Introduction

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

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% - Yerkan et al. Knee 2006
- 7% - Pariente et al. Surg Technol Int 2006
- 4.9% - Arbuthnot et al. KSSTA 2010

Causes

MULTIFACTORIAL

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

Despite flawless surgical execution of the TKR, some patients will continue developing stiffness. The 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)


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

Su et al. Orthopedics 2010

Arthroscopic Arthrolysis in stiff TKRs

Arthroscopy in Total Knee Replacements
Campbell EDD
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 analysis will have an effect on motion after TKR
- Physical therapy (CPM) started immediately (in-patient)
Establishing portals
- Antero-lateral viewing portal
  - to visualize and evaluate the location, and type of fibrosis
  - the AM portal is created under direct vision
  - 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
  - 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
Pseudomeniscus

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


Arthroscopic Arthrolysis
Surgical Technique

- Resect any remaining meniscal tissue

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

Interval Release
- to free the Hoffa pad and patellar tendon

Arthroscopic Arthrolysis
Surgical Technique

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

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**

- Resect the impinging tissue from the back of the polyethylene

**Results**

- Generally good (in terms of motion and pain)
  - Jerosch et al. KSSTA. 2007
  - Arbuthnot et al. KSSTA. 2010

- Not reliable for severely stiff knees

- No major complications have been reported
  - Yercan et al. Knee 2006

- Technically difficult and requires a significant amount of experience

**Conclusion**

- Arthrofibrosis after TKR

**Arthrofibrosis after TKR**

- Arthroscopic Arthrolysis is reproducible and safe

- AA may have greater success

---

**Postoperative regional pain blockade**

**Results**

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

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. Studies</th>
<th>N</th>
<th>Gain ROM</th>
<th>Failure, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthroscopic Arthrolisis</td>
<td>7/1992-2009</td>
<td>49</td>
<td>0°-60°</td>
<td>25.5</td>
</tr>
<tr>
<td>Ankle fusion</td>
<td>4/2001-2004</td>
<td>37</td>
<td>30°-40°</td>
<td>21.6</td>
</tr>
</tbody>
</table>

**Conclusion**

- a revision TKR gives the best chance of gaining motion
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