

# Post Traumatic Knee Joint Stiffness & Arthrofibrosis

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## Knee Trauma

- Fracture
- Ligamentous Injury
- Meniscal Injury
- Articular Cartilage Injury
- Neurovascular Injury
- Associated injuries
  - General Surgery
  - Neurosurgical
  - Soft tissue

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## Knee trauma

- Tertiary Medical Center
- Patients present often as a result of high energy trauma
- Care is prioritized based on injury
- Uncontrolled environment based on multiple factors
  - Unplanned event
  - Knee may not be the highest patient priority
  - Unable to have a pre-injury/pre-op discussion with the patient
  - Prolonged immobilization of the knee and the patient
    - I.e. Intubate, sedated SICU

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## Sports Medicine

- Patient is seen in the office pre-op or post injury
- Methodical Team oriented approach
- Detailed discussion with the patient
  - Injury
  - Treatment
  - Complications
  - Expectations
  - Postoperative course

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## Sports Medicine Team

- Physician(s)
- Physician Assistant
- Scheduler/MA
- Athletic Trainer(s)
- Physical Therapists
- Post op protocol
  - Call night of surgery
  - Follow up 3-5 days post op
  - PT rep in office
  - Review expectations
  - Plan for follow up including goals
- Communication, communication, communication

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## Knee Trauma

- Barriers to success
  - Unexpected nature
  - May not be local
    - Variable team
  - Prolonged follow up
  - Pain
  - Other priorities
    - Injuries
    - Work
    - Family
  - Resources
    - Rides
    - Insurance

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## Knee Arthrofibrosis Symptoms

- Pain
- Stiffness
- Decreased Function
  - Extension
  - Flexion

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## Knee Arthrofibrosis Treatment

- Avoidance- Tertiary Trauma Center
  - Post op
  - Early ROM as soon as medically stable
  - fixation
  - Formal therapy
  - Early post op/post injury follow up
- STRESS EXTENSION
- Avoidance-Sports Medicine
  - Timing of surgery
    - Mechanical Block → early
    - No Mechanical block → late
  - Clear expectations
    - Requirements for therapy
    - Location for therapy
  - LOOSE KNEES GET TIGHTENED, STIFF KNEES GET LOOSENED
  - BETTER OFF LOOSE THAN STIFF

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## Incidence of LOA/MUA after Knee Arthroscopic Surgery

- Werner et al, UVA
- AJSM, 2015
- National insurance database retrospectively queried arthroscopic knee procedures 2007-2011
- 330,714 patients underwent knee scopes

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### Werner et al, UVA

- Conclusion
  - Incidence is low but increases with number of concomitant procedures or the complexity of the procedure
  - Noteworthy for preoperative discussion

Procedure	MUA (%)	LOA (%)
ACL	~1	~1
ACL + meniscus	~2	~2
ACL + meniscus + ligament	~3	~3
ACL + meniscus + ligament + cartilage	~4	~4
ACL + meniscus + ligament + cartilage + meniscus	~5	~5
ACL + meniscus + ligament + cartilage + meniscus + ligament	~6	~6
ACL + meniscus + ligament + cartilage + meniscus + ligament + ligament	~7	~7
ACL + meniscus + ligament + cartilage + meniscus + ligament + ligament + ligament	~8	~8
ACL + meniscus + ligament + cartilage + meniscus + ligament + ligament + ligament + ligament	~7	~7
ACL + meniscus + ligament + cartilage + meniscus + ligament + ligament + ligament + ligament + ligament	~6	~6

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### Knee Arthrofibrosis Treatment

- Non surgical
  - Home exercise program
  - Formal Therapy
  - Dynamic Splinting
  - Medications
    - Anti-inflammatories
    - Oral steroids
    - Intra-articular cortisone shots
- Surgery
  - Manipulation Under Anesthesia
  - Arthroscopy,
    - LOA
    - MUA
    - Lateral Release

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### Non Surgical Treatment

- Non surgical
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### Non Surgical Treatment

- Only works early
- HEP-ineffective in isolation
- Formal PT-imperative with aggressive therapist
- Dynamic splinting-effective for unipolar stiffness
- Medications-imperative
  - Anti-inflammatories
  - Oral steroid taper-long
  - Cortisone shot

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### Surgical-My approach

- Convert the patient to a controlled environment with a formal multifactorial team approach as there is no longer an immediate need.
- Outline bipolar expectations with a formal plan PRIOR to surgery and understand patients goals
- Patient buy in is imperative
  - Commitment to PT every day x 2 w post op-including transportation, wean down if appropriate
  - PT must be pre-approved with insurance
  - CPM
  - Patient has to make it a priority

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### Surgery-My approach

- Review previous history imaging and radiographs
  - Insight in to likely gains
- Less is more
  - MUA vs LOA
  - Reintroducing an inflammatory response.
- Extension is key
- Intraoperative range is maximum and expect regression



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## Surgery-My approach

- Femoral and sciatic nerve blocks
- Pre-operative clinical pics under anesthesia
- Drape out the entire knee
- Use lateral post



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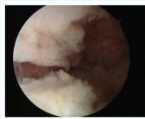
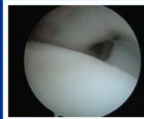
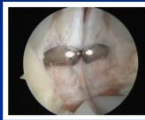
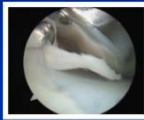
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## Surgery

- Multiple portals
- Tedious surgery
- Start anterior and work posterior if necessary
- Address flexion first
  - Suprapatellar pouch
  - Gutters
- Extension if necessary
  - PM and PL portals
  - Stay 1 portal anterior
  - Caution-avoid axial anatomy with posterior capsule



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## Surgery

- Drain
- Post operative clinical pictures
- Same day physical therapy with demonstration of limits of ROM
- Admit overnight



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### Post op

- Physical Therapy every day
  - Experienced therapist is critical
  - HEP critical
- Follow up within 3 days post op
- 12 day steroid taper once wound healed

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### MUA Posttraumatic Knee Arthrofibrosis

- Sassoon et al, 2015, JOT
- Retrospective review
- 22 patients, high energy trauma
- Ave age 40
- Injuries –fractures of femur, tibia, patella, ligamentous injuries, traumatic arthrotomies
- Mean time from treatment to MUA was 90 days.

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### Sassoon et al, 2015, JOT

<ul style="list-style-type: none"><li>■ Results<ul style="list-style-type: none"><li>■ Pre MUA ROM<ul style="list-style-type: none"><li>■ 59°±25°</li></ul></li><li>■ Intra-op mean<ul style="list-style-type: none"><li>■ 123°±14°</li></ul></li><li>■ Most recent f/u mean<ul style="list-style-type: none"><li>■ 110°±19°</li><li>■ Ext 1.2° (range 0-10°)</li><li>■ Flex 111 (range 75-145°)</li></ul></li><li>■ No intraop complications</li></ul></li></ul>	<ul style="list-style-type: none"><li>■ Results<ul style="list-style-type: none"><li>■ Tob, ↑BMI, open fx, ↑ age did not impact MUA effectiveness</li><li>■ MUA after 90 days = benefit MUA more acutely<ul style="list-style-type: none"><li>■ Mean improvement 58° versus 39° (p=.12)</li></ul></li></ul></li><li>■ May wait given no benefit of early manipulation and ↓ risk of fx displacement</li></ul>
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## Outcomes MUA vs. LOA

- Evans et al, 2013 J Surg Orthop Adv
- 56 patients, 61 knees combat related knee arthrofibrosis
- 41 MUA/20 LOA
- No diff in Pre-op ROM
- Sig improvements in MUA arc of motion compared to arthrolysis (106.3° vs 82.3°) at 2 y f/u (p=.008)
- Complications (p=.04)
  - LOA- 40%
  - MUA-12.2%

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## Treatment Outcomes

- Pain usually improves
- Expect regression
- Extension > Flexion
- ROM often determined by patient diligence with post operative exercises
  - Window of opportunity must be exploited
- Function determined by ROM

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## Summary

- Arthrofibrosis is best treated by prevention
- Sometimes unavoidable
- MUA and LOA results in improved ROM, pain relief and function
- Patient buy in is critical
- Meticulous surgery with arthroscopic LOA

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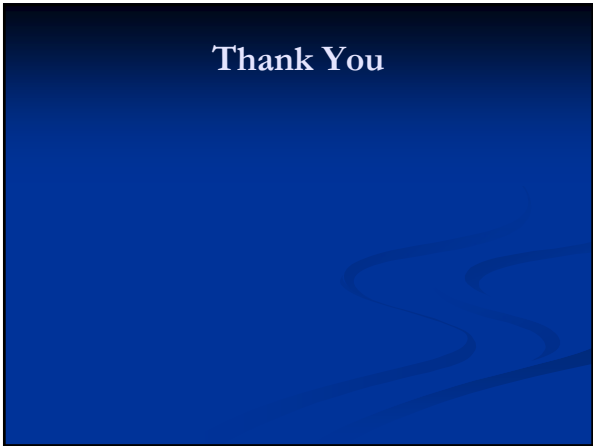
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