TKR Stiffness
MUA vs Arthoscopic Arthrolisis

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DRAFT

- Definition
- Incidence
- Risc Factors
- Causes
- Treatment
- Conclusions

DEFINITION

- **Limited ROM** +/- pain
  - Flexion > 2[illegible]
  - Ext[illegible]
  - [illegible] 2004
  - [illegible]ercan 2004
  - [illegible] 2001
  - [illegible]Christensen 2002
  - [illegible]exion < 90° *Ghandi 2006*

Not well defined

"When a pacient is not satisfied with the ROM"

DEFINITION

Flexion Requeriments for ADL ???

- Lifting objects from the f
- Climbing stairs➔ 8
- Siting➔ 90°
- Tie the

Between 80º and 105º ?

*Individual variations may vary depending on:

- Height, hip mobility, etc.
- The shorter the patient the higher the flexion required

INCIDENCE

The Journal of Arthroplasty Vol. 25 No. 6 2010

Stiffness After Revision Total Knee Arthroplasty

Gregory K. Kim, BA, S.M. Javad Mortazavi, MD, James J. Purtill, MD,
Peter F. Sharkey, MD, William J. Hozack, MD, and Javad Parvizi, MD, FRCS

- 1,3% – 11%

RISCK FACTORS

MANAGEMENT OF STIFFNESS FOLLOWING TOTAL KNEE ARTHROPLASTY

BY JAVAD PARVIZI, MD, FRCS, T. DAVID TARITY, BS, MARLA J. STEINBECK, PHD, ROMAN G. POLITI, BS, ASHISH JOSHI, MD, MPH, JAMES J. PURTILL, MD, AND PETER F. SHARKEY, MD

- ↓ ROM preop
- Age → YOUNGERS
  - Higher expectations // traumatic ethiology
- Immobilization post-TKR
  - Fracture // soft tissue healing
- Infection (subclinical)
- *Patella infera*

ASSOCIATED CAUSES

Stiffness After Total Knee Arthroplasty

Surgical Technique

By Charles L. Nelson, MD, Jane Kim, BA, and Paul A. Lotke, MD

- *Overstuffing* (patellofemoral)
- Excessive constraint (GAP flex & ext)
- PCL preservation
- Malposition of TKR components (malrotation)
- Arthrofibrosis (intraarticular adhesions, scars, etc)

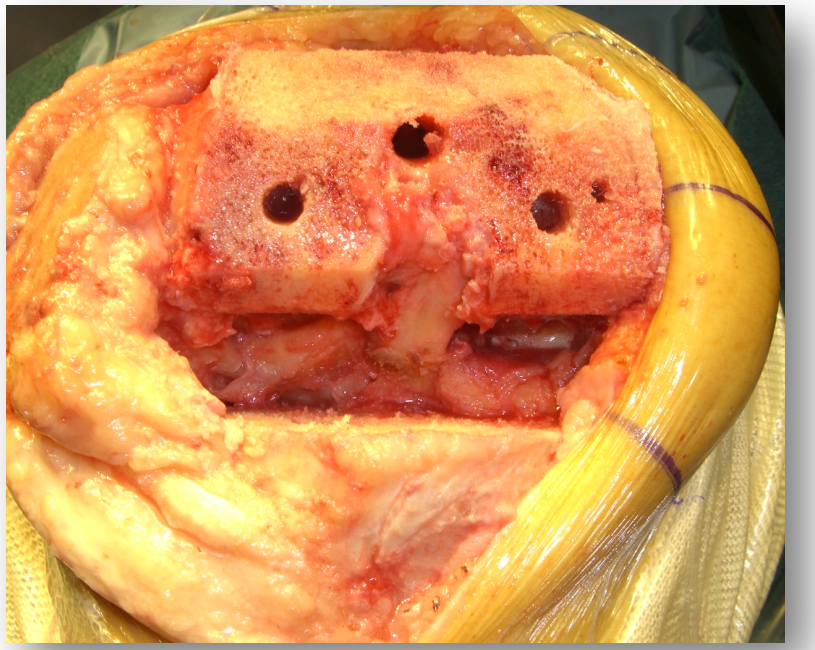
ASSOCIATED CAUSES

- *Overstuffing* (PF)
  - > 8mm ↓ passive flex
  - > 6mm alter PF kinematics

Bracey. Int Orthop. 2015

ASSOCIATED CAUSES

- **PCL Retaining**
  - ↑stability
  - ↓shear stresses @ fixation interface
  - ↑proprioception
  - more efficient gait patterns
    - during level walking & stair climbing



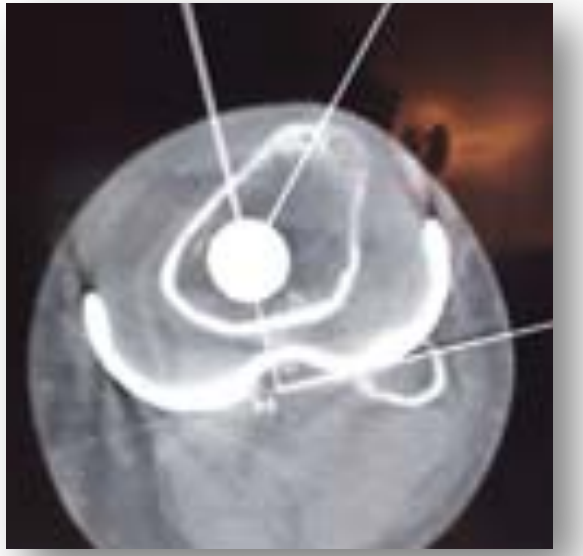
ASSOCIATED CAUSES

- Malposition of TKR components
  - Malrotation

↑ internal rotation difficult
- Correct femoral cuts
- Gap balancing

→ ROM

→ PF tracking

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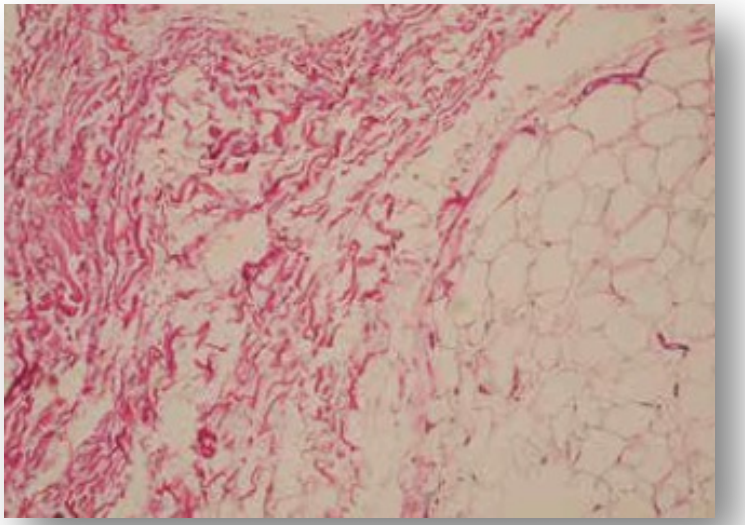
ARTHROFIBROSIS

Some patients develops stiffness despite a correctly-sized & implanted prosthesis

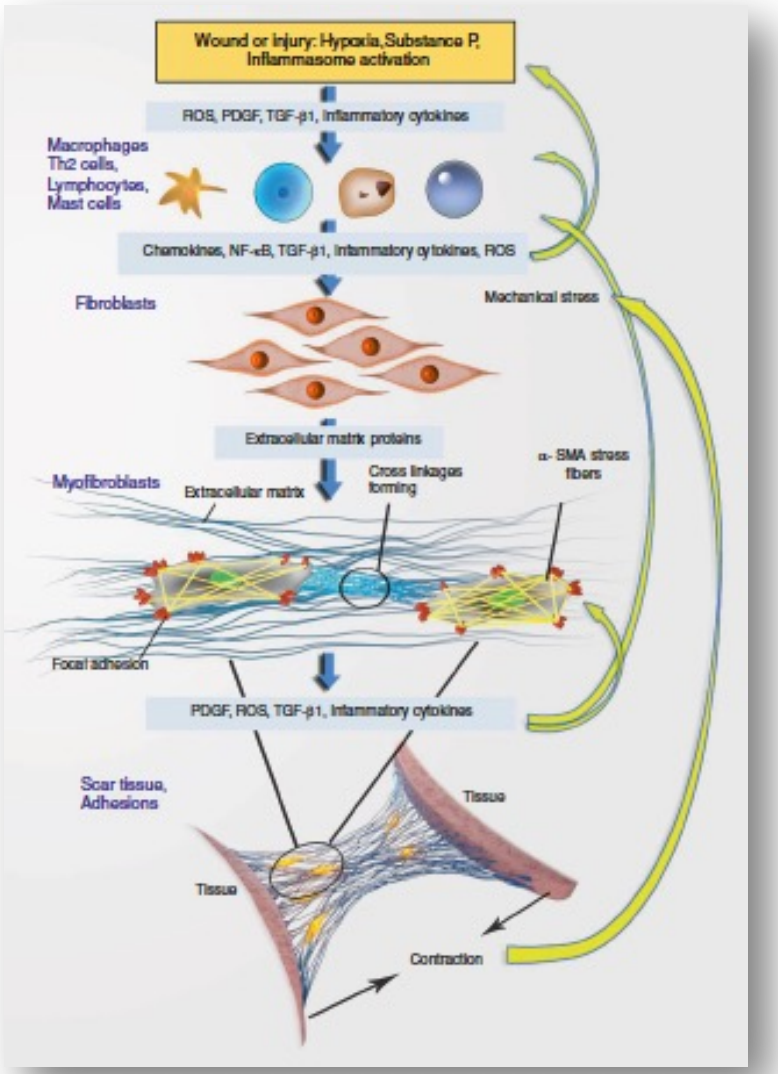
- **Fibrotic joint disorder**
  - Dysregulation of the immune system
    - Intraarticular adhesions or scarring
    - Heterotopic calcifications



Paulos. AJSM 1994, Usher 2019

ARTHROFIBROSIS

- Surgery causes **HYPOXIA**
- Activation of cells inflammasomes*
- Production of reactive O_2 species
- Platelet-derived growth factor (PDGF)
- Transforming growth factor beta (TGF-β)
- Inflammatory cytokines / mediators



**cytosolic multiprotein oligomers of the innate immune system responsible for the activation of inflammatory responses*

Liu. Bone Res. 2010

TREATMENT

- **RHB**
- **MUA**
  - < 12 weeks
- **Arthrolysis→ artroscopically / open**
  - > 12 weeks
- **Revision TKR**
  - **Components Malposition**
  - **Extensor Mechanism**

Mobilization Under Anaesthesia

- > 12 weeks
- Carefully (Fx, wound dehiscence's, ossifications, etc.)
- RHB early & continuous

Mobilization Under Anaesthesia

OUTCOMES

Fitzsimmons 2010

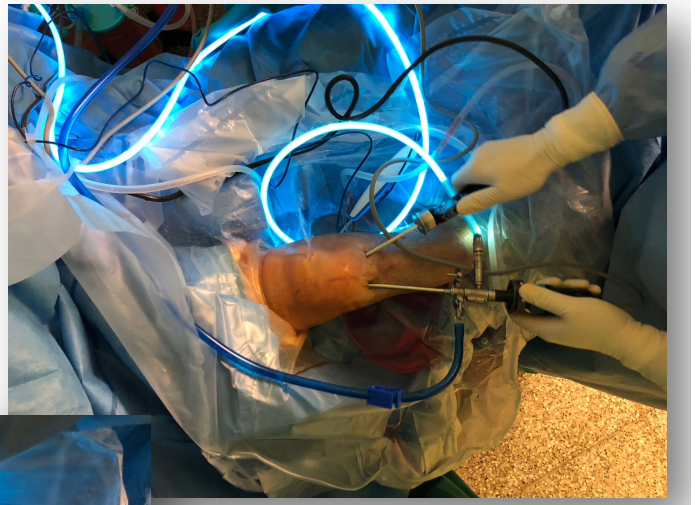
*012

ext)

.7%

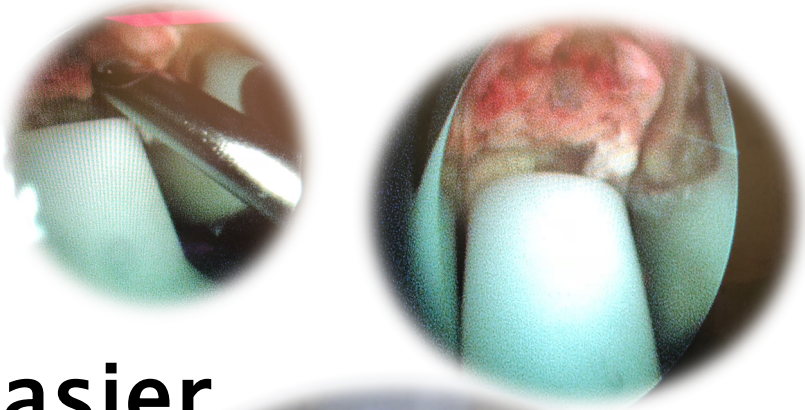
Arthroscopic Arthrolysis

- >12 w
- Systematic *Release*
  - Subquad pouch
  - Gutters (medial & lateral)
  - Anterior compa

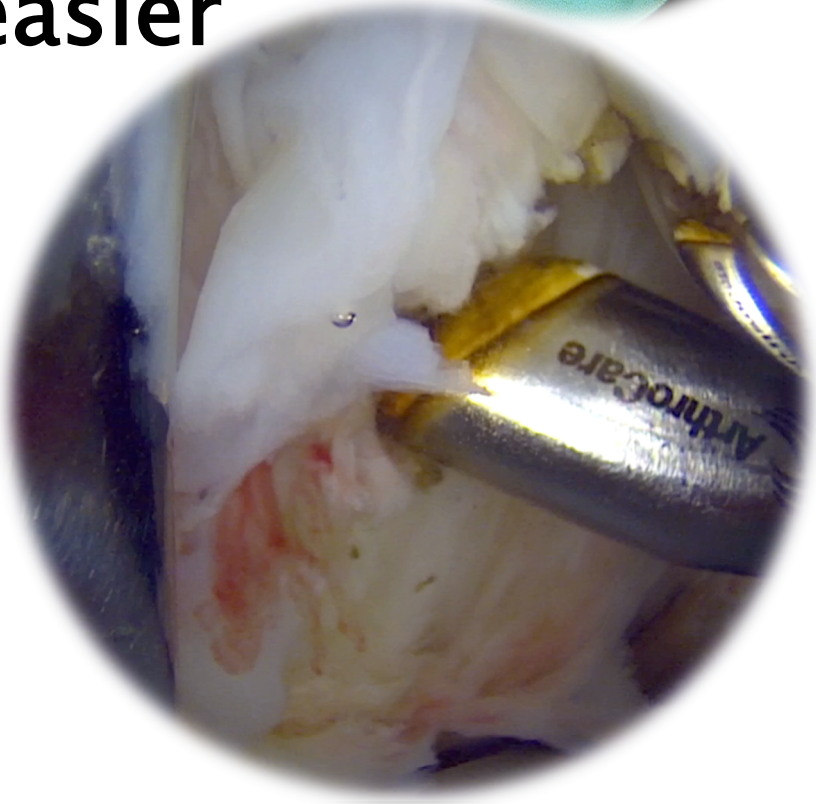


Arthroscopic Arthrolysis

- Systematic *Release*

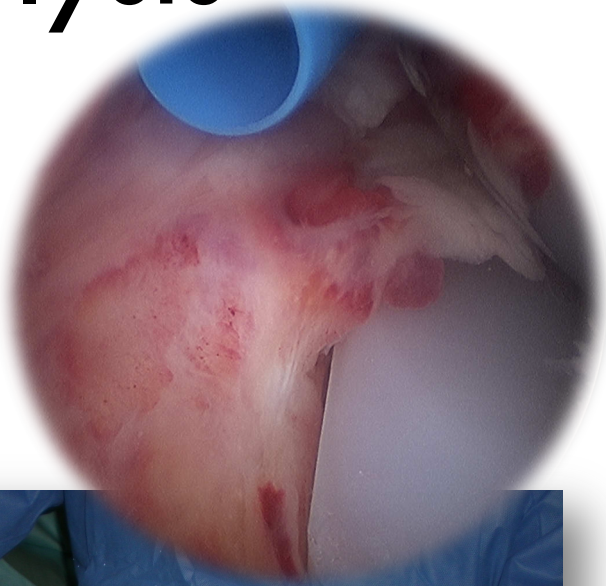


- Flex contracture➔ easier
  - subquad pouch
  - gutters
  - the post/cam box



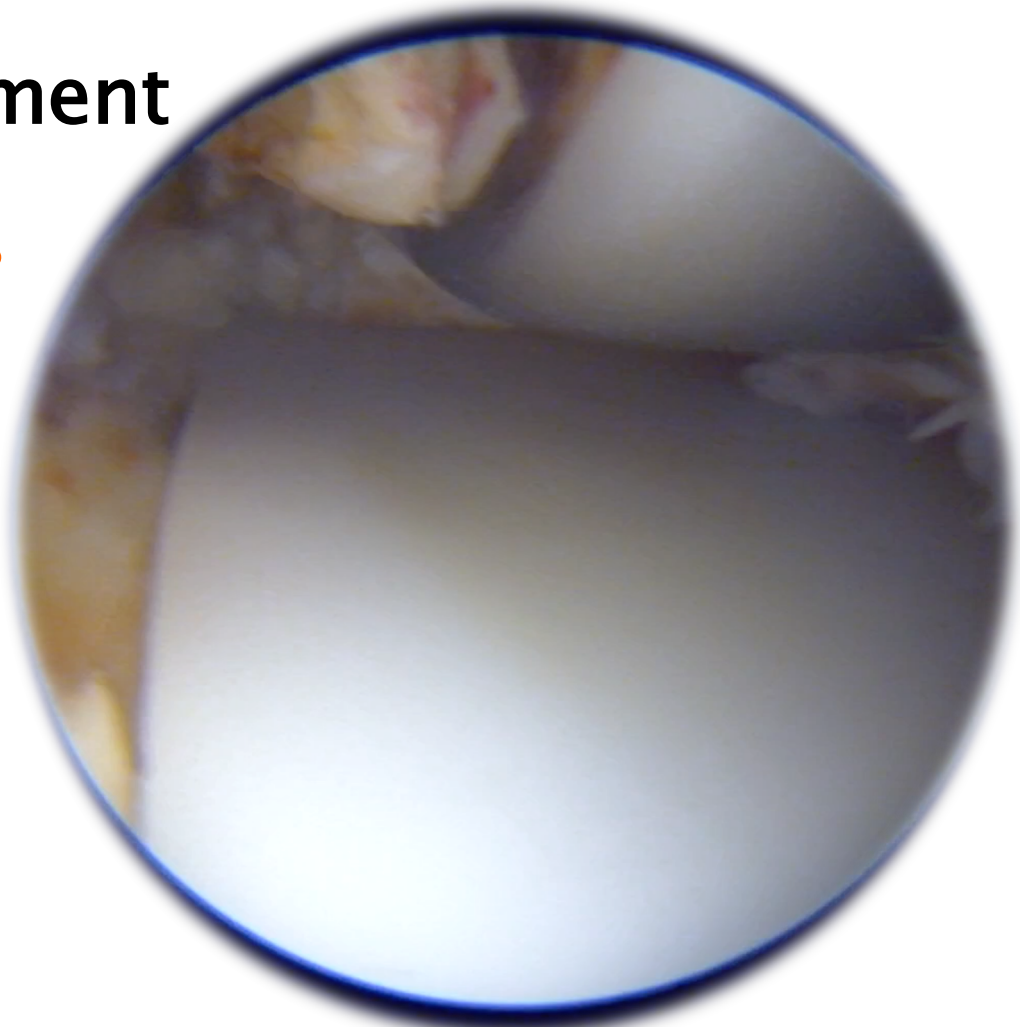
Arthroscopic Arthrolysis

- Extension ➔ more difficult
  - Posterior compartment
    - Posterior portals
    - Capsulotomy



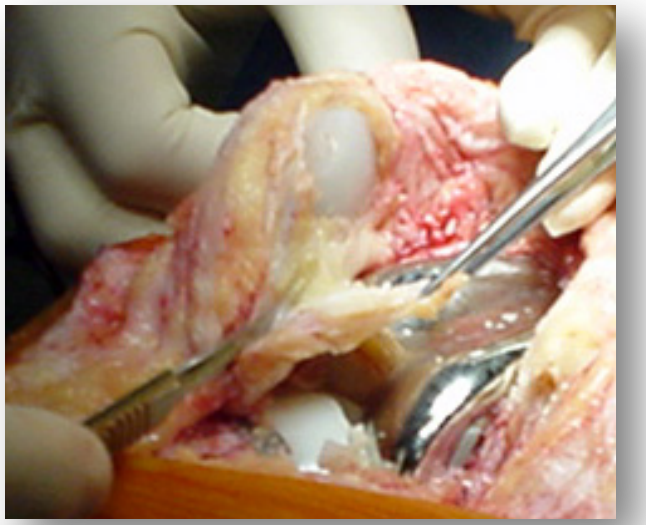
Arthroscopic Arthrolysis

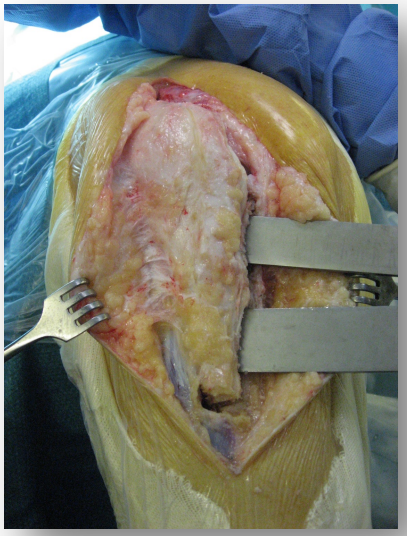
- Extension ➔ more difficult
  - Posterior compartment
    - Some other causes
      - Cement / fabela



Open Arthrolysis

- > 12 weeks – 6 months
  - Sinovectomy
  - Ressection of fibrotic tissue
  - ATT Osteotomy
  - PE insert exchange





POSTOP MANAGEMENT

- CPM set (to the maximum flex / ext obtained) / 6 to 8h a day
- Pain control (epidural catheter in place for 24–48 h)

OUTCOMES

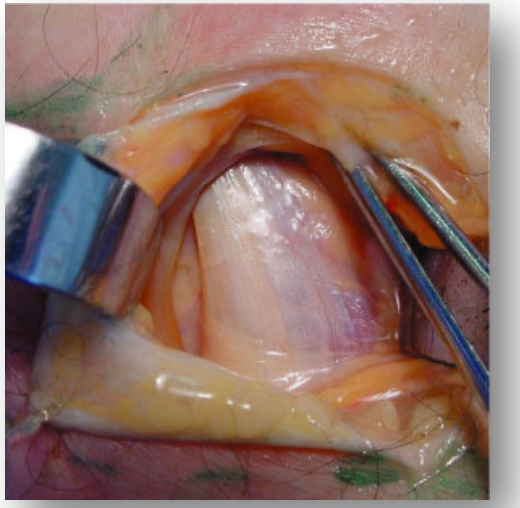
Open Arthrolysis + **Polyethylene Insert Exchange**

Hutchinson et al. JBJS 2005. Results of open arthrolysis for the treatment of stiffness after total knee replacement.

- 13 patients
- ROM➔ 55° to **91°**

Babis et al. JBJS 2001. Poor outcome of isolated tibial insert exchange and arthrolysis for the management of stiffness following total knee arthroplasty.

- 7 patients
- ROM (4 ys FU) ➔ 58°
- KSS pain 44 - 39.6 / function 36.4 - 46



- **Posterior Capsulotomy**
  - **Posteromedial approach**

OUTCOMES

- 56 TKR
- FFC>15° and/or Flexi
- Mean flexion 65°
- Mean gain→ 11°

"Modest" Benefit

patients increased ROM

Kim J et al. Stiffness after total knee arthroplasty: prevalence of the complication and outcomes of revision. JBJS 2004

OUTCOMES

- 16 TKR, ROM < 70°
- 6/11 Quad's snip
- 1/11 MFC osteot
- Mean R
- stifness
- poor results

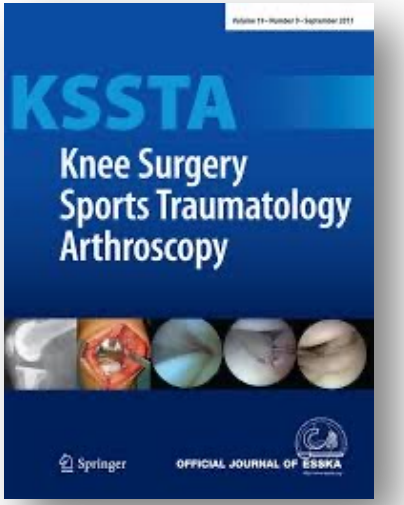
"Modest" Benefit

3°

Haidukewych. Functional results after revision of well-fixed components for stiffness after primary TKA. J Arthroplasty 2005

MUA vs AA (ACL R)

OUTCOMES



SR 25 studies (647 patients)

- 37% had their ROM established using a goniometer
- > 50% successfully treated w/out surgical intervention
- 6% of AA required more than one procedure (for ROM déficits)
- 6 / 25 reported significant improvement in ROM

Ekhtiari S. KSSTA. 2017

In Summary

- Arthrofibrosis is a fibrotic disease
- MUA (early) & surgical lysis (later), remain the primary treatments
  - Open arthrolysis ➔ component malposition
  - CPM➔ to minimise joint contractions
- Early intervention (to prevent fibrosis) is likely to be important

Future Research

- Therapeutic agents to halt or reverse fibrosis
- Anti-fibrotic coatings on surgical implants
- Low-dose ASA + omega 3 fatty acids may be effective modulating inflammasomes

THANK YOU

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