Knee extensor apparatus ruptures: Directs sutures versus Augmentation

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Chirec Delta- BKC

Bruxelles

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Introduction

- Generalities
- Treatment options
- Augmentations
- Surgical strategy
- Algorithm

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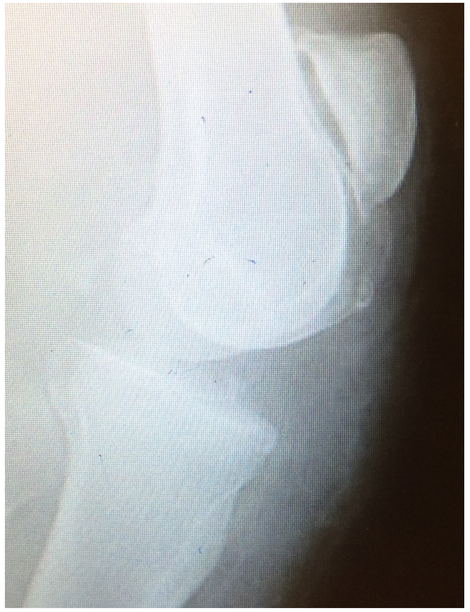
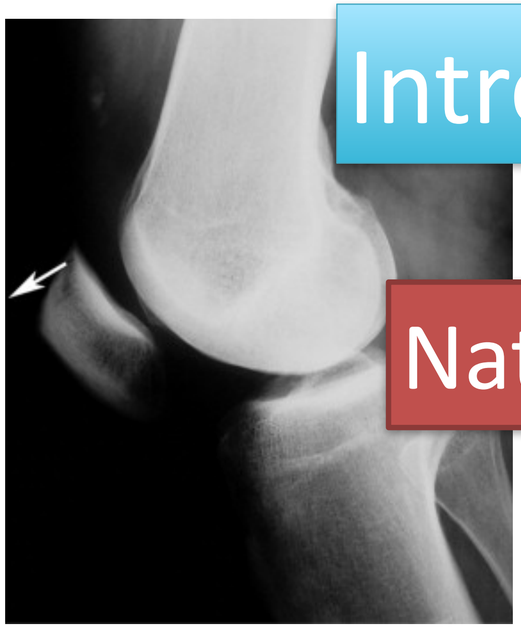
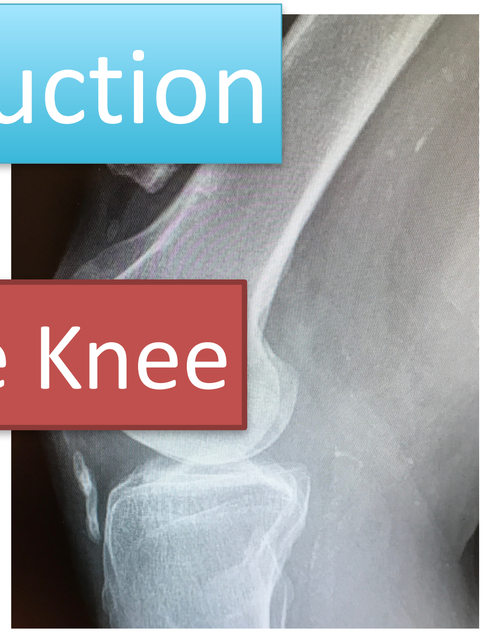
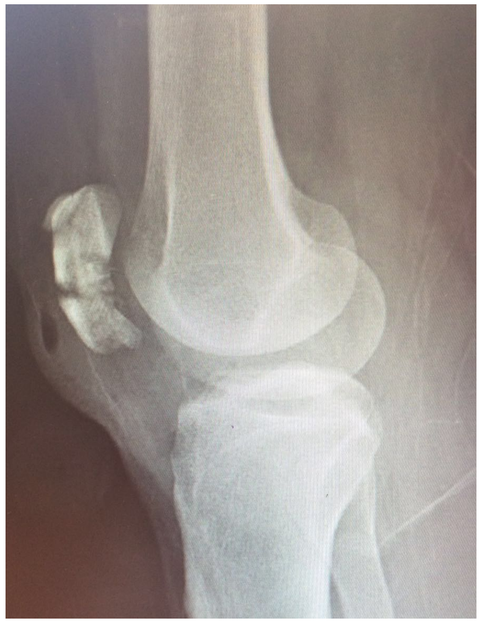
Introduction



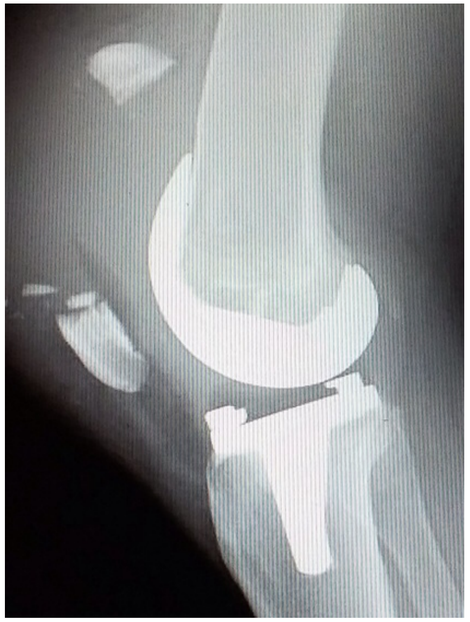


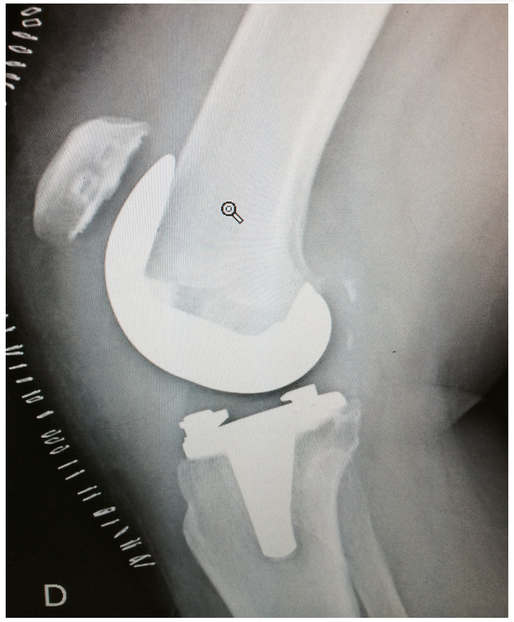
Native Knee



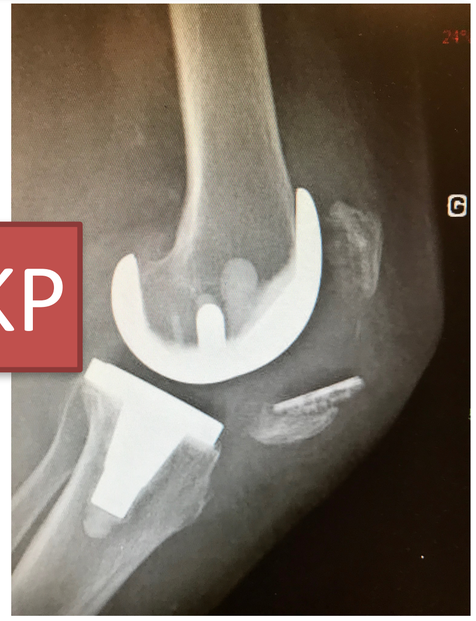


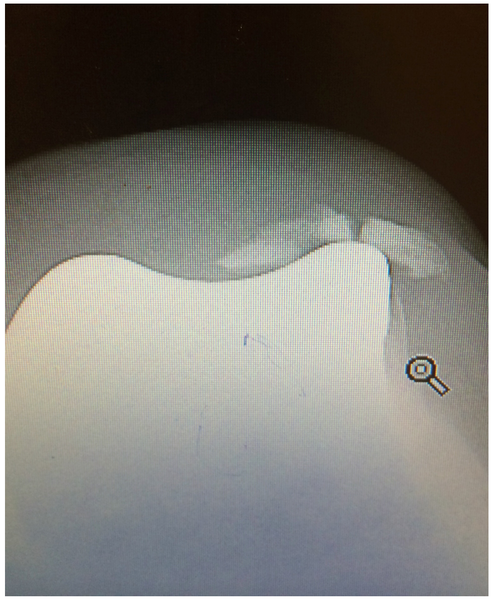
Extensor Mechanism Rupture





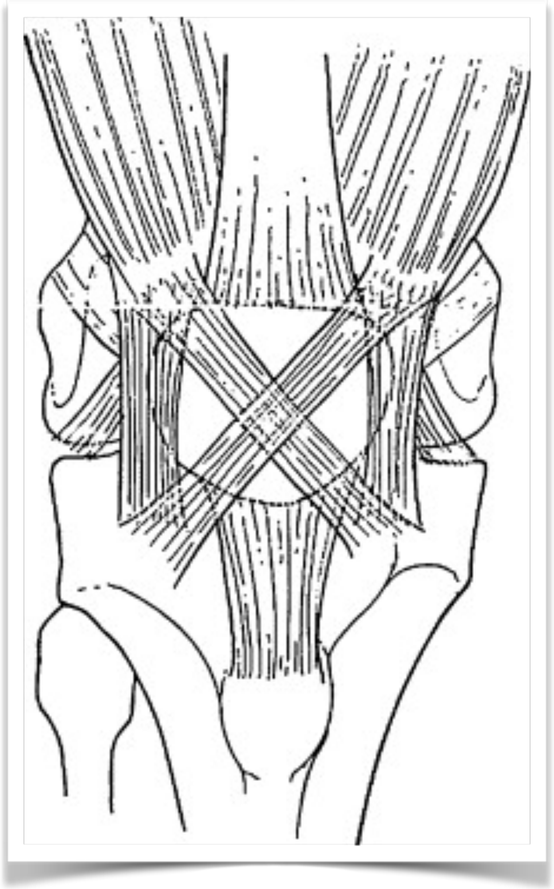
TKP

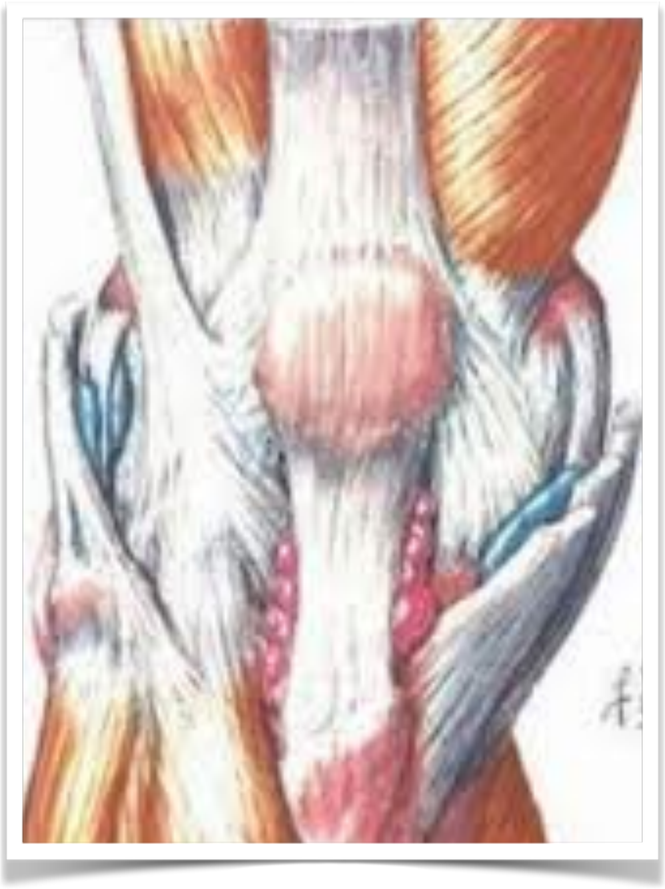




Anatomy

- Quadriceps tendon
- Patella tendon
- Patella
- Medial and lateral retinaculum





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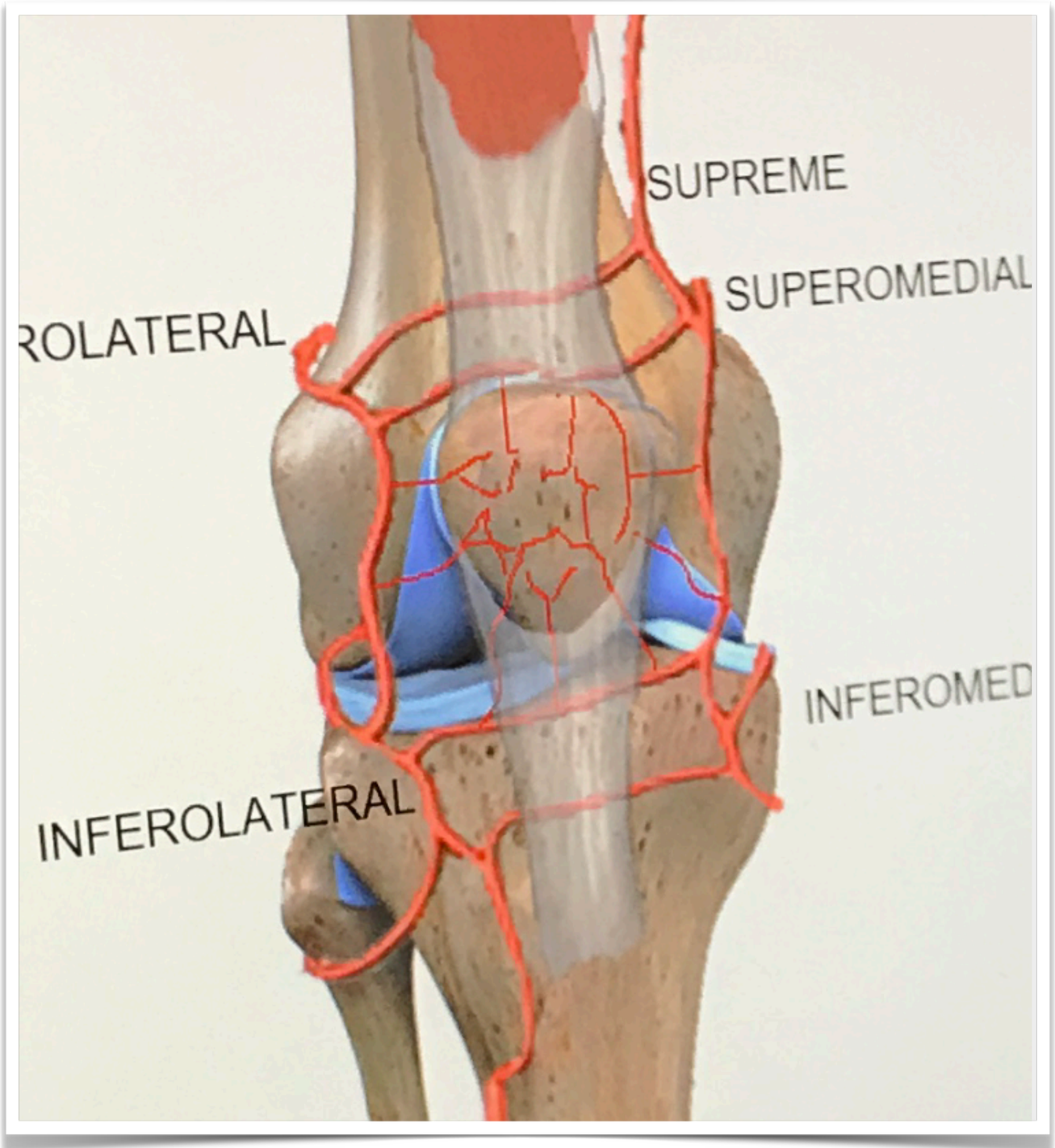

vascularisation

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Data's

	Quadriceps Tendon	Patella Tendon	Patella fracture
Epidemiology	1,37/100 000	0,68/ 100 000	13,1/100 000
Age	>40 years	<40 years	No difference
Mecanism	co-morbidities Medication	Sport accident chronic tendinitis	Trauma in flexion osteonecrosis

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Diagnostic

- History of fall or giving way

  High functional discomfort

  Instability

- **<u>Clinic:</u>** No active extension

  Palpable defect

- Xr and Ultrasound

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Treatment: Goals

- Restore active extension to 0°
- Restore the knee lock
- Correct flexion
- In case of fracture, anatomic reconstruction

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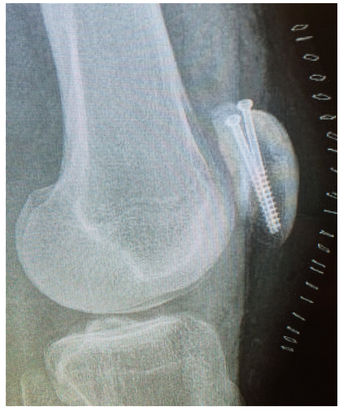
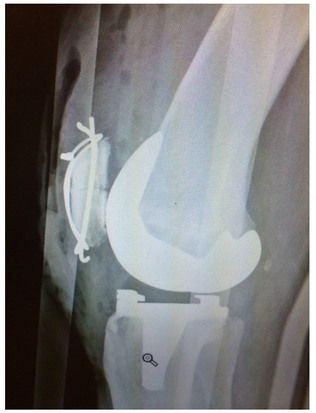
Treatment options

ORIF





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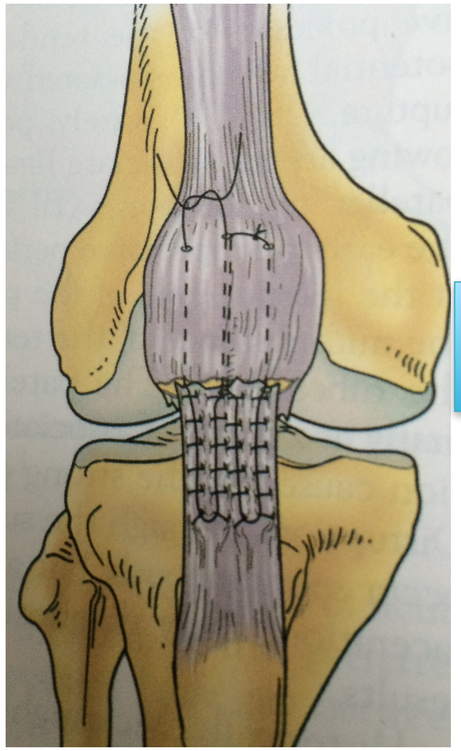
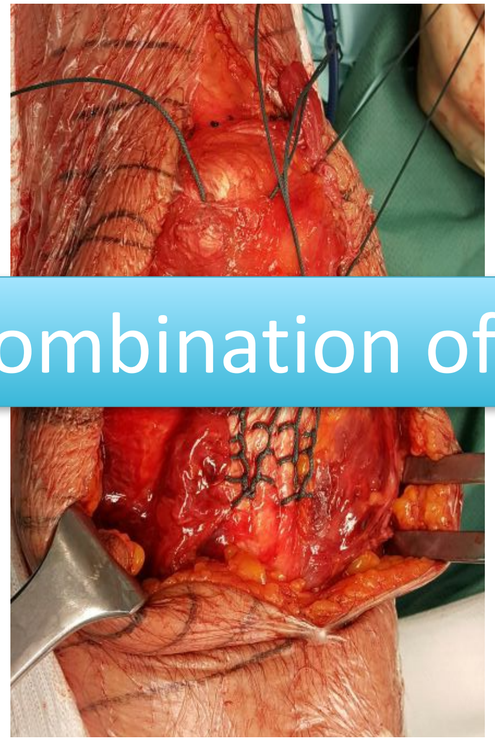
Direct suture

Augmentation





Combination of techniques

Non Biologic	Biologic
cable	Autogreffe: Semi-T
non resorbable suture	Allograft : - Achille tendon - Massive allograft
Tape synthetic	Finn transposition

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Literature

J Orthop Trauma. 2016 Aug;30 Suppl 2:S30-1. doi: 10.1097/BOT.0000000000000604.

Injury. 2017 Dec;48(12):2793-2799. doi: 10.1016/j.injury.2017.10.013. Epub 2017 Oct 16.

Comparison of adverse events and postoperative mobilization following knee extensor mechanism rupture repair: A systematic review and network meta-analysis.

- « Direct suture with an immobilisation in full extension is **not** anymore **<u>the gold standard</u>** »
- **<u>Consequences</u>**: muscle mass loss, stiffness, limited range of motion, very long rehabilitation period, additional complications (DVT, skin laceration,…)
- Immediate mobilisation in all repairs
- Augmented primary repair: best result

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Augmentation = Gold Standard

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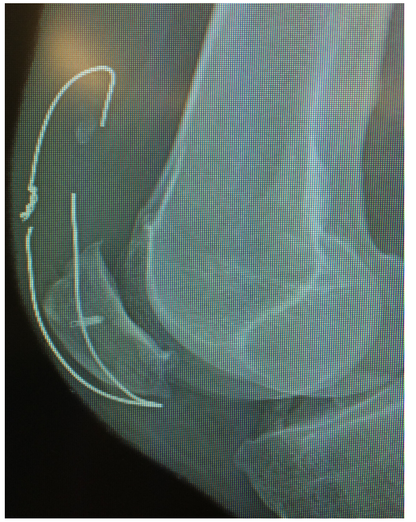
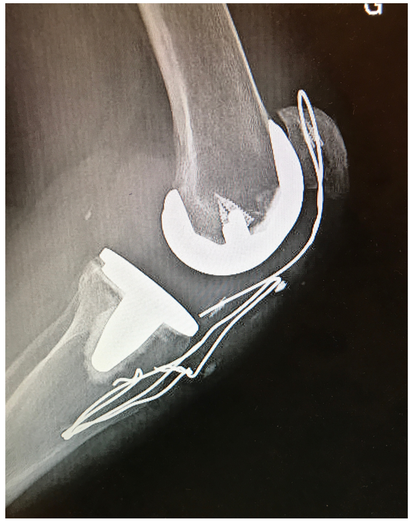
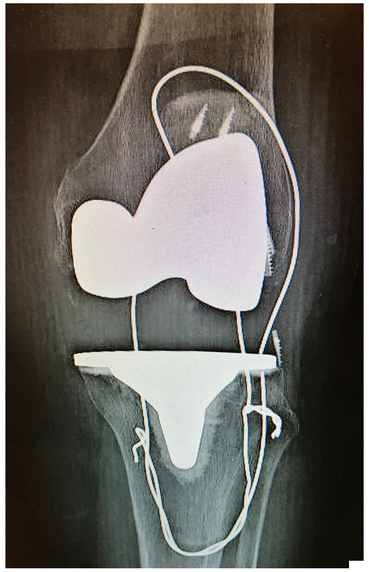
Cable Wire or PDS cord

- cable migration - re operation
- beter resistance







Biomechanical evaluation of different surgical techniques for treating patellar tendon ruptures.

Schliemann B[1], Grüneweller N[2], Yao D[3], Kösters C[2], Lenschow S[2], Roßlenbroich SB[2], Raschke MJ[2], Weimann A[2].

CONCLUSION: Augmentation of a patellar tendon repair with either a cable wire or a PDS cord provides higher primary stability than suture anchor repair in patellar tendon ruptures. The study supports the use of additional augmentation of a tendon repair in the clinical setting in order to prevent loss of reduction and allow for early post-operative mobilisation.

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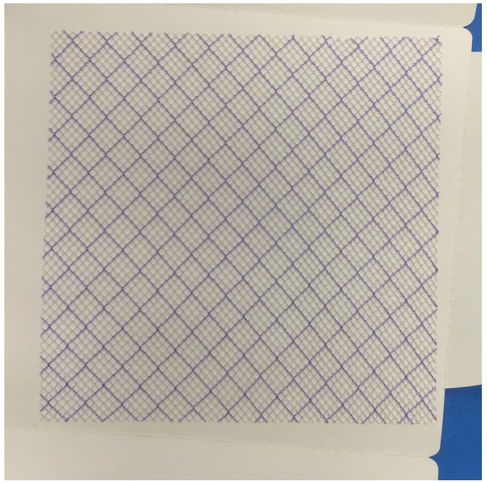
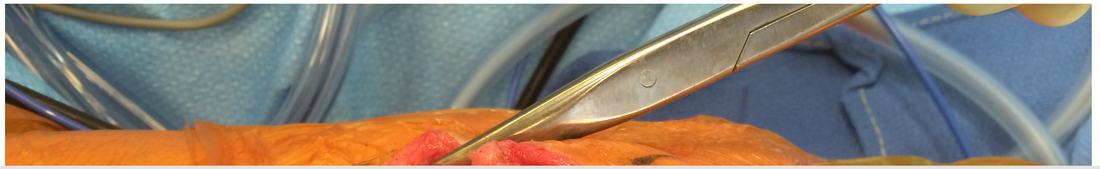
Marlex Tape

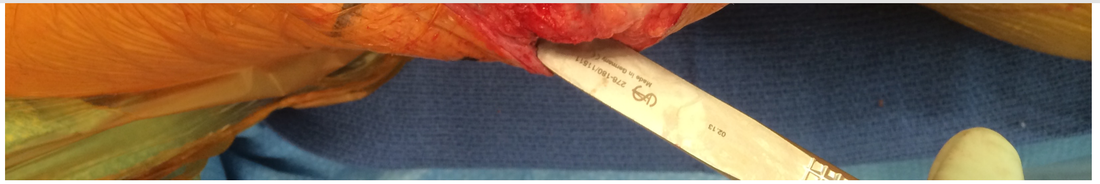


Polyethylene terephthalate tape augmentation as a solution in recurrent quadriceps tendon ruptures.

Leciejewski M[1], Królikowska A[2], Reichert P[3].



mobilization. Besides being durable, multifilament high tenacity polyethylene terephthalate is flexible. Poly tape augmentation is particularly recommended in the following cases: recurrent rupture of the quadriceps tendon; extensor apparatus damage following total knee arthroplasty (TKA); delayed diagnosis of quadriceps tendon rupture; and in elderly patients (with weak bones and poor ligament quality). The surgical technique is simple and the procedure has a low complication rate. There have been many studies confirming the security of polyethylene terephthalate use in the human body. There is also a great deal of evidence concerning tissue ingrowth in the mesh structure of poly tape. Allergic reactions and inflammatory responses are rare.



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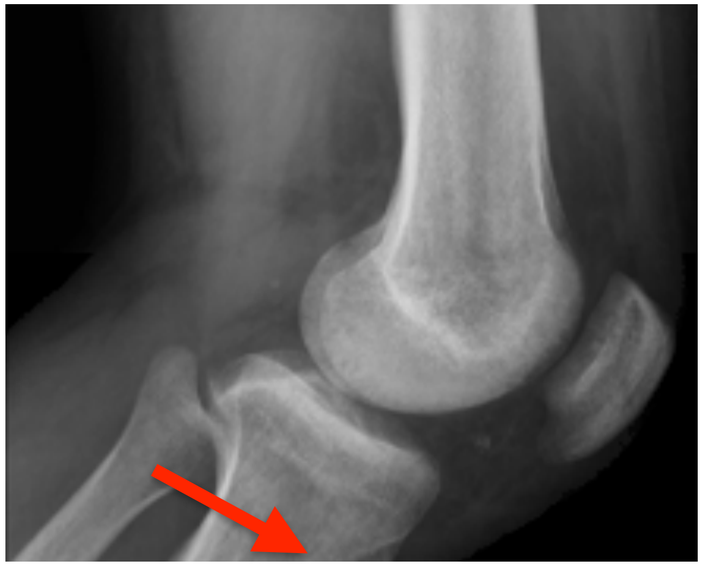
Autograft: semi-tendinus



- autograft- vascularised
- Comorbidities not an option
- r
- li

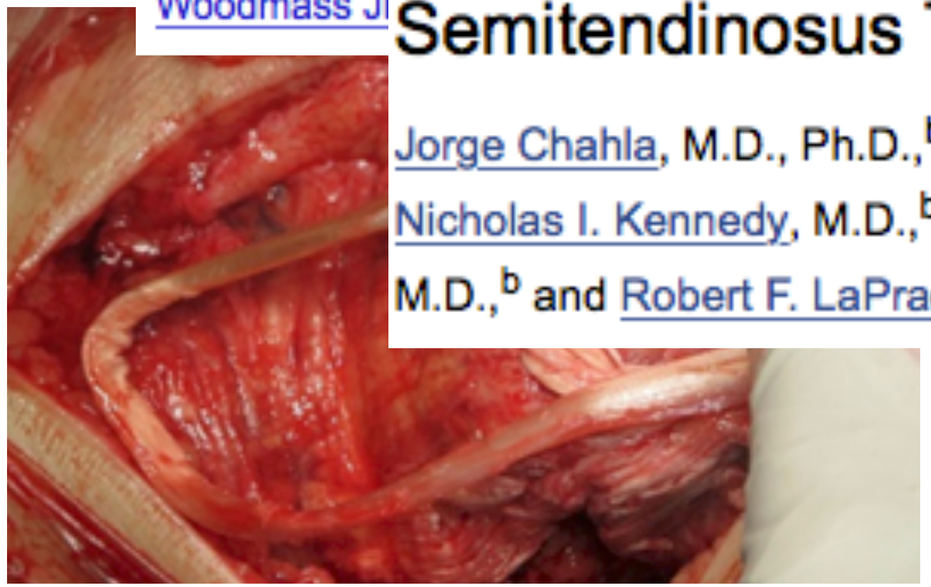
Arthrosc Tech. 2017 Nov 13;6(6):e2177-e2181. doi: 10.1016/j.eats.2017.08.013. eCollection 2017 Dec.

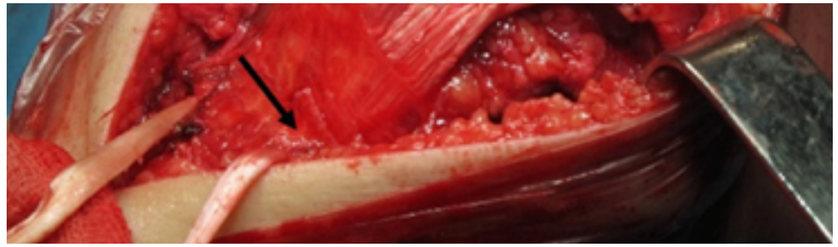
Patellar

Woodmass Jl

Open Repair of Quadriceps Tendon With Suture Anchors and n. Semitendinosus Tendon Allograft Augmentation

Jorge Chahla, M.D., Ph.D.,[b] Nicholas N. DePhillipo, M.S., A.T.C., O.T.C.,[a] Mark E. Cinque, M.S.,[b] Nicholas I. Kennedy, M.D.,[b] George F. Lebus, M.D.,[b] Filippo Familiari, M.D.,[c] Gilbert Moatshe, M.D.,[b] and Robert F. LaPrade, M.D., Ph.D.[a,b,*]





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Allograft

- transmission of infectious disease

International Orthopaedics
October 2018, Volume 42, Issue 10, pp 2367–2373 | Cite as

Long-term results of extensor mechanism reconstruction using Achilles tendon allograft after total knee arthroplasty

Conclusion

Achilles tendon allograft reconstruction is a reliable and durable treatment for patients who sustain not only patellar tendon ruptures, but also quadriceps tendon ruptures following TKA. Despite the success of this technique, the injury and procedure have a profound impact on overall function.

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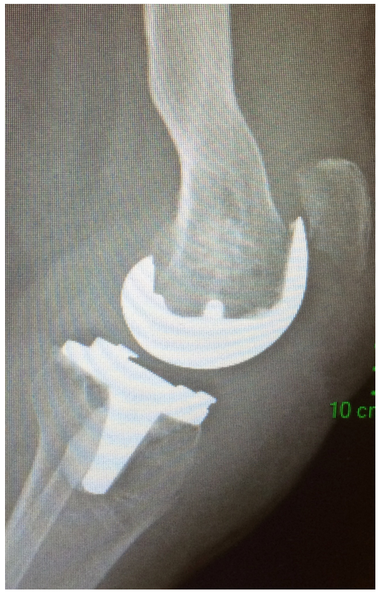
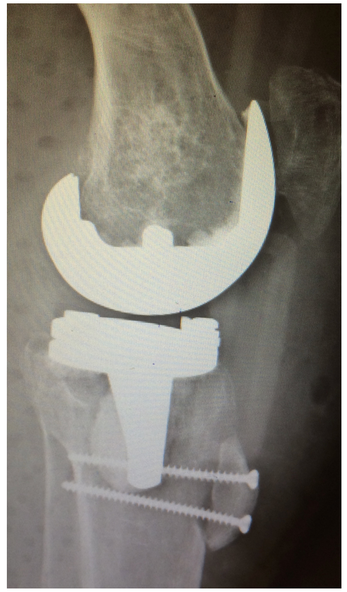
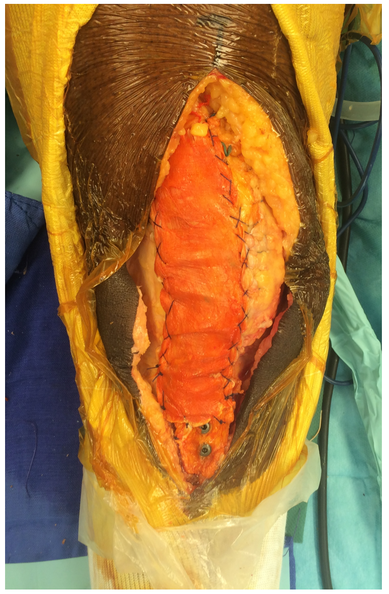
Achille tendon allograft

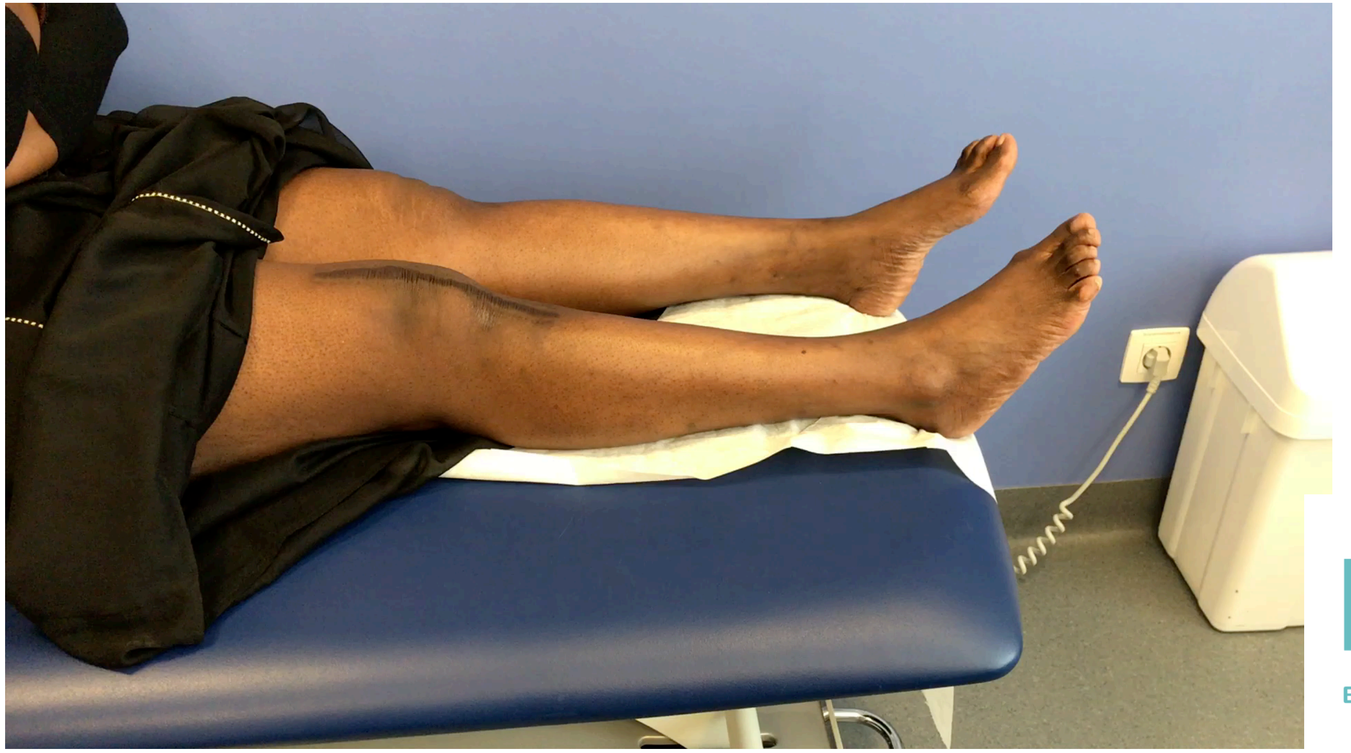
= Patella tendon rupture







Distal part of the patella tendon
Chronic patella tendon rupture
Patella tendon on a TKP



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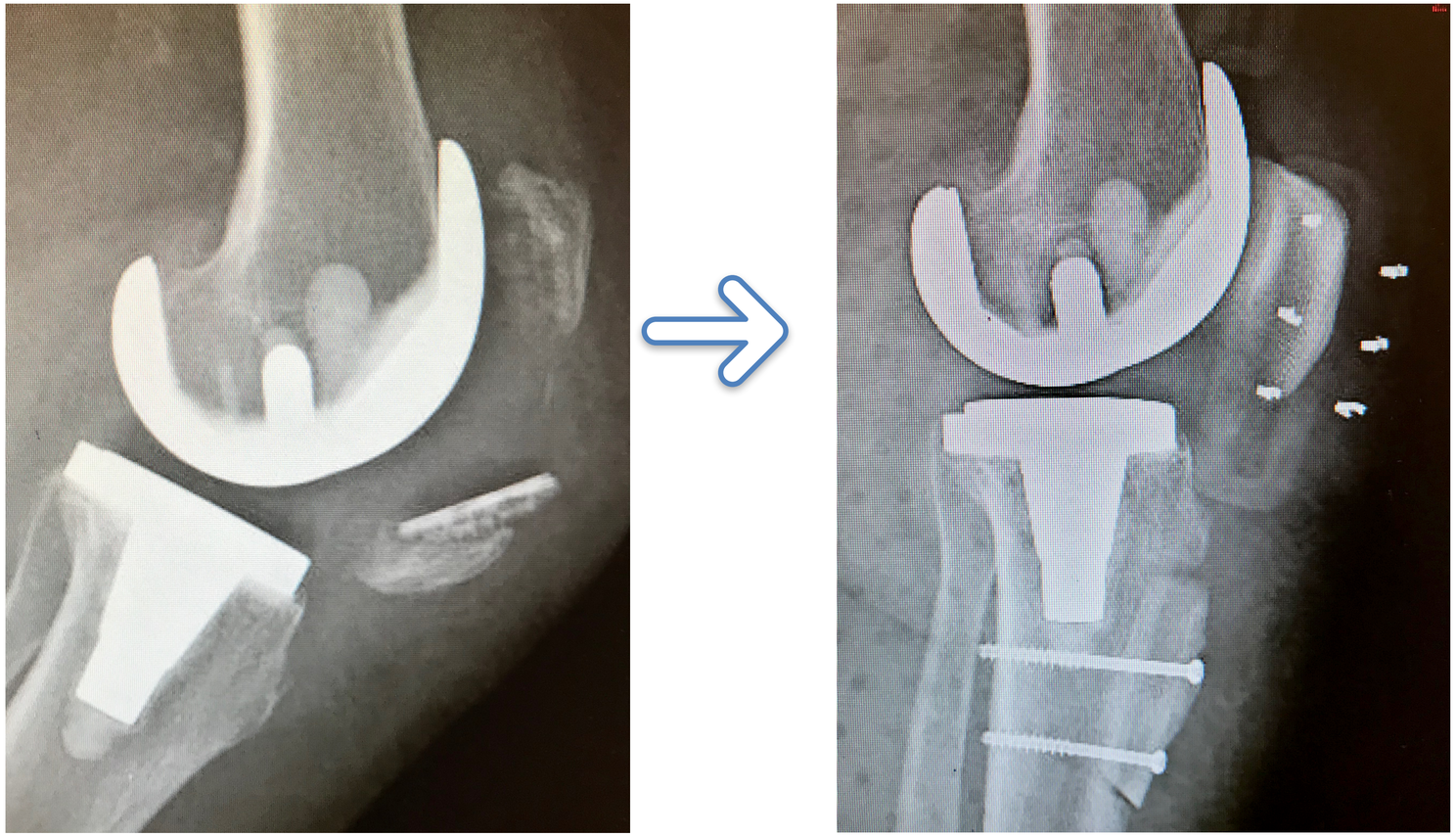
Full extensor mechanism allograft

Patella and quadriceps disorder



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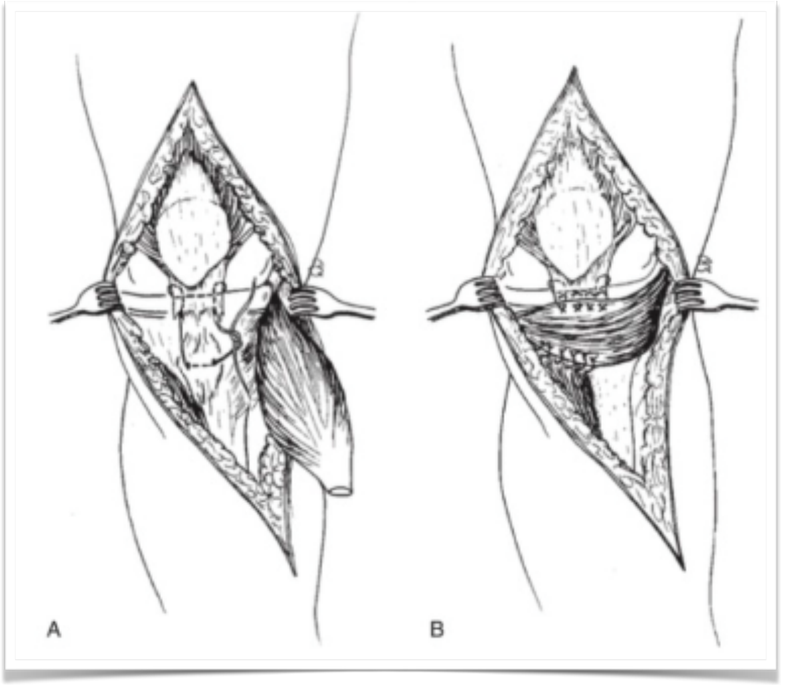
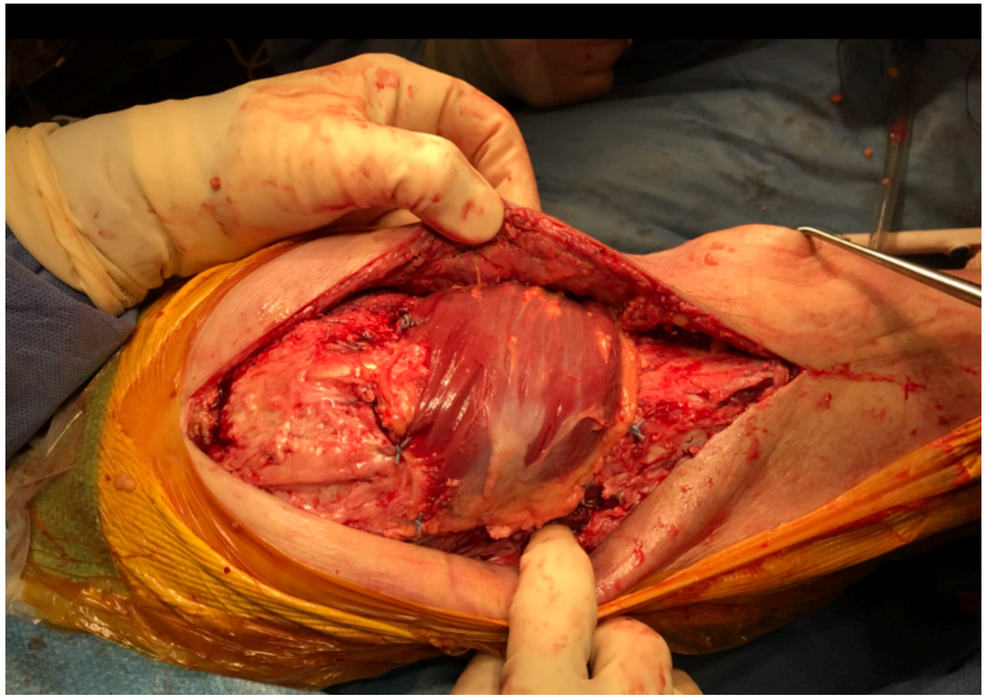
Medial gastrocnemius Flap

Knee Extensor Mechanism Reconstruction With Medial Gastrocnemius Flap

Nishitkumar S. Patel, MD; Denise T. Ibrahim, DO; and Henry A. Finn, MD



- vascular supply
- Skin problems
- limited coverage



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Augmentation, Which one to use?

CONCLUSIONS: We performed the first network meta-analysis to date comparing treatment of EMRs. Our results support the current body of knowledge that there is no single superior repair method. Although there is an increasing trend towards early or immediate post-operative knee mobilization, we found that early mobilization is associated with significantly higher adverse event and total event rates compared to fixed immobilization for a minimum of 6 weeks, implicating an increased financial burden and decreased quality of life associated with early post-operative mobilization.

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Preop analysis for a good **strategy**

- Type of rupture
- co-morbidities
- vascularisation
- skin evaluation

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Type of rupture

- Tibial Tuberositas- Patella Tendon- Patella -Quadriceps Tendon
- Native knee- TKP
- Acute trauma- chronique problem

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Co- morbidities

- Overweight
- Diabetes
- Rheumatoïd arthritis
- Renal failure
- Connective tissue disorder
- Vascular disease
- Medication: Quinolone, Statine, Stéroïde

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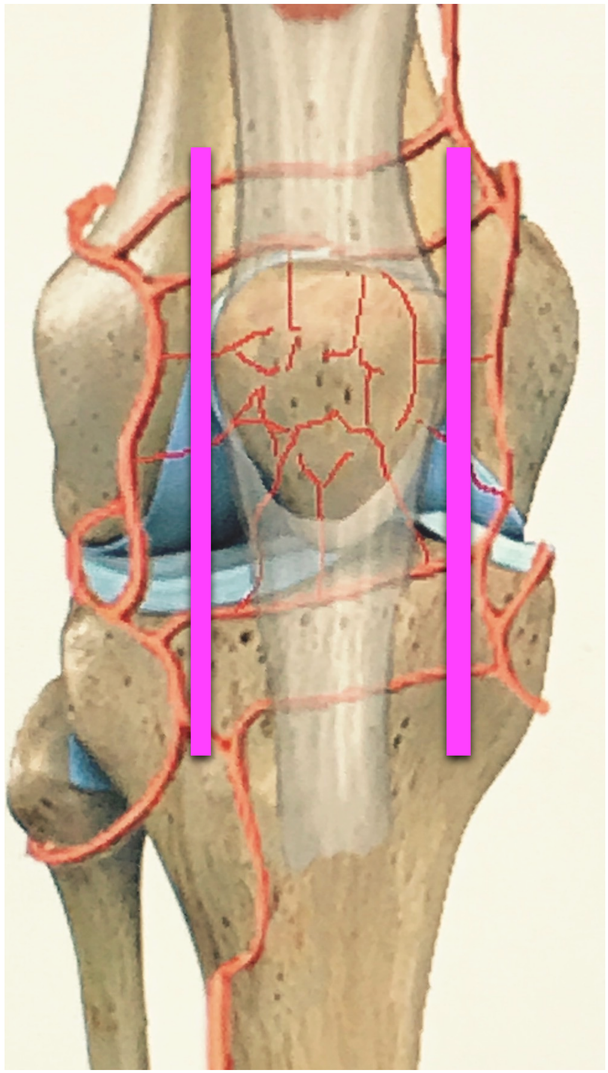
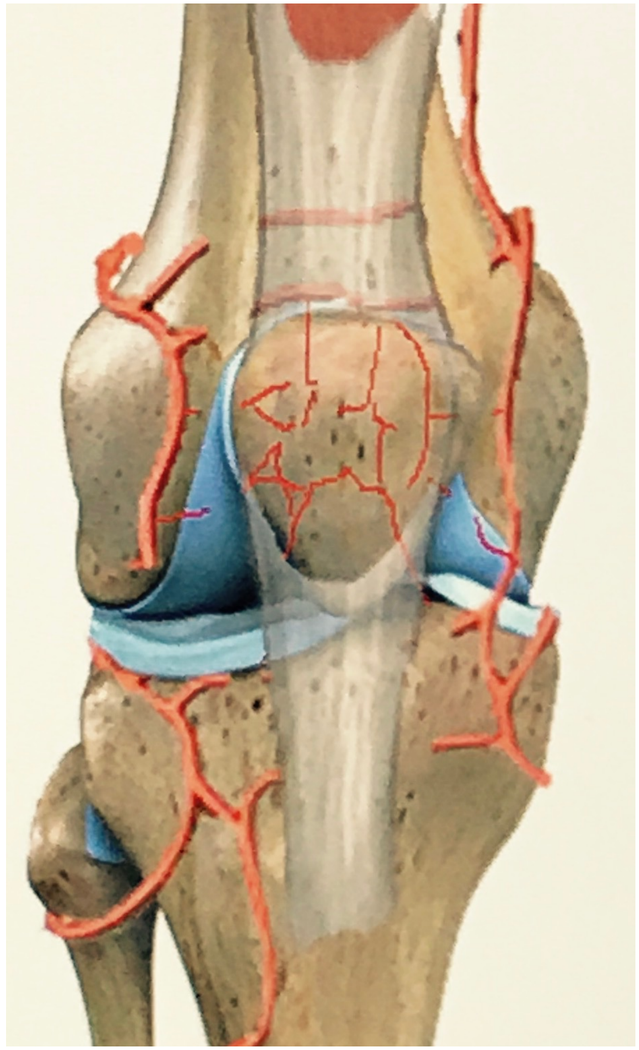
Previous surgeries and the vascularisation
TKP- MPFL- KJ- Insall





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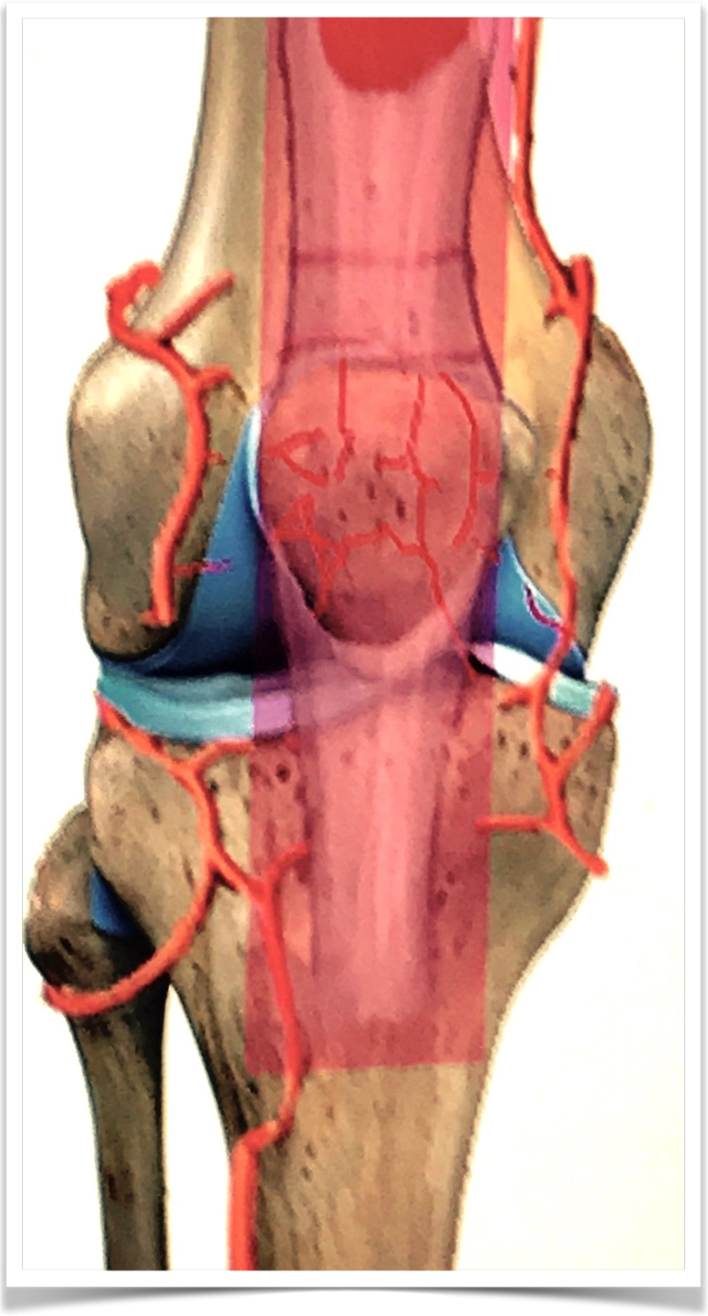
Consequences

Patella fracture
Quadriceps tendon rupture
Patella tendon rupture (oste



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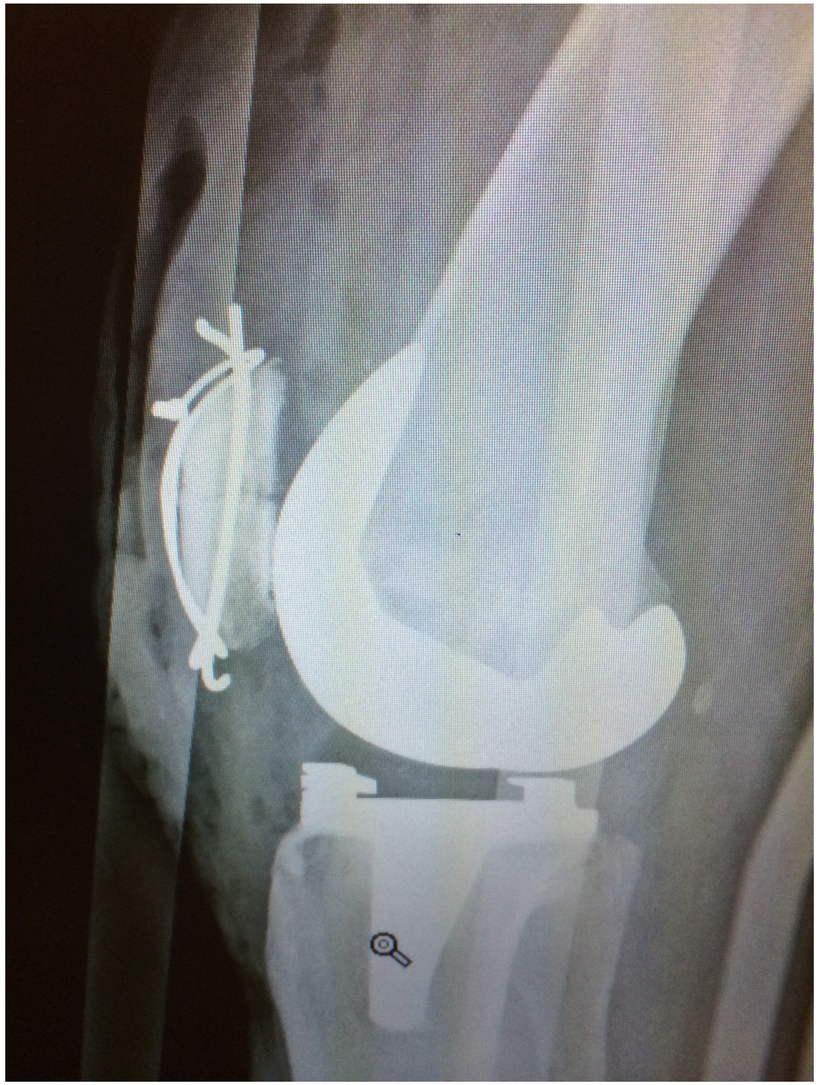
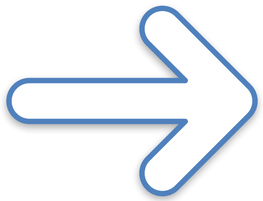
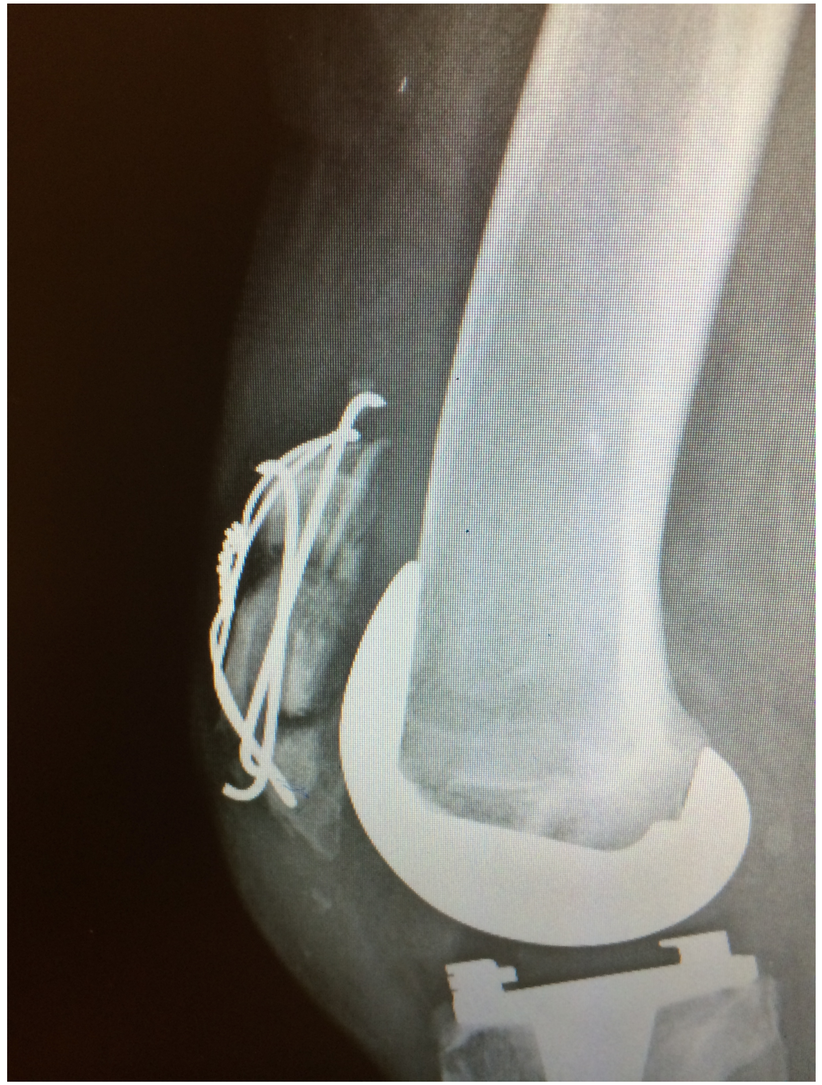
osteonecrosis

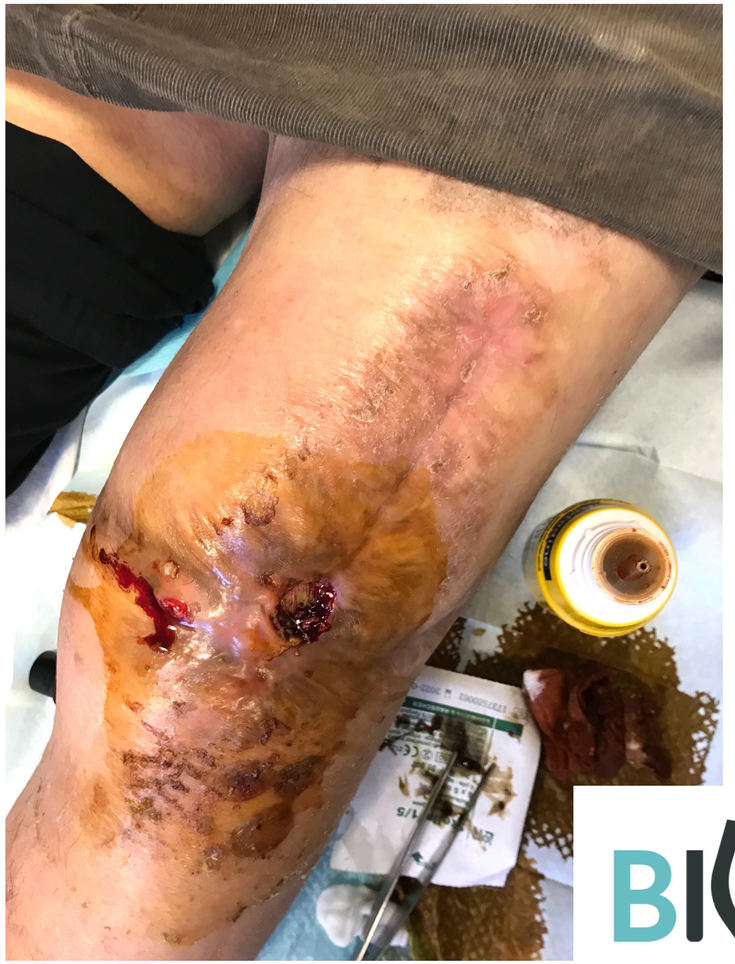






skin status

- skin status analysis:
  - Surgical incisions
  - Quality and vascularisation



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Algorithme

	TKP/chronic	Native
Patella Tendon	Achille Tendon Allograft	Semi T Augmentation Marlex Tape
Patella	ORIf + Marlex Tape Extensor mechanisme Allograft	ORIF
Quadriceps Tendon	Marlex Tape	Semi-T Marlex Tape
Vascular problem or skin problem	+ Finn flap	+ Finn Flap

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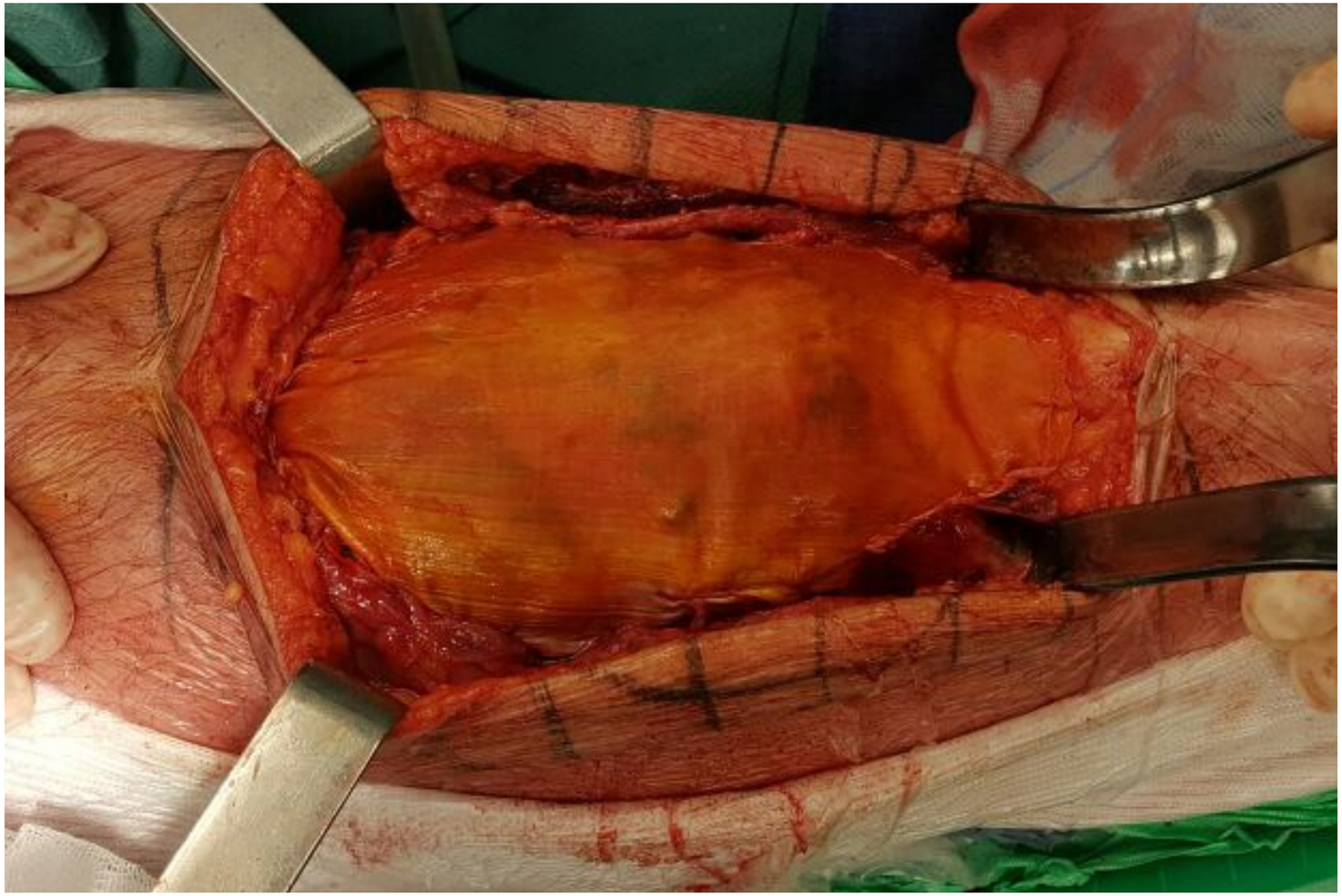
My technique: Combinaison of Augmentation + Marlex tape + Fascia lata allograft over tape



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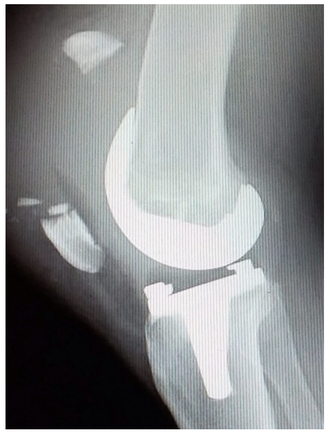
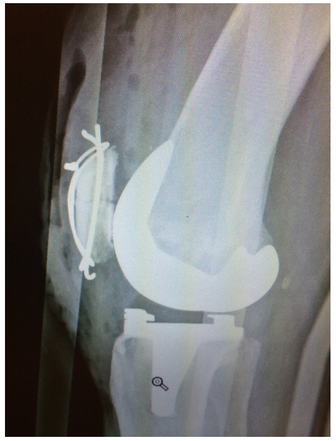
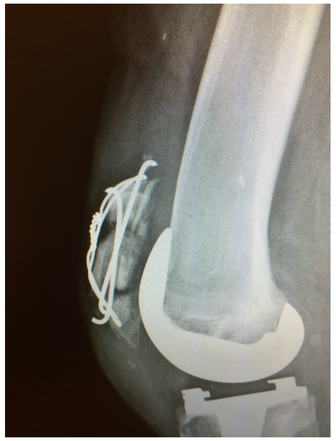
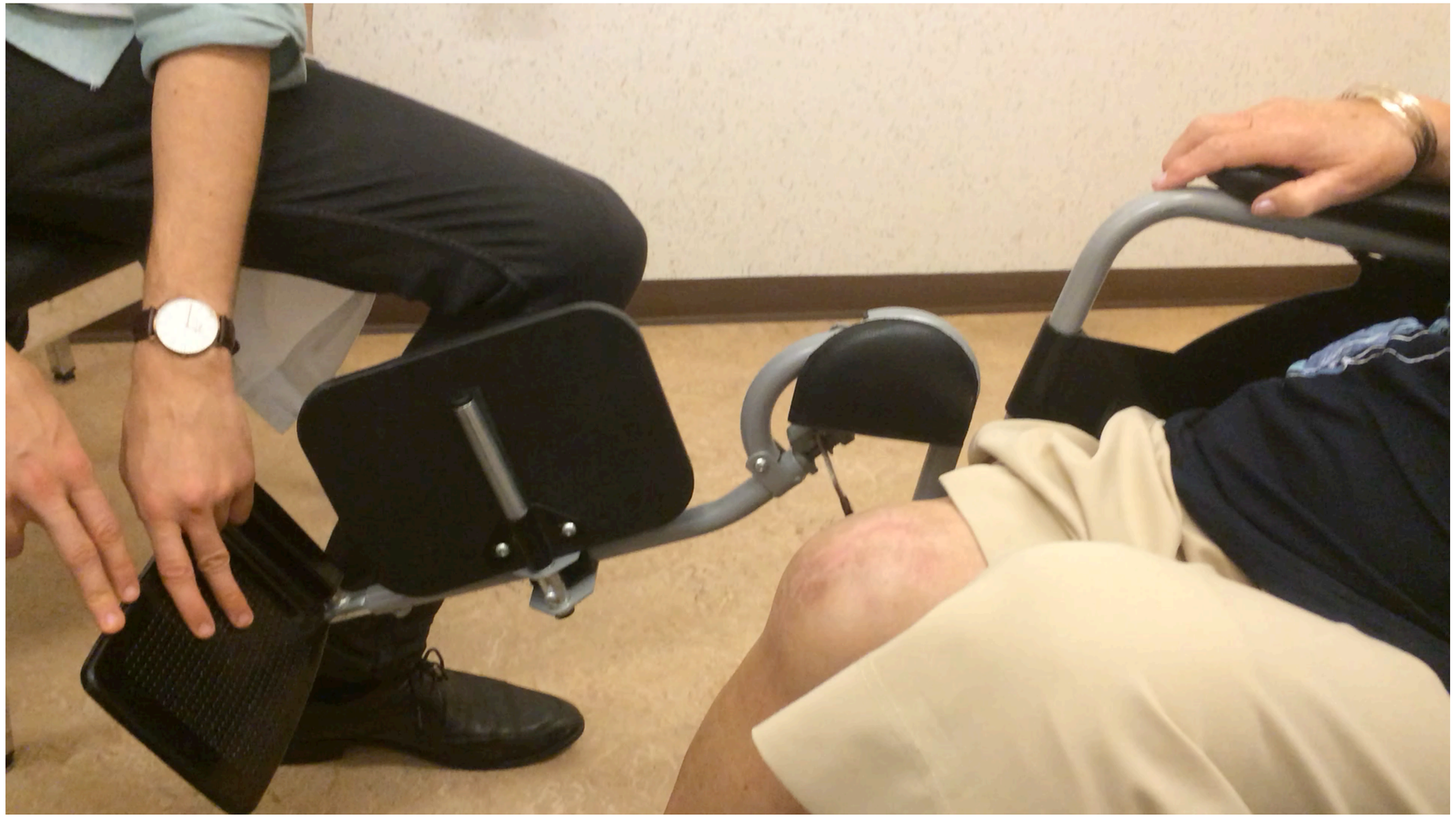






Results



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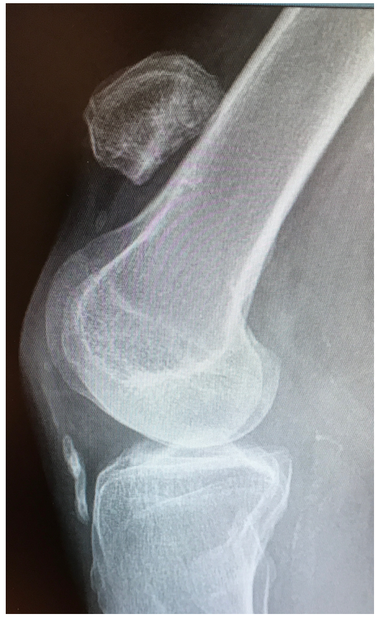

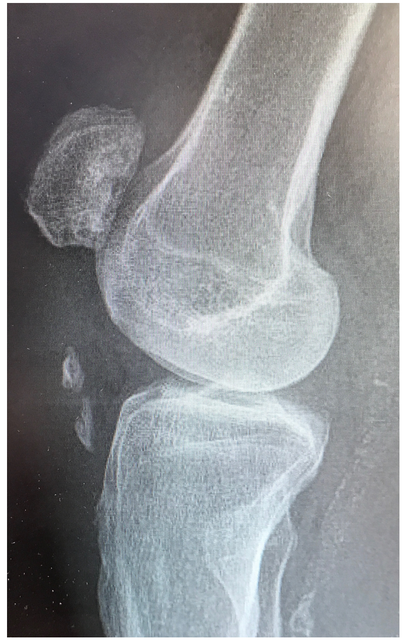

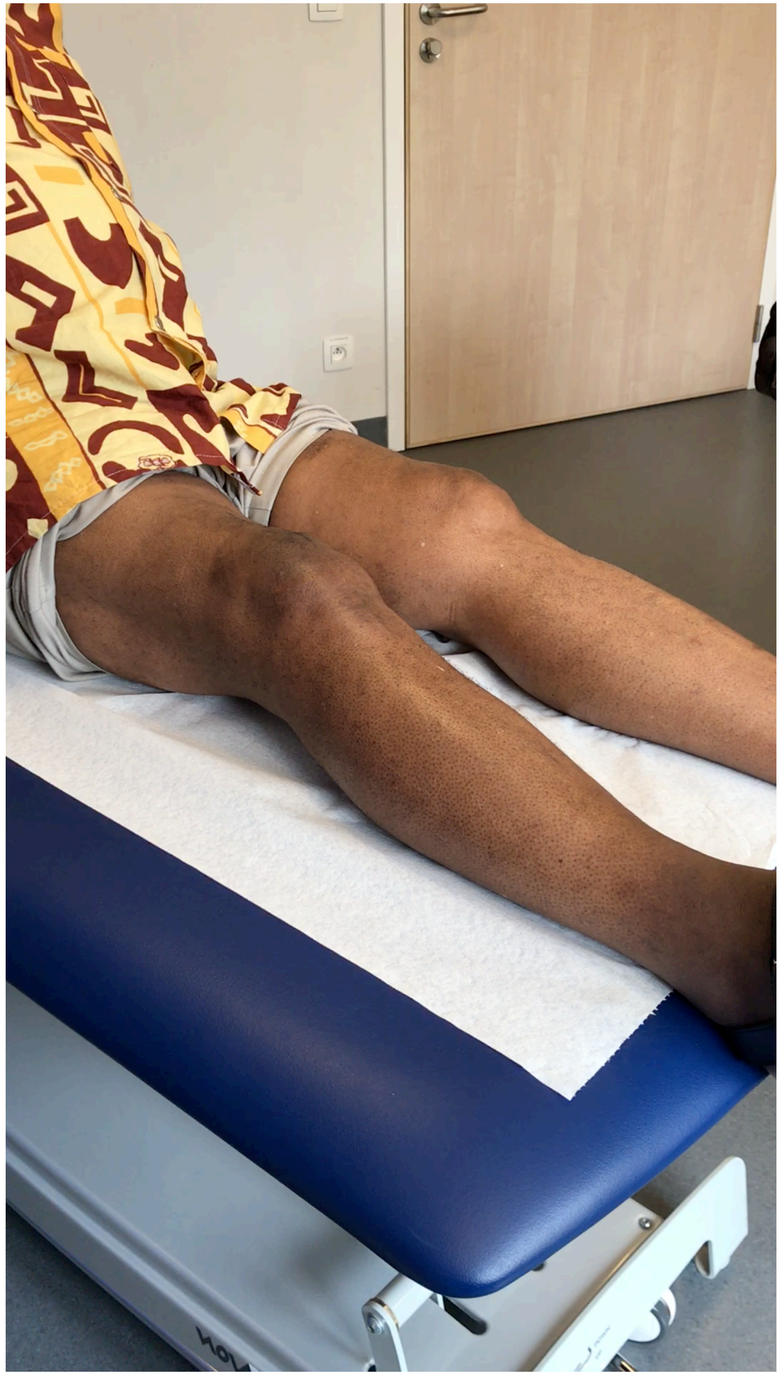

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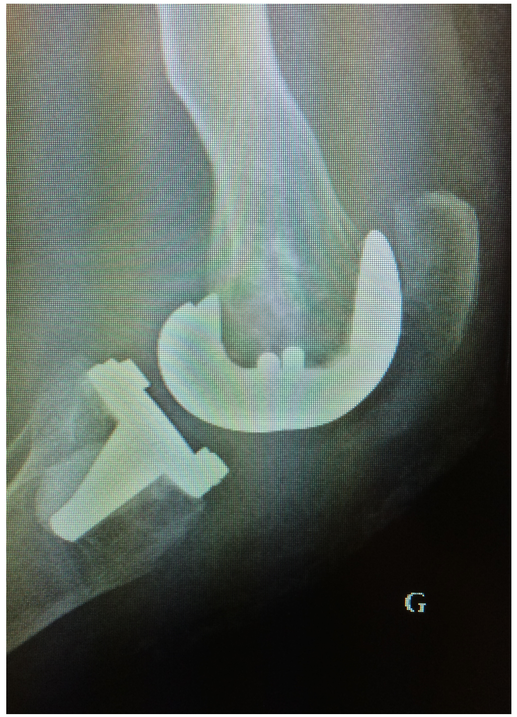

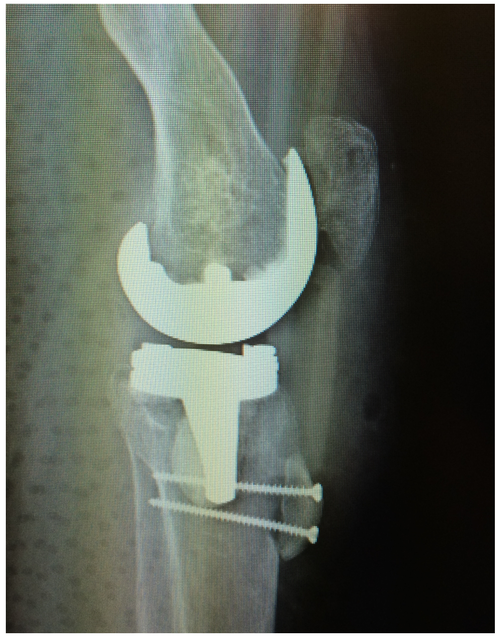

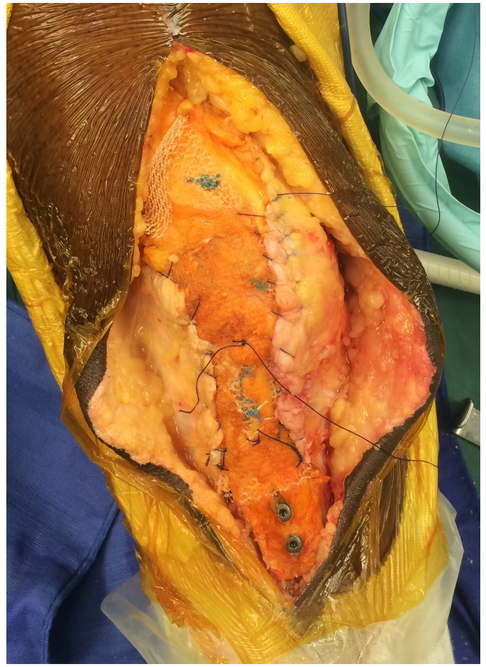

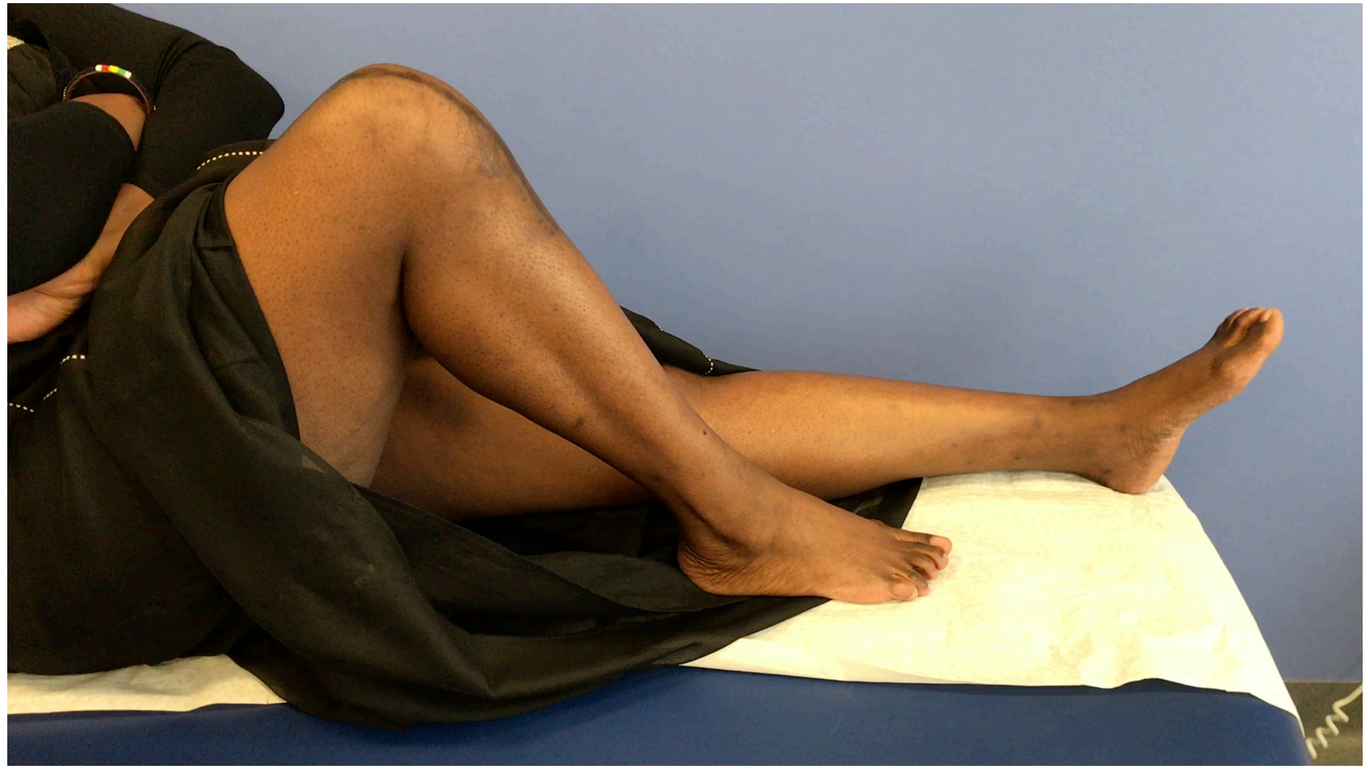

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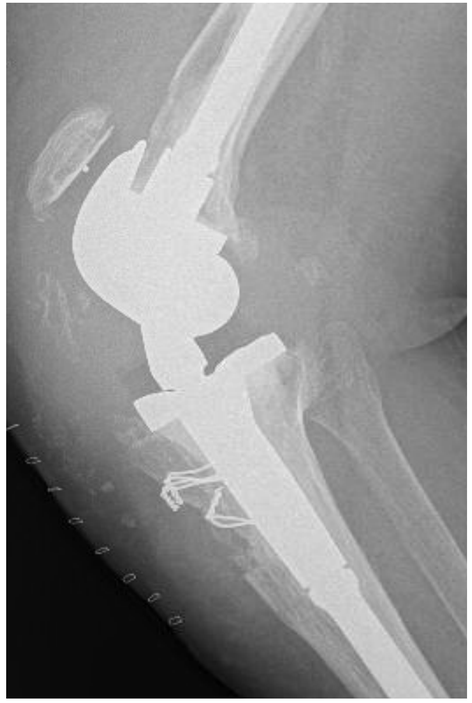

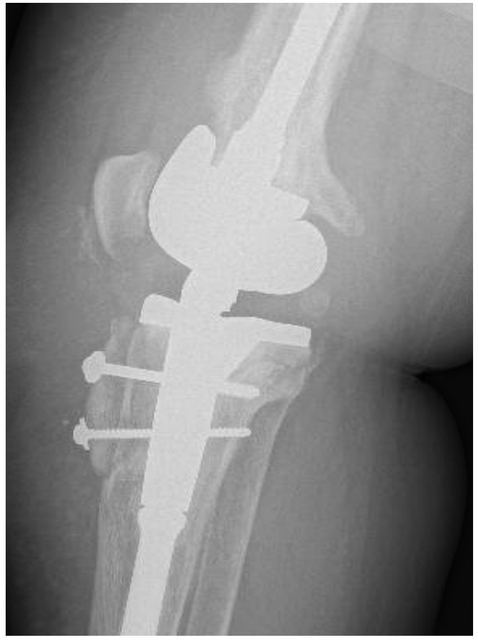

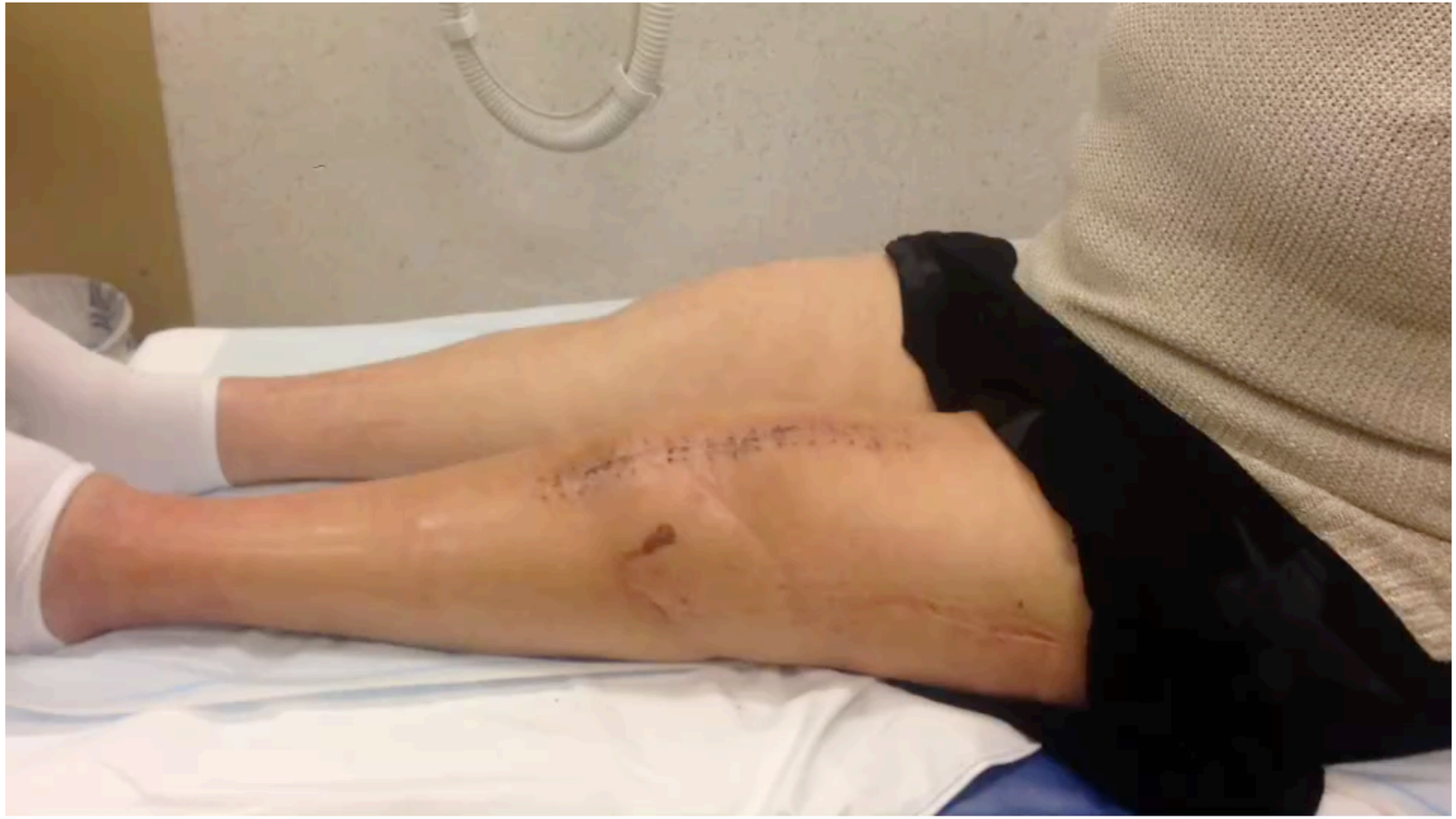

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Conclusion

- Only direct suture is no more the Gold Standard
- Augmentation is necessary
- Early mobilisation
- Not difference between the Augmentations
- Use the great strategy following the type of rupture, the comorbidities, the type of knee and the vascularisation - skin status.

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