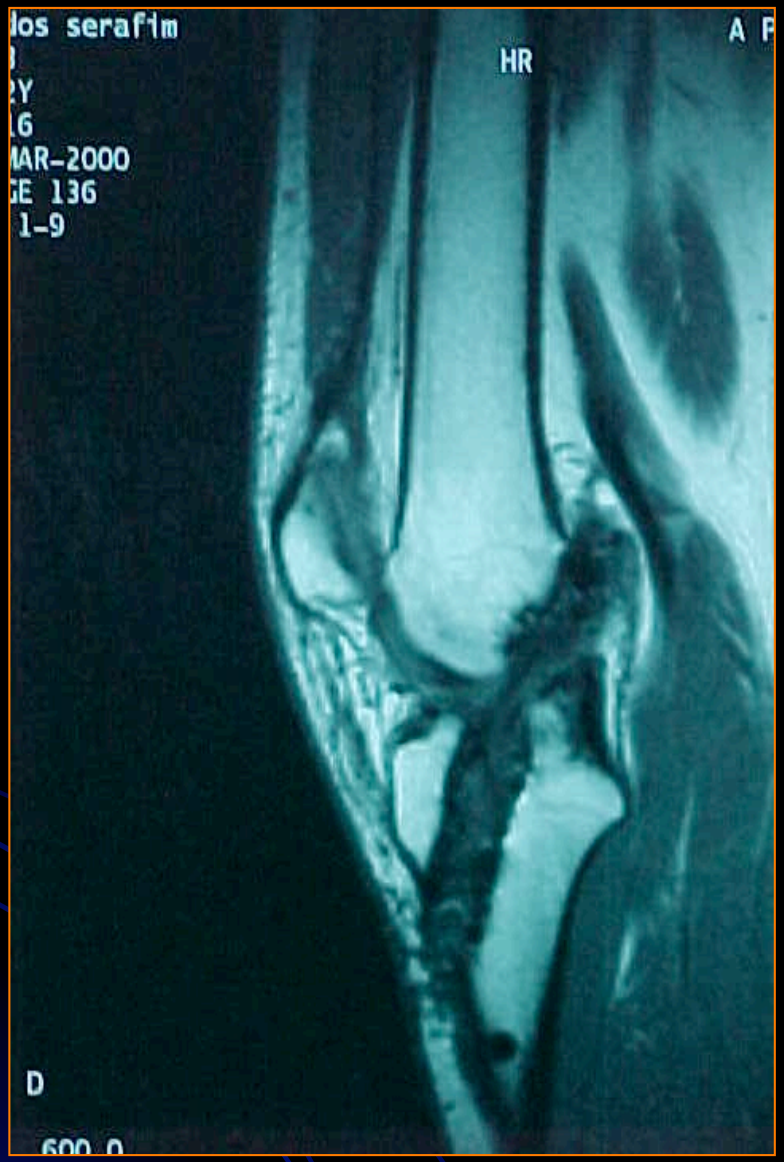
KT-1000: 4.18 mm

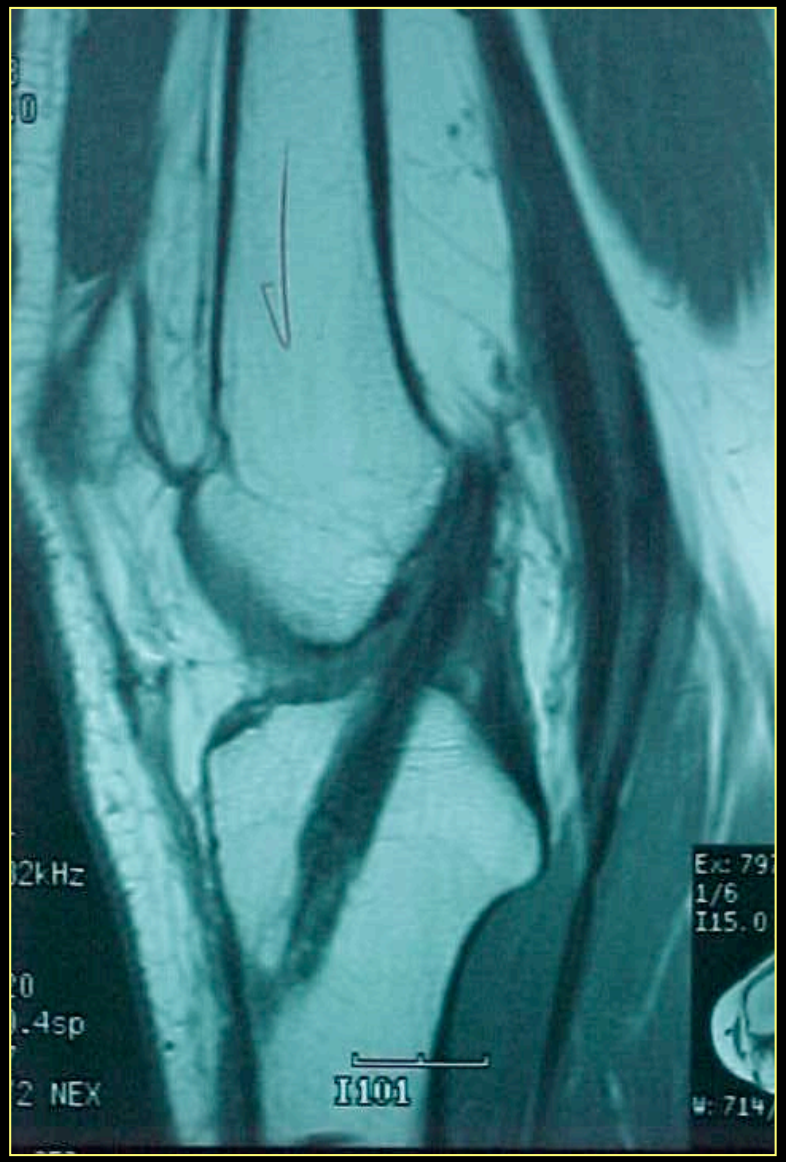


IKDC Scale

A Normal
B Nearly normal
C Abnormal
D Severely abnormal




los serafim
HR
A P
MAR-2000
GE 136
1-9
D


2kHz
.4sp
2 NEX
I101
1/6
I15.0

QTA Morbidity

- local pain and scar tenderness was evident in the QTA group for at least 10 weeks
- the range of painless motion after 2 and 4 weeks was less in the QTA group compared to the hamstring group
- after 4 and 12 months there was no difference

QTA Autograft

Advantages

- easy to harvest
- with or without a patellar bone block
- adequately thick to accommodate an expanded tibial tunnel in revision surgery

Disadvantages

- postoperative quadriceps weakness?
- no track record to date
- under-reported donor-site morbidity
- additional skin incision
- lack of long-term clinical studies
- scarcity of data regarding the biomechanical properties of the quadriceps tendon and its fixation methods


Athens
Sparta