Post-operative STIFFNESS AFTER TKA

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Stiffness

Prevalence:
- Stranton, Jr 2001: 10.4%
- Kim et al 2004: 1.3%
- Nelson et al 2005: 1.3%
stiffness

- Meaning for the surgeon
- Meaning for the patient
Functional knee flexion

- walking \(65^0\)
- Getting up from chair and stairs \(70-83^0\)
- stairs \(90^0\)
- shoe laces \(103^0\)
- Sitting \(93^0\)
stiffness

- Loss of extension > 20° or range < 45°
  \((\text{Nicholls and Dorr 1990})\)

- Flexion < 85°
  \((\text{Scranton 2001})\)

- Range of movement < 70°
  \((\text{Christensen et al 2002})\)

- Loss of extension > 15° and flexion < 75°
  \((\text{Kim et al 2004})\)
Preoperative parameters

- Preoperative range of movement
- Post-traumatic OA
- Previous operations
- Obesity
  Extra-articular (OA hip)
Errors of surgical technique I

- Medial rotation and/or medial displacement of femoral component
- Medial rotation and/or medial displacement of tibia
- Femur in flexion (overstuffing patello-femoral joint)
- PCL
- Size of implant
Errors of surgical technique II

- Patella mal tracking
- Elevated joint line
- Adhesions- Arthrofibrosis
- Replacement or not of the patella
- Loosening of the patella implant
- Ectopic ossification
Treatment = Prevention

- Pain control
- C.P.M.
- Physiotherapy
- MUA
- Adhesions Release open or arthroscopically
- Revision/correction of causes
CPM is it useful?

- No effect on length of hospital stay
- Reduces the risk for MUA
  
  *Harvey et al 2010, Cochrane Database Syst Rev*

- No influence on the final range of movement but increases the speed of reaching the expected flexion

*Useful following MUA*
MUA

*Esler et al, JBJS 1999* ... All patients retained range of movement 1 year after MUA even if MUA was done 4/12 post

Yercan et al 2006, Knee. Improvement of flexion from 67° to 117°

Pariente et al 2006. Improvement from 71° to 102°

Ipach et al BMC Musc Dis 2011: MUA useful but time interval from operation not important. Number of previous operations and flexion< 70 deg less effective
- **Fox & Poss JBJS 1981**
  1 year post MUA av increase of movement 13 deg
  Complications 3%

- **Daluga et al J Arthroplasty 1991**
  Same results if MUA before 3/12 or after, following TKA

- **Mohhamed et al Ann R Coll Surg Engl 2009**
  Mean time to MUA 13.2/52 (Range 6-32/52)
  Useful in early stiffness

- **SE Fitzsimmons et al Clin Orthop Relat Res 2010**
MUA

- Possible complications:
  - Supracondylar fracture of the femur
  - Tear/Detachment of patella ligament
  - Ectopic ossification
ARTHROFI BROSIS 1.2-17%

Open Arthroscopically

Results

!! Leakage
Infection
Damage to Implants

Reflex sympathetic dystrophy
Treatment

- Revision:
  - Posterior Stabilized Prosthesis
- New PE insert?
Revision

- It is important, when deciding to perform a revision arthroplasty to know the reason for failure and loss of motion.

• Failure to correctly identify the cause of failure may result in recurrence of the problem.

Giles R. Scuderi, MD The Stiff Total Knee Arthroplasty Causality and Solution. The Journal of Arthroplasty 2005
William J. Maloney, MD The Stiff Total Knee Arthroplasty Evaluation and Management The Journal of Arthroplasty 2002
<table>
<thead>
<tr>
<th>Causes for Revision Surgery*</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene wear</td>
<td>25.0</td>
</tr>
<tr>
<td>Loosening</td>
<td>24.1</td>
</tr>
<tr>
<td>Instability</td>
<td>21.2</td>
</tr>
<tr>
<td>Infection</td>
<td>17.5</td>
</tr>
<tr>
<td>Arthrofibrosis</td>
<td>14.6</td>
</tr>
<tr>
<td>Malalignment / malposition</td>
<td>11.8</td>
</tr>
<tr>
<td>Extensor mechanism deficiency</td>
<td>6.6</td>
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<tr>
<td>Avascular patellar resurfacing</td>
<td>4.2</td>
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<tr>
<td>Fracture</td>
<td>2.8</td>
</tr>
<tr>
<td>Isolated patellar resurfacing</td>
<td>0.9</td>
</tr>
</tbody>
</table>

*More than 1 cause may exist for each revision
Surgical Technique

- Approach: *quads snip, V-Y, tibial tubercle osteotomy, lateral release*
- Correct flexion-extension gaps
- Correct joint line level
- Correct rotation of femur and tibia
- Correct size of femur and tibia
PE exchange

- Babis et al JBJS 2001
  exchange PE, arthrolysis, debridement
  High failure %

- Engh et al JBJS 2000
ligaments

Posterior cruciate:
? Arthroscopic release
Open release and PS implant

Medial and Lateral collateral:
Extensive release
** Lateral gutters
Revision

- Results: 2/11 flexion > 100°
- Complications:
  - Continued stiffness (4/11 MUA)
  - Low patella (1/11)
  - Delayed healing (2/11)

*Christensen et al 2002*
Kim et al 2004.  56 patients

Results: 93% fair improvement (av. 82°) of range
4/56 MUA, 2/56 second revision

Hartman et al J Arthroplasty, 2010  35 patients

54.5/12 F-U,
improvement of range from 44.5 deg to 98.1 deg
17 patients (49%) required additional procedure for stiffness or other complication.
stiffness

Own results: 412 TKA 1999-2004

Symptomatic stiffness: 6 (1.5%)

- 4 MUAs
- 2 Revisions
revision

- MUA:

- 2 in < 12/52 (non compliance of patients for physiotherapy,
  Range of movement 0 – 75°)

- 2 in > 12/52 (1 ectopic ossification)
Revision

Revision:

- 1 ectopic ossification
- 1 fibrous adherence of quads and PE wear
Χειρουργική Τεχνική

✓ Μεγάλη τάση οπισθίου χιαστού
✓ Μεγάλη τάση οπισθίου θυλάκου
✓ Απελευθέρωση πλαγίων συνδέσμων
✓ Διατομή καθεκτικών συνδέσμων της επιγονατίδας
✓ Αφαίρεση οπισθίων οστεοφύτων
Προεγχειρητικοί παράγοντες

- Προεγχειρητικό εύρος κίνησης
- Μετατραυματική ΟΑ
- Προηγηθείσες χειρουργικές επεμβάσεις
treatment

- Simple MUA in < 12 weeks
- Manipulation plus arthroscopic adhesion release and/or PCL if > 12 weeks
- Open manipulation and arthrolysis

*Scranton 2001*