Soft Tissue Knee Assessment Clinical Pathways

Release Date: September 2022

Version 1

Quick links:

- S1. Overview
- S2. Screening
- S3. History-taking
- S4. Physical Examination
- S5. MRI Appropriateness Checklist
- S6. Pathway Selection Algorithm
- S7A. Acute Knee Injury – Differential Diagnosis
- S7B. Acute Knee Injury Pathway
- S8A. Acute Intra-Articular Knee Ligament Injury (AIKLI) - Differential Diagnosis
- S8B. Acute Intra-Articular Knee Ligament Injury (AIKLI) Pathway
- S9A. Acute Extra-Articular Knee Ligament Injury (AEKLI) - Differential Diagnosis
- S9B. Acute Extra-Articular Knee Ligament Injury (AEKLI) Pathway
- S10A. Acute Patellar Instability - Differential Diagnosis
- S10B. Acute Patellar Instability Pathway
- S11A. Chronic (atraumatic, overuse) Knee – Differential Diagnosis
- S11B. Chronic (atraumatic, overuse) Knee Pathway
- S12A. Knee Arthritis & Degenerative Meniscus - Differential Diagnosis
- S12B. Knee Arthritis & Degenerative Meniscus Pathway

These pathways will help guide clinicians with appropriate procedures for patient management, investigations, and referrals.

The purpose of these pathways is to:

- initiate early, non-operative management for suitable patients;
- reduce unnecessary diagnostic imaging;
- increase the appropriateness of surgical referrals; and,
- reduce waiting lists for surgical consult.

Alberta Health Services
Bone & Joint Health Strategic Clinical Network™

ALBERTA BONE & JOINT HEALTH INSTITUTE

SECTION 1. OVERVIEW

This tool has been developed for point-of-care providers (e.g., primary care, allied health) who are managing patients with acute knee injuries and chronic knee problems. This tool will help guide assessment, screening, history-taking, physical examination, and differential diagnosis. It will also provide evidence-based, goal-oriented management while identifying triggers for investigations and referrals. We acknowledge that this tool is not comprehensive but serves as a helpful clinical decision-making tool for managing common conditions of the knee.

When using this tool:
- Sound clinical judgement should be used in conjunction with this tool as a guide;
- Consult the MRI knee appropriateness checklist when ordering MRI (Section 5);
- Referral to a surgeon is only indicated if patient desires and is medically appropriate or fit for surgery

INSTRUCTIONS:

STEP 1: Initial Assessment: Perform Steps 1a-1d

1a: Perform HISTORY-TAKING (Section 3: History-taking, Page 4)
1b: Perform PHYSICAL EXAMINATION (Section 4: Physical examination, Page 5)
1c: Identify RED FLAGS (Section 2: Screening, Page 3)
1d: Identify YELLOW FLAGS (Section 2: Screening, Page 3)

STEP 2: Pathway Assessment

Identify an appropriate pathway using the Pathway Selection Algorithm (Section 6, Page 7)

STEP 3: Follow Selected Pathway

Utilize the differential diagnoses and associated pathways to assist in clinical decision-making
- **Acute Knee Injury** (Sections 7A/B, Pages 8-9)
  - **Acute Intra-Articular Knee Ligament Injury** (AIKLI) (Sections 8A/B, Pages 10-11)
  - **Acute Extra-Articular Knee Ligament Injury** (AEKLI) (Sections 9A/B, Pages 12-13)
  - **Acute Patellar Instability** (Sections 10A/B, Pages 14-15)
- **Chronic (atraumatic/overuse) Knee** (Sections 11A/B, Pages 16-17)
- **Knee Arthritis & Degenerative Meniscus** (Sections 12A/B, Pages 18-19)

STEP 4: MRI Knee Appropriateness Checklist

- Please review this checklist prior to requesting outpatient MRI knee referrals (Section 5, Page 6)
- This checklist will help to inform MRI decision-making
- **NOTE: MRI is NOT required for referral to a trained knee expert.** If necessary, the trained knee expert will make arrangements for an MRI to be completed

SECTION 2. SCREENING

RED FLAGS
Red flags identified during the primary care assessment require urgent secondary care referral

DIFFERENTIAL DIAGNOSIS	INDICATION	URGENT SECONDARY CARE REFERRAL
Irreducible fracture or dislocation	Obvious deformity	Same day emergency referral to ED
Neurovascular compromise	Altered or absent pulse, motor function, or sensation	Same day emergency referral to ED
Compartment syndrome	Constant or progressive intractable pain; reduced or absent distal pulse; neurological disturbance (absent or altered sensation)	Same day emergency referral to ED
Severe cut or laceration	Obvious wound; severe bleeding; constant or progressive pain	Same day emergency referral to ED
Infection or septic arthritis	Systemically unwell; fever; significant swelling not related to trauma; pain unrelated to activity; pain not relieved with rest	Same day emergency referral to ED
Tumour	History of cancer; night sweats; unremitting night pain; unexplained, unintentional, or sudden weight loss; unexplained deformity or mass; acute onset with no identifiable cause; pain unrelated to activity; pain not relieved with rest	Urgent referral to orthopaedic oncology surgeon

*ED: emergency department

YELLOW FLAGS
Yellow flags identified during the primary care assessment may a) require additional resources to help manage the patient if not already being managed or b) need referral to alternative pathway measures

INDICATION	SUGGESTED COLLABORATIVE MANAGEMENT PATHWAY
Inflammatory arthropathy (e.g., rheumatoid arthritis, gout, psoriatic arthropathy)	Rheumatologist
Receiving active treatment at chronic pain clinic (e.g., knee pain part of a generalized pain condition)	Pain management specialist
Receiving active treatment for a neurological or neuromuscular condition (e.g., stroke, multiple sclerosis)	Neurology/ Neurosurgeon
Receiving active treatment for a medical condition such as diabetes, renal disease, respiratory disease, or ischemic heart disease	General internal specialist
Unexplained neurological disturbance or deficit in the affected knee (e.g., altered power or sensation, numbness, tingling, burning)	Neurology/ Neurosurgeon
Referred pain from lumbar spine or pelvis resulting in knee and/or other lower limb pain or altered sensation or altered power	Spine SCN Pathway
Traumatic knee injury is a part of an active medicolegal or third-party claim (e.g., motor vehicle accident)	General practitioner and/or treating medical team
Traumatic knee injury is a part of a work-related incident (Workers' Compensation Board related)	Workers' Compensation Board case manager
Patients presenting with kinesiophobia	Psychosocial support
Patients presenting with psychological distress or inability to cope with knee injury	Psychosocial support
Patients lacking a support network or system to help with knee injury	Psychosocial support and/or Social Worker

SECTION 3. HISTORY-TAKING

PATIENT PROFILE			
Age:	Sex:	Occupation:	Affected Knee: L, R or both

Q 1. When did your knee problem start? (Specify date, < 6 weeks, > 3 months)

Q 2. What is the current problem or primary concern with your affected knee? [e.g., pain, instability, swelling, mechanical symptoms (clicking, catching, locking)]

Q 3. Did this problem start suddenly? (e.g., acute injury) or come on gradually over time?

Q 4. If **suddenly**, proceed through below Questions

- When you look at your affected knee compared to your other knee, do you see or feel any of the following: severe cut or laceration, wound that might be infected, obvious bone deformity?
- Is this a knee injury that your suffered at work?
- Did your knee problem start following an accident or injury? Please describe in detail what you were doing when you injured your knee.
- Did you hear a pop and/or snap at the time of the accident or injury?
- Did you have immediate pain at the time of the accident or injury? If yes: Where was the pain? (medial, lateral, anterior, posterior)
- At the time of injury, were you able to weight bear?
- Did your knee swell <24 hours after the accident or injury?
- At the time of the injury, were you able to fully straighten your knee?

Q 5. If **gradually over time**, proceed through below Questions

- Other than your knee, do you have other painful joints?
- Other than your knee, do you have other swollen joints?
- Do you have morning stiffness?
- Do you have systemic symptoms? (e.g., fever, rash)

Q 6. Currently, do you have knee pain? If **YES**, proceed through below Questions

- Where is the location of your knee pain? (medial, lateral, anterior, posterior)
- When did it start? Was it constant/intermittent, gradual/sudden?
- What is the pain like? (sharp, dull ache)
- Does it radiate/move anywhere?
- Does anything make it better or worse?
- How severe is the pain, on a scale from 0 (no pain) – 10 (worst pain)?

Q 7. Currently, do you have numbness, tingling, burning sensation in the knee?

Q 8. Currently, do you have mechanical symptoms such as catching or locking?

Q 9. Currently, are you able to fully straighten your knee?

Q 10. Currently, does your knee feel like it is going to give way or buckle? (going up stairs, going down stairs, twisting and/or pivoting, playing sports, during my normal daily activities, all of the above, other)

Q 11. Before this current knee injury, have you ever previously injured either knee? (What type of injury? Which knee? Date of injury? Is your current injury maybe a re-injury to a previous knee problem?

Q 12. Have you ever had surgery on your knees? (Which one? What surgeries? When?)

Q 13. What diagnostic tests/imaging for your current knee injury?

Q 14. What treatments have you had for your current knee injury?

Q 15. What medications are you currently on? What medications are you taking for your current knee injury?

Q 16. Do you currently have any medical conditions that apply to your current health? (Which ones?)

SECTION 4. PHYSICAL EXAMINATION

STEP 1. Observe gait (e.g., antalgic, flexed knee) and lower limb alignment (e.g., varus, valgus, neutral)

STEP 2. Inspect for effusion, bruising, deformities, atrophy, prior scars, and lacerations

STEP 3. Palpate: a) point of maximal tenderness; b) patella borders; c) joint lines; d) pes anserine

STEP 4. Perform: a) active range-of-motion (ROM); b) passive ROM; and c) strength testing of the knee bilaterally

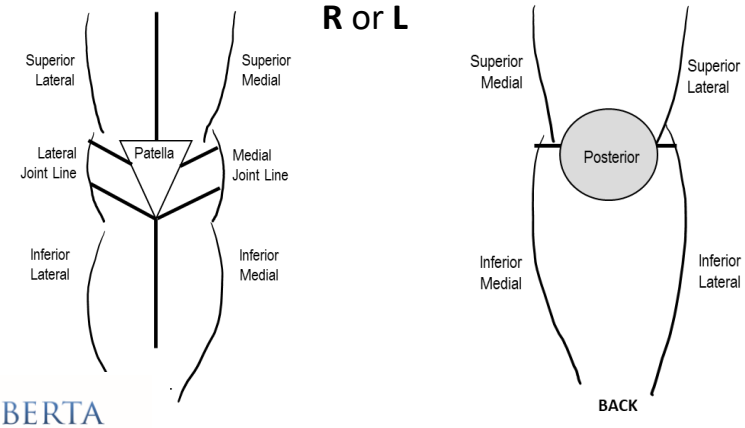
		Knee Flexion	Knee Extension
ACITIVE ROM	**LEFT**	Full **OR** Limited	Full **OR** Limited
	RIGHT	Full **OR** Limited	Full **OR** Limited
PASSIVE ROM	**LEFT**	Full **OR** Limited	Full **OR** Limited
	RIGHT	Full **OR** Limited	Full **OR** Limited
STRENGTH	**LEFT**	Full **OR** Limited	Full **OR** Limited
	RIGHT	Full **OR** Limited	Full **OR** Limited

STEP 5. Examine a) joints above and below affected knee; and/or 2) lumbar spine if indicated.
To examine joints above/below/lumbar spine, perform active ROM, dermatomes, myotomes, and reflexes if indicated

If joint above and below are normal, proceed to Section 6: Pathway Selection Algorithm

If pain/symptoms are reproduced with examination of joints other than the knee during STEP 5, ALTERNATIVE OR SPINE SCN PATHWAY IS REQUIRED. Refer to Section 2.

STEP 6. Indicate point of maximal tenderness on diagram with "X"



SECTION 5. MRI KNEE APPROPRIATENESS CHECKLIST

- Please review this checklist prior to requesting outpatient MRI knee referrals.
- This checklist will help to inform MRI decision-making.
- **NOTE: MRI is NOT required for referral to a trained knee expert.** If necessary, the trained knee expert will make arrangements for an MRI to be completed.

FOR ACUTE KNEE INJURIES (< 6 weeks from injury and history of knee trauma), MRI is recommended for:

- ❑ *Locked knee (Section 7A/7B)
- ❑ Osteochondral fracture (often associated with patellar dislocation) (Section 7A/7B)
- ❑ Multi-ligamentous knee injury (i.e., knee dislocation) (Section 7A/7B)
- ❑ Clinical suspicion of posteromedial or posterolateral corner injuries (Section 9A/9B)
- ❑ Clinical suspicion of 3rd degree distal medial collateral ligament injury (i.e., Stener lesion) (Section 9A/9B)

FOR SUB-ACUTE KNEE INJURIES (6-12 weeks from injury or symptom presentation), consider MRI if there is:

- ❑ Persistent swelling and effusion despite appropriate non-operative management (i.e., exercise and strength-based rehabilitation program & anti-inflammatories) for 6 weeks
- ❑ Inability to lift and extend knee against gravity

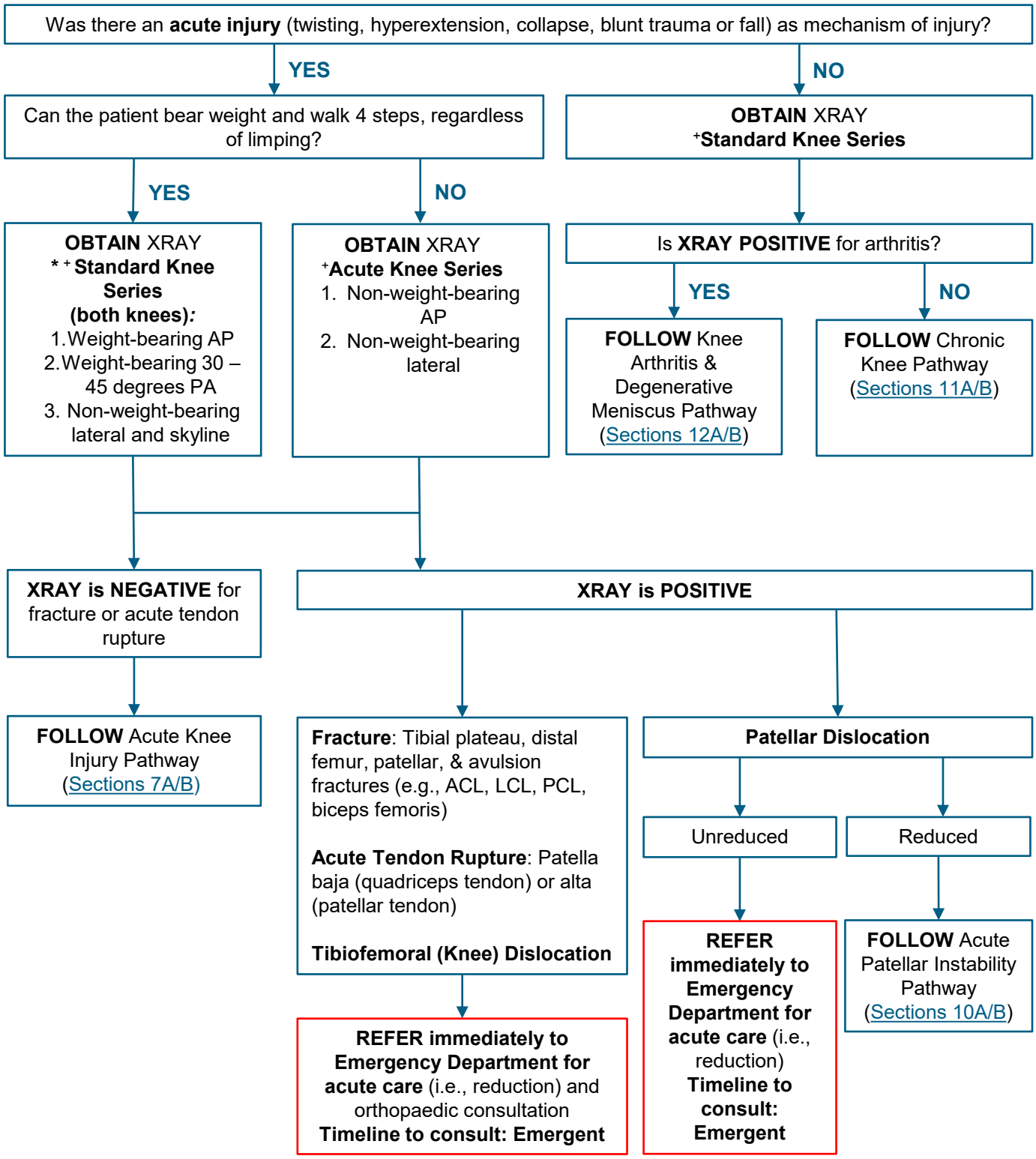
FOR CHRONIC KNEE INJURIES (> 12 weeks from injury or symptom presentation), consider MRI if **ALL** of the following are present:

- ❑ Absence of osteoarthritis
- ❑ Persistent unexplained symptoms (e.g., pain, instability, giving way) > 3 months
- ❑ Failed non-operative management (i.e., exercise and strength-based rehabilitation program & anti-inflammatories)
- ❑ Patient desires and is medically appropriate or fit for surgery

DO NOT order MRI when:

- ❑ Weight-bearing x-rays demonstrate osteoarthritis and symptoms are suggestive of osteoarthritis as the MRI rarely adds useful information to guide diagnosis or treatment

SECTION 6: PATHWAY SELECTION ALGORITHM



⁺**oblique views** are only indicated to diagnose possible occult fractures not seen on initial imaging

SECTION 7A. ACUTE KNEE INJURY - *Differential Diagnosis*

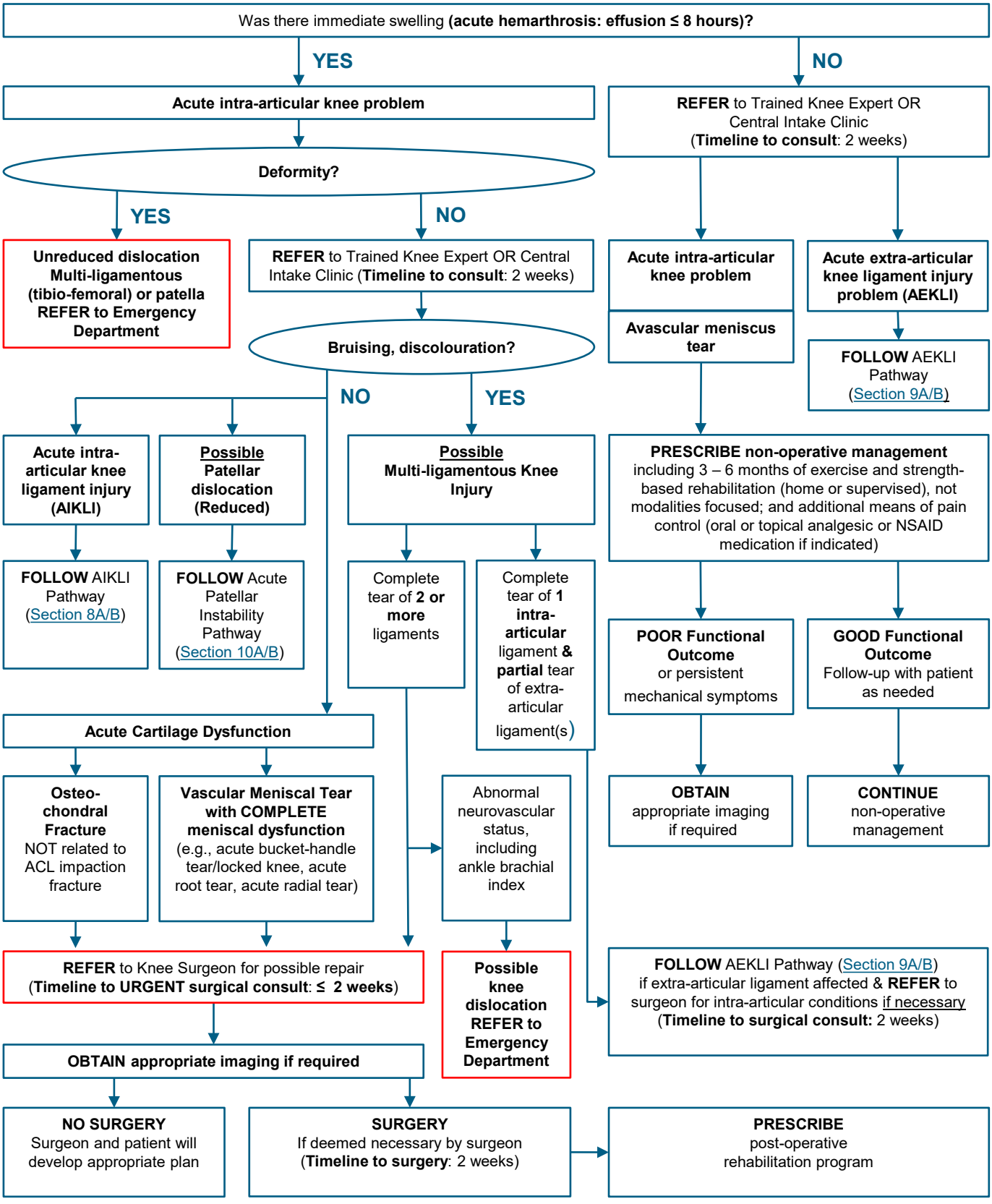
twisting, hyperextension, collapse, blunt trauma or fall as mechanism of injury

DIAGNOSIS		DISTINGUISHING FINDINGS	PATHWAY
Intra-articular knee problem	Multi-ligamentous knee injury **(must rule out tibio-femoral dislocation)**	• High energy mechanism of injury (e.g., motor vehicle collision, motorized recreational vehicle accident, contact sport) • Immediate significant swelling (acute hemarthrosis); possible bruising, discolouration, and deformity • Possible neurovascular injury • Confirm with history, physical examination, and special tests (Section 8A) & (Section 9A) **PHYSICAL EXAMINATION** • Check neurovascular status, including ankle brachial index (normal > 0.9)	**Unreduced dislocation: Refer to Emergency Department** **No dislocation:** Call knee surgeon or orthopaedic consult line for **urgent** consult
	Acute intra-articular knee ligament injury (AIKLI)	• Immediate swelling (acute hemarthrosis), **NO** significant bruising and discolouration • Possible conjunction with meniscus or cartilage injury • Confirm with history, physical examination, and special tests (Section 8A)	Follow **AIKLI Pathway** (Section 8B)
	Patellar Dislocation	• Immediate swelling (acute hemarthrosis) • **NO** significant bruising and discolouration • Must rule out AIKLI • Confirm with history, physical examination, and special tests (Section 10A)	Follow **Patellar Instability Pathway** (Section 10B)
	Acute cartilage dysfunction - Osteochondral fracture	• Immediate swelling (acute hemarthrosis) • **NO** bruising or discolouration • Confirm with imaging (XRAY or MRI **only** if indicated)	Call knee surgeon or orthopaedic consult line for **urgent** consult
	Acute cartilage dysfunction - Vascular meniscus tear (e.g., acute bucket-handle tear/locked knee, acute root tear, acute radial tear)	**HISTORY** • MOI: twisting with knee in flexed/squat position • Pain, clicking, locking, maybe instability **PHYSICAL EXAMINATION** • Immediate swelling (acute hemarthrosis) • **NO** bruising or discolouration • Joint line tenderness • Must rule out locked knee = loss of extension & maintenance of flexion (vs stiff knee = loss of both extension and flexion) **SPECIAL TESTS** • + Meniscal tests (e.g., McMurray, Apley's, Bounce)	Call knee surgeon or orthopaedic consult line for **urgent** consult
	Avascular meniscus tear	**HISTORY & SPECIAL TESTS** • Same as vascular meniscal tear **PHYSICAL EXAMINATION** • **NO** acute hemarthrosis, bruising, or significant discoloration • Joint line tenderness	FOLLOW **Acute Knee Injury Pathway** (Section 7B)
Extra-articular knee problem	Acute extra-articular knee ligament injury (AEKLI)	• **NO** acute hemarthrosis • May have bruising or significant discoloration • Confirm with history, physical examination, and special tests (Section 9A)	Follow **AEKLI Pathway** (Section 9B)

MOI: mechanism of injury

Acute Hemarthrosis: effusion ≤ 8 hours

SECTION 7B. ACUTE KNEE INJURY PATHWAY



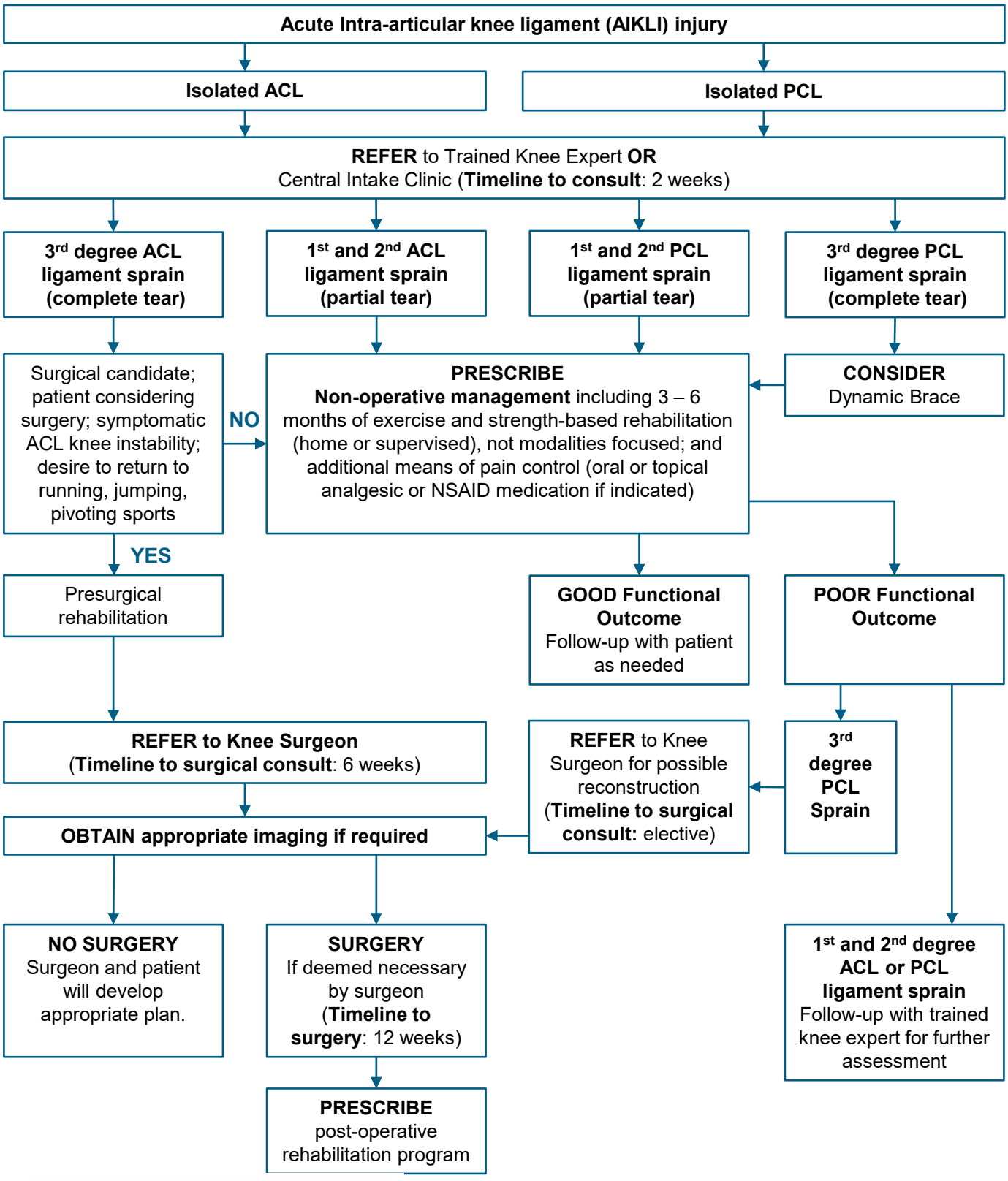
SECTION 8A. ACUTE INTRA-ARTICULAR KNEE LIGAMENT INJURY (AIKLI) - *Differential Diagnosis*

DIAGNOSIS		MAIN FINDINGS
Anterior cruciate ligament (ACL) injury	1st and 2nd degree (partial tear)	**HISTORY** • Non-contact MOI (80%): pivot or change in direction, deceleration, landing from a jump, fall while skiing with binding not releasing • Heard and/or felt "pop" • Immediate pain, inability to finish game/activity **PHYSICAL EXAMINATION** • Immediate swelling with large, acute hemarthrosis within 24 hours **SPECIAL TESTS** • + **Lachman**: increased laxity with an endpoint present compared to unaffected knee
Anterior cruciate ligament (ACL) injury	3rd degree (complete tear)	**HISTORY & PHYSICAL EXAMINATION** • Same as 1st and 2nd degree ACL injury **SPECIAL TESTS** • + **Lachman**: increased laxity with **NO** endpoint present compared to unaffected knee
Posterior cruciate ligament (PCL) injury	1st and 2nd degree (partial tear)	**HISTORY** • Contact MOI (majority): direct blow to proximal tibia, dashboard injuries in motor vehicle accidents • Immediate pain in the back of the knee **PHYSICAL EXAMINATION** • Immediate swelling with moderate acute hemarthrosis within 24 hours **SPECIAL TESTS** • + **Posterior Drawer**: increased laxity with an endpoint present compared to unaffected knee • + **Posterior Sag Sign**: tibia appears to sag ("step-off")
Posterior cruciate ligament (PCL) injury	3rd degree (complete tear	**HISTORY & PHYSICAL EXAMINATION** • Same as 1st and 2nd degree PCL injury **SPECIAL TESTS** • + **Posterior Drawer**: increased laxity with **NO** endpoint present compared to unaffected knee • + **Posterior Sag Sign**: tibia appears to sag ("step-off")

MOI: mechanism of injury

Acute Hemarthrosis: effusion ≤ 8 hours

SECTION 8B. ACUTE INTRA-ARTICULAR KNEE LIGAMENT INJURY (AIKLI) PATHWAY



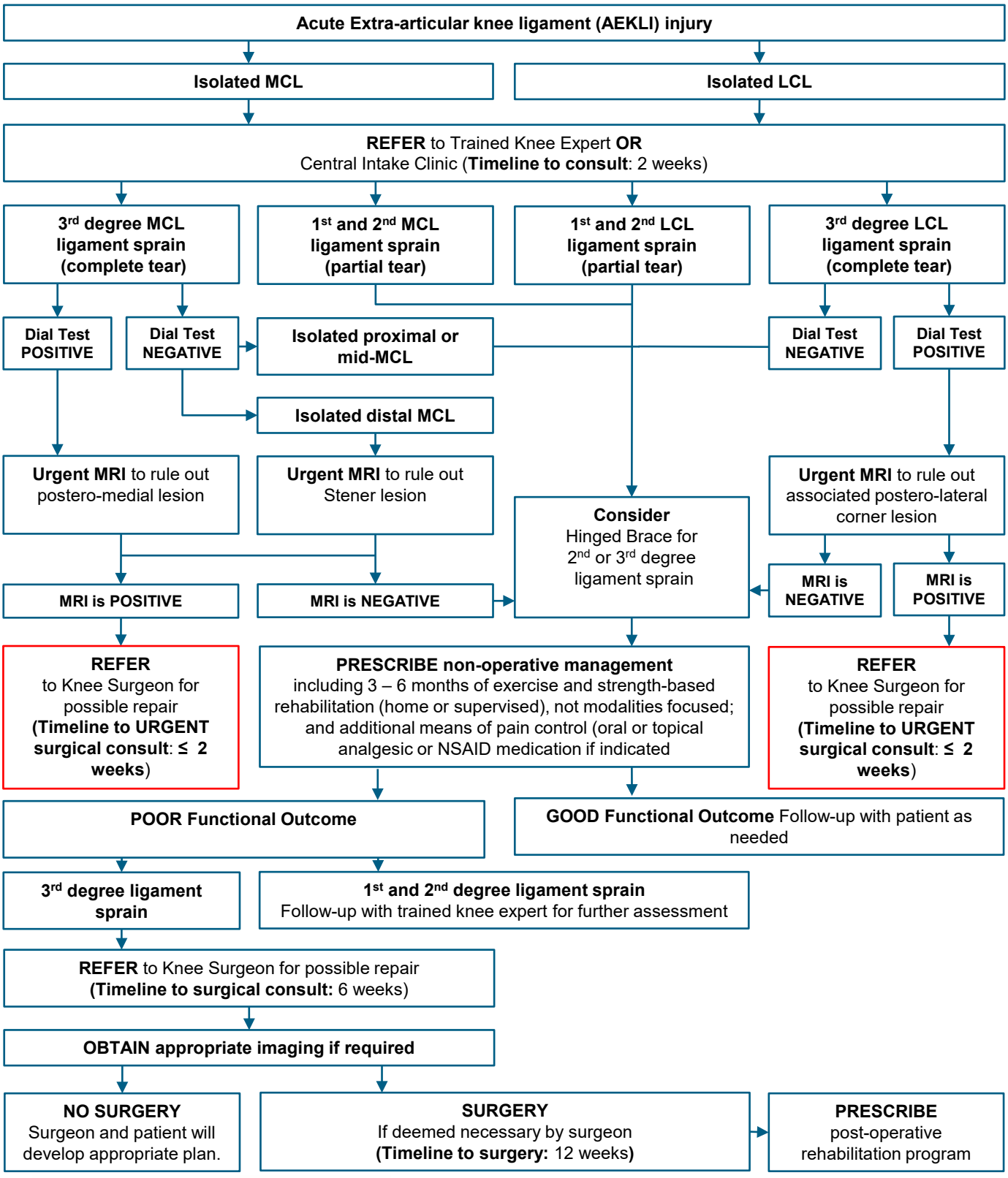
SECTION 9A. ACUTE EXTRA-ARTICULAR KNEE LIGAMENT INJURY (AEKLI) - *Differential Diagnosis*

DIAGNOSIS		MAIN FINDINGS
Medial collateral ligament (MCL) injury	1st and 2nd degree (partial tear)	**HISTORY** • Contact (majority): direct blow to lateral aspect of knee causing valgus force • Immediate pain on medial aspect of knee **PHYSICAL EXAMINATION** • **NO** acute hemarthrosis • May have some bruising or discoloration **SPECIAL TESTS** • + **Valgus (0 degree)**: stable with an endpoint present • + **Valgus (30 degree)**: increased laxity with an endpoint present compared to unaffected knee
	3rd degree (complete tear)	**HISTORY & PHYSICAL EXAMINATION** • Same as 1st and 2nd degree MCL injury **SPECIAL TESTS** • + **Valgus (0 degree)**: increased laxity compared to unaffected knee • + **Valgus (30 degree)**: increased laxity with **NO** endpoint present compared to unaffected knee • + **Dial**: significant difference in tibial external rotation compared to unaffected knee; if positive, must consider MCL + posteromedial corner (PMC) injury
Lateral collateral ligament (LCL) injury	1st and 2nd degree (partial tear)	**HISTORY** • Contact: direct blow to medial aspect of knee causing varus force • Immediate pain on lateral aspect of knee **PHYSICAL EXAMINATION** • **NO** acute hemarthrosis • May have some bruising or discoloration **SPECIAL TESTS** • + **Varus (0 degree)**: stable with an endpoint present • + **Varus (30 degree)**: increased laxity with an endpoint present compared to unaffected knee
	3rd degree (complete tear)	**HISTORY & PHYSICAL EXAMINATION** • Same as 1st and 2nd degree LCL injury **SPECIAL TESTS** • + **Varus (0 degree)**: increased laxity compared to unaffected knee • + **Varus (30 degree)**: increased laxity with **NO** endpoint present compared to unaffected knee • + **Dial**: significant difference in tibial internal rotation compared to unaffected knee; if positive, must consider LCL + posterolateral corner (PLC) injury

MOI: mechanism of injury

Acute Hemarthrosis: effusion ≤ 8 hours

SECTION 9B. ACUTE EXTRA-ARTICULAR KNEE LIGAMENT INJURY (AEKLI) PATHWAY

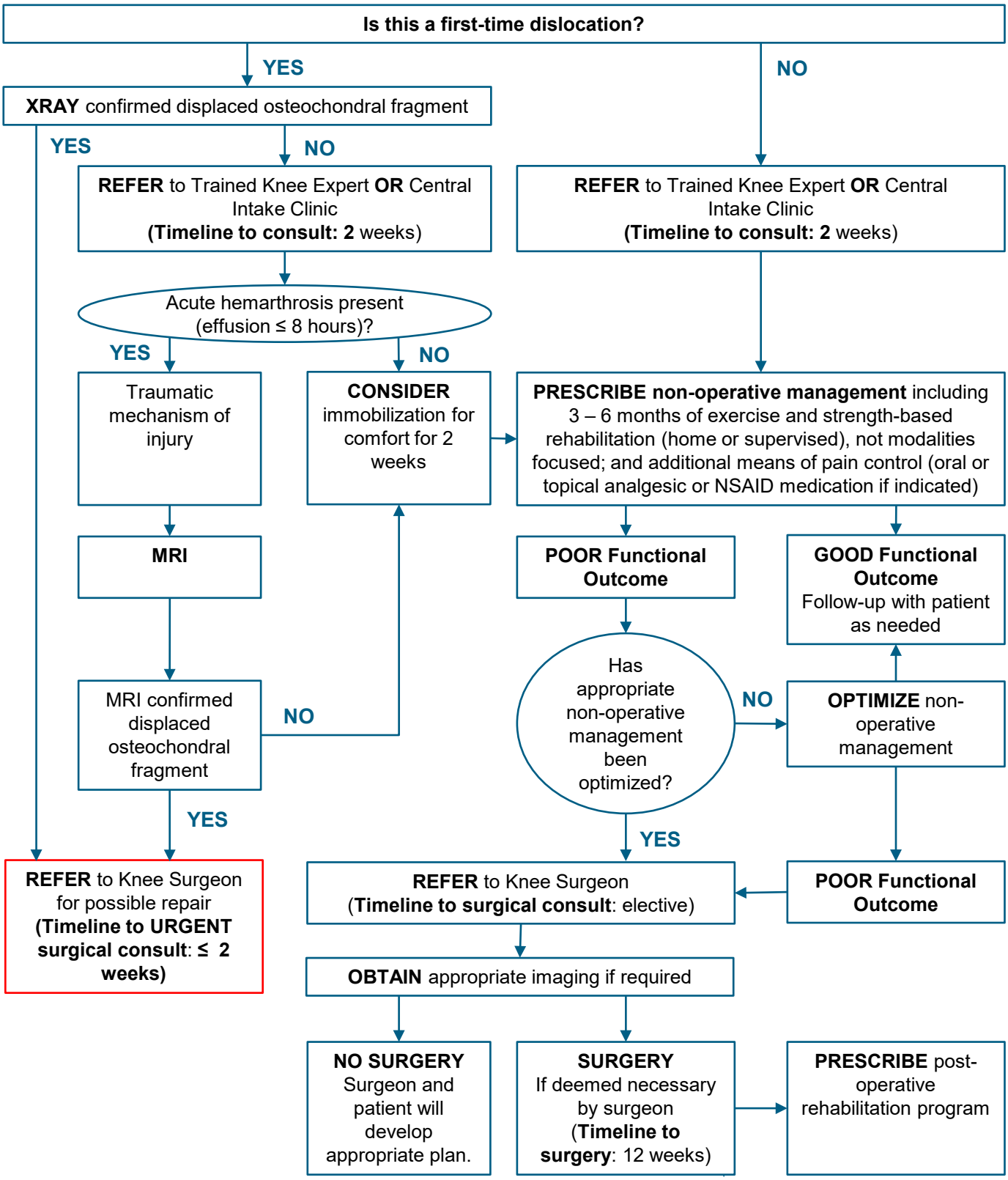


SECTION 10A. ACUTE PATELLAR INSTABILITY - *Differential Diagnosis*

DIAGNOSIS	MAIN FINDINDGS
Acute reduced patellar dislocation	**HISTORY** • Non-contact MOI: twist with knee in extended position • Contact: direct medial blow to patella **PHYSICAL EXAMINATION** • Immediate swelling within 24 hours • **NO** bruising or significant discoloration • Tender medial facet of patella and/or lateral femoral condyle **SPECIAL TESTS** • + **Apprehension**: reproduces pain and apprehension • + **Patellar Glide**: increased lateral patellar translation compared to unaffected knee

MOI: mechanism of injury

SECTION 10B. ACUTE PATELLAR INSTABILITY PATHWAY



SECTION 11A. CHRONIC (ATRAUMATIC, OVERUSE) KNEE- *Differential Diagnosis* For non-degenerative conditions; if degenerative, please use our degenerative knee condition pathway

DIAGNOSIS	MAIN FINDINGS
Chronic (atraumatic, overuse) knee problem	**HISTORY** • Insidious or gradual onset • **NO** acute mechanism of injury • Possibly repetitive use injury • Possibly no injury **PHYSICAL EXAMINATION** • Pain, instability, and swelling may be present • **NO** bruising or significant discoloration **IMAGING** • XRAY (Weight-bearing series) is negative for arthritis

SECTION 11B. CHRONIC (ATRAUMATIC, OVERUSE) KNEE PATHWAY

For non-degenerative conditions; if degenerative, please use our degenerative knee condition pathway

NO acute injury

*** Standard Knee Series (both knees):**
1. Weight-bearing AP
2. Weight-bearing 30 – 45 degrees PA
3. Non-weight-bearing lateral and skyline

OBTAIN XRAY (***Standard Knee Series**)

NORMAL

EVIDENCE OF DEGENERATIVE CHANGE

FOLLOW Knee Arthritis & Degenerative Meniscus Pathway (Sections 12A/B)

Pain?

Swelling?

Instability?

Mechanical Symptoms? e.g., clicking, catching, locking

PRESCRIBE a trial of non-operative management that includes one or more of the following depending on the condition

- Exercise and strength-based rehabilitation program (home or supervised), not modalities focused
- Additional means of pain control (oral or topical analgesic or NSAID medication)
- **CONSIDER** referring for imaging guided injections if indicated (e.g., cortisone, hyaluronic acid, combination)
- Taping/Bracing
- Weight loss

POOR Functional Outcome

REFER to Trained Knee Expert **OR** Central Intake Clinic
(Timeline to consult: 2 weeks)

OBTAIN appropriate imaging if required

GOOD Functional Outcome
Follow-up with patient as needed

CONTINUE non-operative management

SECTION 12A. KNEE ARTHRITIS & DEGENERATIVE MENISCUS *Differential Diagnosis*

DIAGNOSIS	TYPICAL FINDINGS
Mild/moderate osteoarthritis	**HISTORY** • Knee pain that is mild/moderate with weight-bearing activity, and better with rest **RISK FACTORS** • Age >40 years old • Previous injury and/or surgery • Increased weight **PHYSICAL EXAMINATION** • Presence of varus/valgus malalignment • Antalgic gait • Small effusion, unless acute flare-up • Decreased range-of-motion • Crepitus **IMAGING** • XRAY (Weight-bearing series) is positive for mild/moderate arthritis
Severe osteoarthritis	**HISTORY** • Knee pain that is severe with weight-bearing activity and better with rest **RISK FACTORS & PHYSICAL EXAMINATION** • Same as mild/moderate arthritis **IMAGING** • XRAY (Weight-bearing series) is positive for severe arthritis
Degenerative meniscus tear	**HISTORY** • Maybe atraumatic and part of the degenerative arthritis disease process • May have mechanical symptoms including clicking, catching, locking **PHYSICAL EXAMINATION** • May have tender over joint line • May have + meniscal tests (e.g., McMurray, Apley's, Bounce) **IMAGING** • XRAY (Weight-bearing series) may have findings of degenerative OA • Order MRI **ONLY if** mechanical symptoms are present and after trial of non-operative management has failed to confirm displaced meniscal flap or bucket-handle tear

SECTION 12B. KNEE ARTHRITIS & DEGENERATIVE MENISCUS PATHWAY