Lower Extremity Injuries in Wrestling

Patellar Instability & Lateral Meniscus Injuries

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From the Athletic Trainer's Perspective

Immediate care and evaluation When to refer

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Patellar Instability

- Predisposing Factors
 - Shallowed patellar groove
 - · Previous injury
 - · Hypermobility and connective tissue disorders
 - Q-Angle and hip strength
- Mechanism
 - Most often similar to a non-contact ACL rupture
 - Plant and sudden direction change
 - · Less often but direct blow to the medial knee

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Key Evaluation Findings

- Subjective
 - Pt will likely report feeling their patella shift
 - · Previous instability events Consistent MOI
- Objective

 - Antalgic gait, immediate swelling
 Obvious deformity if a full dislocation
 - Tender to palpation along medial patellar border, MPFL origin on medial femoral epicondyle, lateral patellar border, lateral femoral epicondyle
 Active and passive ROM painful and limited secondary to pain

 - Special tests- (+) Patellar Apprehension
 Rule out other ligamentous and meniscal injury

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Immediate Care and When to Refer

- Immediate Care
- If dislocated, reduce
- Ice and compression
- Ambulatory aid as needed
- NSAIDs as tolerated Begin rehab as patient is able to tolerate-
 - ROM
 - Quad Activation
 - Swelling Management
 - Progress as able

 Mechanical Symptoms · Other ligamentous injury

Dislocation

Pt is not improving withing 2-3 days after injury

When to Refer

- Pain is staying consistent
 ROM is not improving
- Swelling is not decreasing

Return to Play – Conservative Management

- · Full active ROM compared bilaterally
- Strength within 90% of uninvolved limb w/o pain
- · Little to no swelling
- Full practice with no limitations
- Typically between 10 days to 3 weeks
- Bracing/Taping can help

Lateral Compartment Injury

• Predisposing Factors

- Compromised positioning
- Poor landing mechanics · Weak guads and glutes
- Previous iniury
- Mechanism
 - Load and Twist
 - High energy situations
 - Forced hyperextension and varus stress

Key Evaluation Findings

- Subjective
 - Feeling a "pop"
 Mechanical symptoms- catching, locking, clicking

 - Pain with hyperflexion
 Issues traversing stairs or sloped surfaces
- Objective

 - Antalgic gait, swelling
 Tender to palpation in the lateral joint line, popliteal fossa, popliteus tendon, lateral femoral epicondyle/lateral tibial condyle/fibular head, LCL
 Active and passive ROM painful and limited compared bilaterally. Possibly able to reproduce a click or find a block

 - Special tests: (+) McMuardy's, Apley's Compression and Distraction, Thessaly, possible pain with valgus stress
 Important to rule out other ligamentous injury

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Immediate Care and When to Refer

From the Doctor's Perspective

Immediate Care

- Ice and Compression
- Ambulatory aid as needed
- NSAIDs as tolerated
- Similar rehab approach
 - ROM Quad activation

 - Swelling management
 - Progress as able- hip and quad strength, landing mechanics
- When to Refer
- Mechanical symptoms · Unsure of testing results
- Other ligament injury
- Little to no improvement after 2-
- 3 days
- Bottom Line: If I suspect a lateral compartment injury, I refer

Return to Play

- Doctor's release
- Full active ROM compared bilaterally
- Strength within 90% of uninvolved limb with little to no pain
- Little to no swelling
- · Minimal mechanical symptoms
- Full practice with no limitations
- Bracing can help

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Meniscus Vascular Zones

- Red-Red Zone (Peripheral 1/3)
- Red-Ked Zone (Perpheral 1/3)
 Rich blood supply; higher healing potential.
 Most tears here are amenable to repair.
 Red-White Zone (Middle 1/3)
 Intermediate vacularity; repair considered if tissue quality is good.
 White-White Zone (Inner 1/3)
- Avascular; poor healing—meniscectomy often considered.



AMP Meniscal Anatomy Tibial Attachment Capsular Attachment Root Attachment Meniscofemoral Ligaments • Transverse Meniscal Ligament

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- Bracing
- PT

 - Quadriceps/VMO strengthening
 Addition of core and hip strengthening is important
 Reduce knee stress and increasing dynamic stability/neuromuscular control



- Trochlear dysplasia
- Patella alta
- TT-TG >16mm

Surgical Indications

• Acute dislocations with:

- Intra-articular loose bodies Repairable osteochondral defects
- Recurrent instability with failure of non-operative treatment

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Surgical Treatment AMF · Perform the procedure that will address the underlying cause of instability Techniques · Proximal repair or realignment Distal realignment Distal malaligne

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• Prospective randomized study of 80 patients with primary patella

AM

- · Randomized to MPFL repair or conservative therapy



Tibial Tubercle Osteotomy



- · Corrects malalignment by realigning the abnormal bony anatomy Indications
- Recurrent instability with elevated TT-TG distance, patella alta, CD ratio >1.4
 Can also be used to offload the patella
- Various procedures have been described
 - Medialization
 Anteromedialization

 - Distalization



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| First Time Dislocation | | AMP |
|--|--|-----|
| Symptomatic Control MRI PT Plan for non-op unless there is some specific reason not to Loose Body Ostecchondral Injury Fracture Non-reducible Dislocation | | |



Lateral Release or Lengthening – Evaluate Intra-operatively AFTER MPFL/TTO

From the Physical Therapist's Perspective

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Rehab after meniscal repair



Phase 1: 0-2 weeks

Precautions:

- TTWB (crutches for 6 weeks)
 Posterior root repair 6 weeks of NWB
- ROM 0-90° (don't force deep knee flexion)

• Brace:

Phase 1 0-2 weeks (cont.)

- Therapeutic Exercises:
 - Isometric quad sets (NMES if indicated)
 - SLR (no medial SLR on MMR) • Heel slides (0-90°)
 - Isometric hamstring sets
 - Side Lying hip abduction
 - Prone quad sets

Phase 1 0-2 weeks (cont.)

- Manual Therapy:
 PROM (per guidelines specific to each case)
 - Patellar mobilization Retrograde tissue mobilization to decrease swelling

Modalities

- Cryotherapy
 - NMES
 - IFC

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Phase 2

2-6 weeks

• Precautions:

• 25% WB --> Gradually increase to 100% over next 4 weeks ROM 0-120° (full motion by 6 weeks)

• Brace:

- 0-120°
- D/C brace when pt. can demonstrate adequate quad contraction

Phase 2 2-6 weeks (cont.)

- Therapeutic Exercises (exercises as tolerated and within ROM/WB precautions:
 - Continue with previous exercises as HEP
 - Nu-Step —> Progressing to recumbent bike as motion allows
 - Leg press (within precautions)
 - Balance / Proprioception exercises once full WB.
 Hip extension and abduction strengthening
 - Quad and ham strengthening (CKC —> OKC)

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Phase 3 6 weeks +

- Full WB
- Full ROM
- Functional rehab -3 months +
- High risk sports -6 months +





Phase 1 (protection phase) week 0-6

- Protect Repair
- Decrease pain/inflammation
- Prevent negative effects of immobilization
- Restore normal arthrokinematics
- · Prevent hypomobility
- · Promote dynamic stability
- · Prevent reflex inhibition
- Develop neuromuscular control

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Week 0-2

- Gentle AAROM (0-90)
- Obtain full extension ASAP • Total leg strengthening

 - Standing hip abduction
 Side-lying clam
 Side-lying hip abduction
 Side bridge
 Unilateral bridge

- Quadriped
 SLR in all planes
 Foot and ankle strengthening
 Trunk and core exercises
- PF joint mobilization all planes (2Q)
- Cryotherapy for pain control

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Week 3-6

- Progress knee motion to 0-120°
- · Continue cryotherapy prn
- Begin CKC exercises
 - Kinesthetic awareness trainer Single leg balance exercises

 - Limited arc leg press
 Limited arc Total Gym
 - Retro step up
 Lateral step up Forward lunge
- Pelvic drop
- Transverse lunge Single-leg deadlift
 Lateral band walks
 - Single leg wall squats
- Forward step up Sideways lunge

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Week 6-10

- Return to light work activities
- Continue to improve ROM to full after 5-6 weeks
- Full ROM should be achieved by 10-12 weeks
- Advance exercises to
- Mini Squats
- Mini Lunge
- Hamstring curls Single leg squats

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Phase 2 (moderate protection phase) Weeks 6-12

- Progressively restore ROM
- Full by week 12
- Maintain repair
- Progressively restore motion, strength, and balance

Weeks 7-12

- Continue to progress motion
- Exercise progression
 - · Submaximal to maximal Double leg to single leg
 - · Eyes open to eyes closed
 - Slow speed to fast speed
- Advanced exercises
 - BOSU/Dynadisc lunges
 - BOSU/Dynadisc step-overs

Phase 3

(maximum protection phase) weeks 13-16

- Full non painful AROM/PROM
- Restoration of strength, power, and endurance
- No pain or tenderness
- Full balance/ proprioception
- Gradual initiation into functional activities · Progress intensity and decrease repetitions of exercises
- Advance to
- Double leg jump in place/ multiple planes
 Single leg hopping in place
 Light functional plyometric activities

- Advance Exercises

 Forward/Sideways/Transverse hop

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Phase 4

(Return to activity phase) weeks 17-20+

• Full strength, power, and endurance

Maintain balance and proprioception

• Return to unrestricted sports activities

Maintain knee motion

• Progress functional activities

Weeks 20+

Continue previous exercise

Advance to

- Single leg plyo's
- Sports specific training
- Interval sports programs
- JoggingSwimming
- Basketball
- Baseball

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Discharge • Criteria

- Full LE strength
- Full ROM
- Functional tests
- Single leg Step down

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Single leg step down test

- Test extremity near edge of 20 cm step
- Hands on waist
- · Flex test knee enough to touch foot gently on floor
- 5 reps
- Score
 - 0-1 Good quality
 - 2-3 Medium quality
 - 4+ poor
 - LEFS-MCD of 9 points

Score (cont.)

• Jump test

- 100% height (males)
- · 90% height (females)
- Hop test
 - 90% height (males) 80% height (females)
- LEFT
 - Good: 90s (males); 100-120s (females)
 - Avg: 100s (males); 120-150s (females)
 - · Below Avg: 125s (males); 140-180s (females)

Proximal/Distal Patellar Realignment Rehab Protocol



Phase 1 0-6 weeks

• Goals

- Protect fixation and surrounding tissue
- Control inflammationRegain active quadriceps neuromuscular control
- Full knee extension and gradual flexion as outlined below
- Patient education on rehab process
- Gradually wean off crutches (5-6 weeks), then out of brace

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Precautions / Weight Bearing

- No closed-kinetic chain exercises for 6 weeks
- No SLR for 2 weeks
- Proximal realignment- WBAT
- Distal realignment TTWB, advance WB 25% each week as tolerated

Caveat with TTO - NWB for 6 weeks



ROM

• 0-2 weeks: 0-40°

- 4-6 weeks: 0-90°
 6 weeks+: full motion as tolerated

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Brace

 Per ROM guidelines above. Locked in full extension for sleeping 0-4 weeks.

Therapeutic Exercises

- Isometric quad sets (NMES as needed per tolerance)
- Heel slides in appropriate ranges, outlined above.
- Resisted ankle ROM with Theraband
- Non-weight bearing hamstring and gastrocnemius / Soleus
 Stretching
- Four-way SLR starting at 2 weeks as patient symptoms allow
- Gait training in pool: 4-6 weeks (if incision is fully healed)

Manual Therapy

- PROM (per guidelines above)
- Patellar mobilization (begin when tolerated)
- Retrograde tissue mobilization for swelling

Criteria for progression to phase 2

- Good quadriceps tone, No extension lag with SLR
- ~90° of flexion
- No signs of active inflammation

Phase 2 6-12 weeks

• Goals

- Increase flexion to full motion
- Increase strength / proprioception exercises to functional exercises over the next 6 weeks
- Wean off crutches and out of brace if not already

- Therapeutic Exercises 6-8 weeks
- Continue with previous exercises progressing towards full flexion
- Nu-Step —> progressing to stationary bike as motion allows
- Balance / proprioception exercises once full weight bearing
- Wall slides / sits progressing to mini squats (0-45°)

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Therapeutic Exercises

8-12 weeks

- Add resistance to stationary bike
- Leg press 0-90°
- Continue proprioception exercises
- Hamstring curls
- Treadmill walking to normalize gait
- Continue to progress gentle strengthening and flexibility exercises

Criteria for progressing to phase 3

- Normal gait pattern
- Good active quad contraction with patellar tracking
- Full active motion
- No extension lag with SLR
- Clearance from physician to begin functional rehab

5/18/2025

Phase 3 3-6 months+

• Functional rehab – 3+ months

High risk sports – 6+ months

From the Athlete's Perspective

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