



U^AB
Universitat Autònoma de Barcelona

Stiffness after Knee Arthroplasty
Arthroscopic Arthrolysis


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Introduction

Knee replacement is a very effective procedure for relieving pain and improving function in the treatment of OA



Introduction

Stiffness is one of the most frequent complications of TKR



Definition of Stiffness

- 1990 → Nicholls and Dorr defined stiffness after TKR as flexion < 45° and a flexion contracture of 20°
- 2002 → Christensen et al. defined stiffness as a flexion of < 75°
- 2006 → Yercan et al. defined the stiff knee as one that flexed < 95° and had a flexion contracture of 10°

The definition of stiffness has changed over time as the expectations increased

Prevalence

The incidence of stiffness after TKR appears to be low in published series

- 1.3% - Kim et al. *JBJS* 2004
- 5.3% - Yercan et al. *Knee* 2006
- 7% - Pariente et al. *Surg Technol Int* 2006
- 4.9% - Arbutnot et al. *KSSSTA* 2010



Causes

MULTIFACTORIAL

- Infection
- Poor component positioning or sizing
- Inadequate soft tissue balancing
- Aseptic loosening
- Complex regional pain syndrome



But

Despite flawless surgical execution of the TKR some patients will continue developing stiffness

genetic component of the healing process yet to be defined (HLA, gene, etc.)

Arthrofibrosis

- excessive scarring within the knee due to fibrocartilaginous metaplasia
- ✓ increased interstitial fibrosis
- ✓ formation of dense intra-articular adhesions
- ✓ isolated infrapatellar adhesions
- ✓ diffuse (suprapatellar pouch, medial and lateral gutters, and posterior capsule)



Fleis MD, Badalamente M. Arthrofibrosis after total knee arthroplasty. Clin Orthop. 2000

Options

- Accept the reduced ROM
- To address it
 - non-surgically → MUA (60-90 days)
 - surgically → Arthrolysis (3 to 6 mths)
 - open
 - arthroscopically

MUA

- effective in managing limited flexion
- less successful in addressing extension deficits (first 2 months)
- successful in 80% of cases
 - 20% will require repeated manipulation
 - 10% will ultimately undergo surgery



Yarkan et al. Knee 2006
Su et al. Orthopedics 2010

Arthroscopic Arthrolysis in stiff TKRs

Arthroscopy in Total Knee Replacements
Campbell ED Jr
Arthroscopy 1987;3(1):31-5

- 8 pts with fibroarthrosis following TKR from June 1983 to Sept 1986
 - due to reduced ROM and unsatisfactory pain level after trying all standard treatment modalities
 - evaluated through questionnaires and by an independent examiner
- RESULTS
- Improvement in flexion was consistent, yet extension was not generally improved
 - Postoperative pain level was reduced as compared with preoperative pain level, and there were no major complications
 - Results appear promising for the fibroarthrotic patient with regard to improvement in flexion and subjective pain reduction

Arthroscopic Arthrolysis Principles

- Selective breaking of the adhesions inside the knee
- Gentle manipulation
- Postoperative regional pain blockade or multimodal analgesia
 - (postop analgesia will have an effect on motion after TKR)
- Physical therapy (CPM) started immediately (in-patient)

Arthroscopic Arthrolysis Surgical Technique

Establishing portals

- Antero-lateral viewing portal
 - to visualize and evaluate the location, and type of fibrosis
 - the AM portal is created under direct visio
 - sometimes difficult due to extensive scar tissue
 - use as many portals as needed

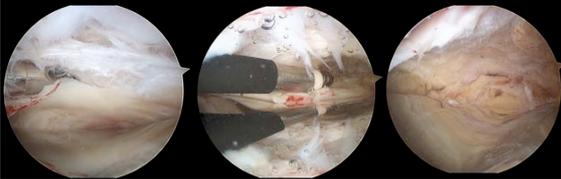


Arthroscopic Arthrolysis Surgical Technique

- Suprapatellar pouch release
- Reestablish the medial and lateral gutters
- Release the patella
- Resect any remaining meniscal tissue
- Resect anterior compartment
- Release posterior capsule

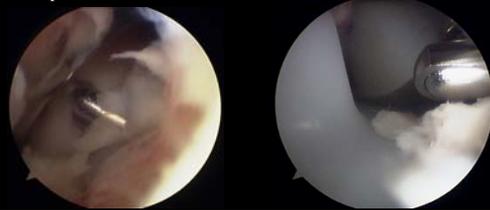
Arthroscopic Arthrolysis Surgical Technique

- Suprapatellar pouch
 - release of fibrous bands
 - opening obliterated superior recess
 - until the dimensions of the original pouch are re-established (or until fibres of *articularis genu* muscle are seen)



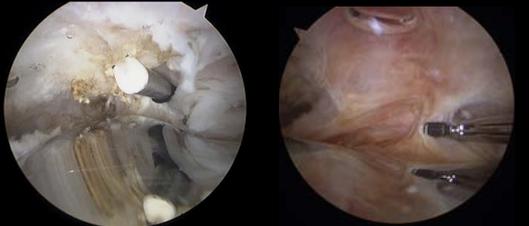
Arthroscopic Arthrolysis Surgical Technique

- Anterior Compartment
 - Sometimes difficult (tight patella) to get in the suprapatellar pouch then start in anterior compartment or use suprapatellar portals



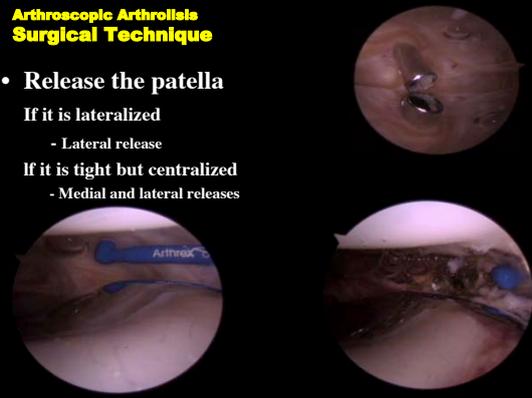
Arthroscopic Arthrolysis Surgical Technique

- Reestablish the medial and lateral gutters
Particularly the medial one to free the MCL



Arthroscopic Arthrolysis Surgical Technique

- Release the patella
 - If it is lateralized
 - Lateral release
 - If it is tight but centralized
 - Medial and lateral releases



**Arthroscopic Arthrolisis
Surgical Technique**

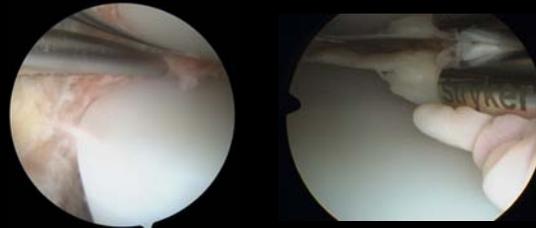
- Resect any remaining meniscal tissue



Pseudomeniscus

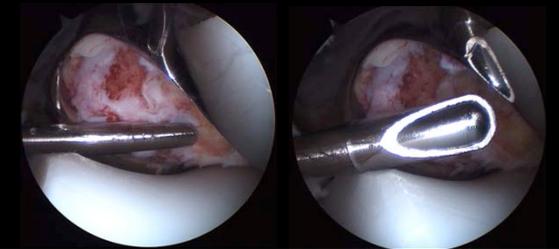
Onset of pain may represent an impinging pseudo-meniscus (usually localized posteromedial or posterolateral)

Scher DM et al. J Arthroplasty 1997



**Arthroscopic Arthrolisis
Surgical Technique**

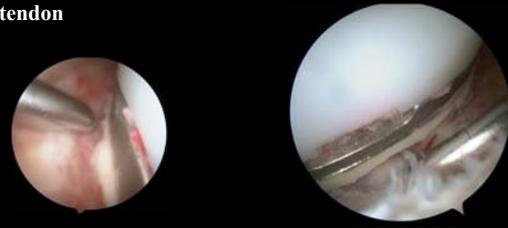
- Resect anterior compartment
 - Cyclops lesions, etc... till the knee can be fully extended



**Arthroscopic Arthrolisis
Surgical Technique**

INTERVAL RELEASE

- to free the Hoffa pad and patellar tendon



If flexion contracture persist

Treatment of the final 10° of extension can still be unsuccessful.

If so,
consider posterior capsulotomy as it is technically feasible arthroscopically



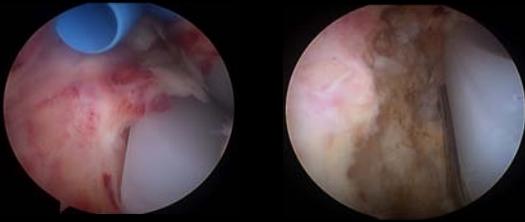
**Arthroscopic Arthrolisis
Surgical Technique**

- Release the posterior capsule
 - Need for posterior medial and lateral portals (Kim approach)



Arthroscopic Arthrolysis Surgical Technique

- Resect the impinging tissue from the back of the polyethylene

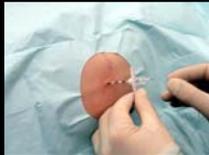


Arthroscopic Arthrolysis Surgical Technique

- Release the capsule from the back of the femur



Postoperative regional pain blockade



Results

- Generally good (in terms of motion and pain)

Williams et al. Clin Orthop. 1996
Ditloch et al. Arthroscopy. 1997
Lucas et al. Clin Orthop. 1999
Scranton. J Arthroplasty. 2001
Jerosch et al. KSSTA. 2007
Arthrobot et al. KSSTA. 2010

- Not reliable for severely stiff knees

Yercan et al. Knee 2006

- No major complications have been reported

There is an unreported risk of instrument breakage and abrasion of the prosthesis

- Technically difficult and requires a significant amount of experience

Results

- literature review period 1987 to 2009
- 18 peer-reviewed studies on the surgical intervention for stiff TKR

Review of Literature Comparing Results of Different Surgical Strategies for Stiffness of TKR				
Treatment	No. Studies	N	Gain ROM	Failure, %
Arthroscopic debridement & manipulation under anesthesia	7 (1987-2006) ^{1,16-21}	49	0°-42°	24.5
Arthrolysis & poly exchange	4 (2001-2006) ²²⁻²⁴	37	20°-40°	21.6
Revision TKR	7 (1990-2006) ^{2,5,6,24-27}	112	16°-50°	14.3

Abbreviations: ROM, range of motion; TKR, total knee replacement.

Conclusion - a revision TKR gives the best chance of gaining motion

Gonzalez della Valle et al. HSS J. 2007

Conclusions

Arthrofibrosis after TKR

- Arthroscopic Arthrolysis is reproducible and safe

- AA may have greater success

Conclusions

Stiff TKR

- The results of revision TKR have the lowest incidence of failure or recurrence
- Therefore, a revision gives the best chances of gaining motion

Thank you



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