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

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
- Uncontrolled environment
  - 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 ICU
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

Sports Medicine Team

- Physician(s)
- Physician Assistant
- Scheduler/MA
- Athletic Trainer(s)
- Physical Therapists
- Communication, communication, communication

- 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

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
Knee Arthrofibrosis Symptoms

- Pain
- Stiffness
- Decreased Function
  - Extension
  - Flexion

Knee Arthrofibrosis Treatment

- 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 LOOSENERED
  - BETTER OFF LOOSE THAN STIFF

- 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

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
**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

**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:
    - LDA
    - MUA
    - Lateral Release

**Non Surgical Treatment**

- Non surgical
- Home exercise program
- Formal Therapy
- Dynamic Splinting
- Medications
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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

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

Surgery—My approach

- Review previous history imaging and radiographs
  - Insight into likely gains
- Less is more
  - MUA vs LOA
  - Reintroducing an inflammatory response
- Extension is key
- Intraoperative range is maximum and expect regression
Surgery - My approach

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

Surgery

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

Surgery

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

ROM 30-90° at 11 months post op
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

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 arthrotoomies
  - Mean time from treatment to MUA was 90 days.

Sassoon et al, 2015, JOT

- Results
  - Pre MUA ROM
    - 59°±25°
  - Intra-op mean
    - 123°±14°
  - Most recent f/u mean
    - 110°±19°
  - Ext 1.2° (range 0-10°)
  - Flex 111 (range 75-145°)
  - No intraop complications

- Results
  - Tob, ↑BMI, open fx, ↑ age did not impact MUA effectiveness
  - MUA after 90 days = benefit MUA more acutely
  - Mean improvement 58° versus 39° (p=.12)
  - May wait given no benefit of early manipulation and ↓ risk of fx displacement
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%

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

Summary

Arthrofibrosis is best treated by prevention
MUA and LOA results in improved ROM
Patient buy in is critical

Meticulous surgery with arthroscopic LOA

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Thank You