ASSESSMENT & MANAGEMENT

OF ACUTE MSK INJURIES

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FINANCIAL AFFILIATIONS: NONE

OBJECTIVES

1. TO DESCRIBE A CLINICAL APPROACH TO COMMON MSK INJURIES
2. IDENTIFY MSK INJURIES THAT NEED URGENT REFERRALS FOR TREATMENT AND DISPOSITION
3. DEVELOP EVIDENCE-BASED MANAGEMENT PLANS FOR COMMON ACUTE MSK INJURIES

OUR TRAINING LIMITS OUR ABILITY TO FULLY ASSESS AND ADVISE OUR PATIENTS

WE ARE POORLY EDUCATED IN MSK MEDICINE.

- 38-41% of presentations to PCPs and EDs are MSK
- 3% of a medical curriculum is MSK
- trained by physicians who aren't great at MSK exams and the diagnostic process themselves

- "dead people tests" that are positional, not functional
- most tests have poor individual SN/SP, POR/NOR
- most tests are based on flawed, underpowered studies
- tremendous amount of inter- and intrarater variability

NOT EVERYTHING IS DOOM AND GLOOM

ACUTELY TRAUMATIC INJURIES OFTEN HAVE OBVIOUS DIAGNOSES

- fractures, dislocations
- complete ruptures of structural elements
- concussions

IT'S THE SUBTLE INJURIES THAT WILL GET YOU IN THE END

- injuries and impacts on systems and joints above and below
- joint subluxations or instability
- meniscal/labral tears
- tendonopathies, partial tendon injuries, adhesive capsulopathies

MISDIAGNOSED AND MISGUIDED TREATMENT PLANS FOR ACUTE INJURIES

CHRONIC DECOMPENSATIONS, FUNCTIONAL MODIFICATIONS

REDUCED QUALITY OF LIFE AND IMPAIRED FUNCTIONAL ENGAGEMENT

QUALITY OF LIFE (QOL)

- **THE WORLD HEALTH ORGANIZATION DEFINITION**
  - the well-being of an individual, regarding both positive and negative elements within the entirety of their existence at a specific point in time.

QUALITY OF LIFE (QOL)

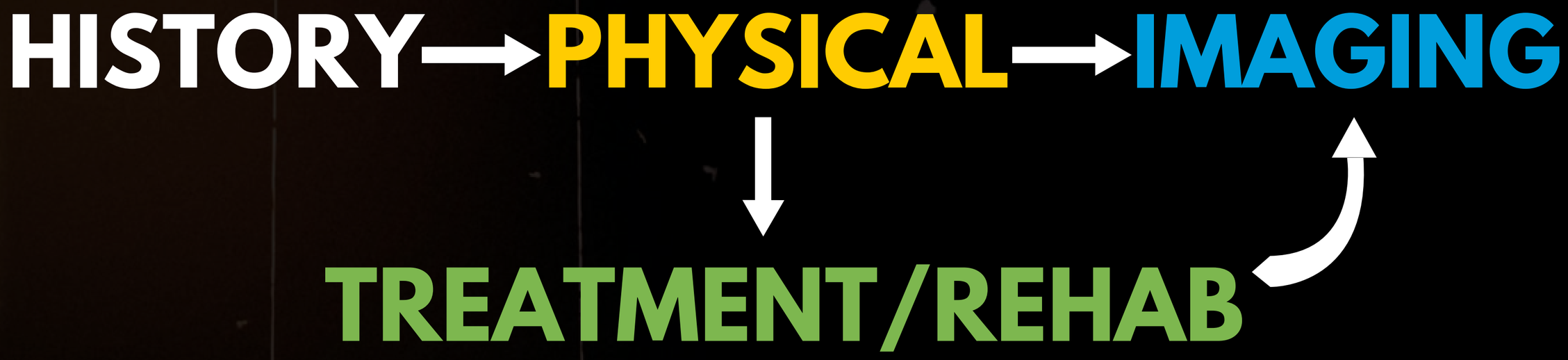
- **MY DEFINITION**
  - Each person wants to **move** through their day, **engage** with the environment that they are in at every moment of their life, and they want to **enjoy every valued possibility** that their lives have the capacity to have.

COMPREHENSIVE ASSESSMENT AND ACCURATE DIAGNOSIS FOR ACUTE INJURIES

EFFECTIVE AND EFFICIENT MULTIDISCIPLINARY TREATMENT PLAN

RAPID RESTORATION OF THE PATIENTS QUALITY OF LIFE.


INJURY
LOAD > CAPACITY


HISTORY
PHYSICAL
IMAGING
TREATMENT/REHAB

HISTORY

- **MECHANISM OF INJURY IS EVERYTHING**
  - Acute vs insidious/progressive
  - Loaded vs unloaded
  - Concentric vs eccentric
  - Shear
  - Torque
  - Velocity
  - Relative strength in isolation or within a system of muscles and joints.
  - Surface or equipment that was engaged with the limb at the time of the injury

HISTORY

- **POINT OF MAXIMAL TENDERNESS**
  - One finger
  - One spot
  - Epicenter of pain
  - BUT:
    - compensating collaborative structure
    - unopposed co-contracting muscle group

- **SWELLING**
  - Acute: minutes
  - Subacute: hours
  - Chronic: days

HISTORY

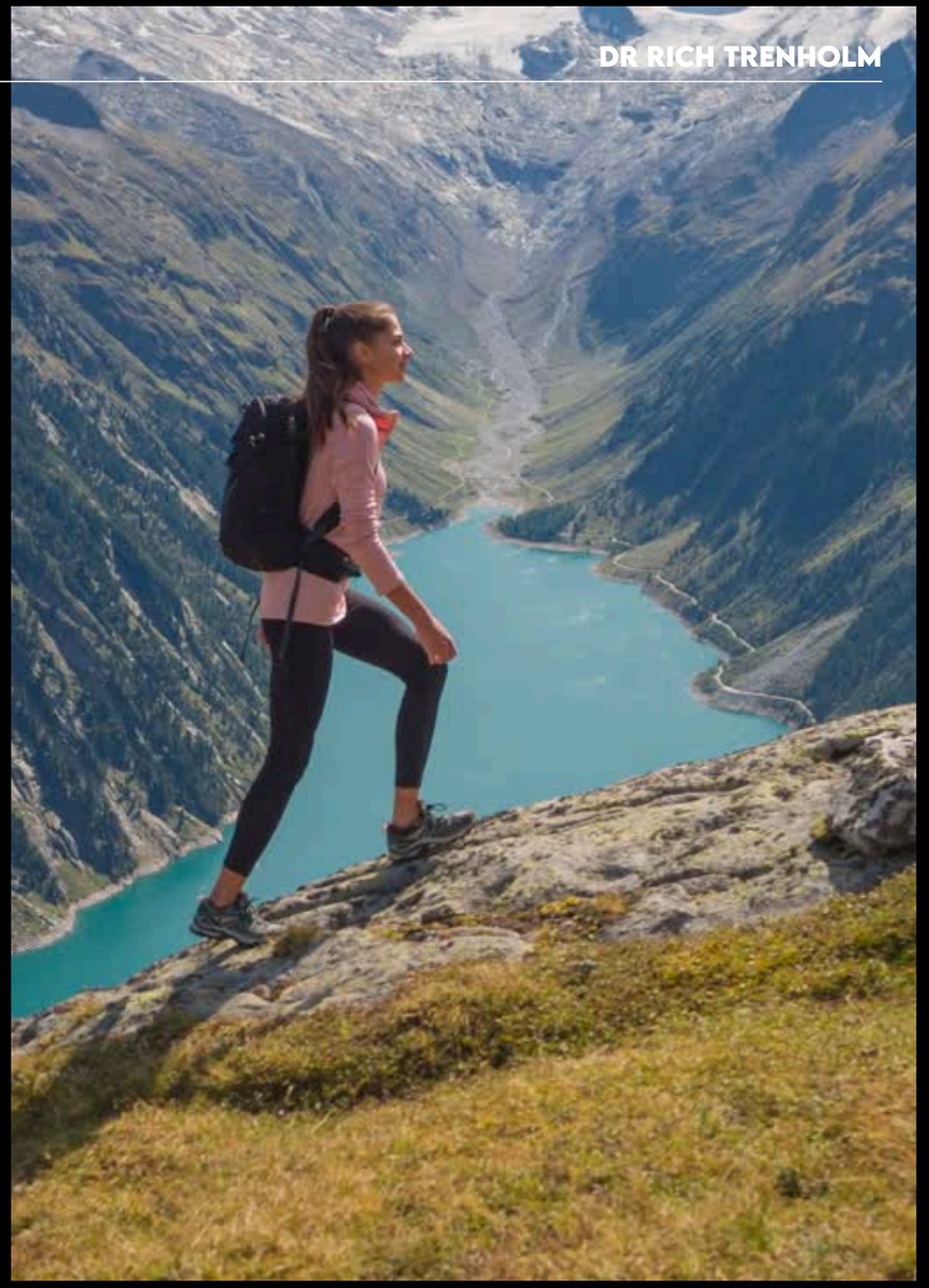
- **RED FLAGS:**
  - Locking (inability to get full extension) and how they reduce the lock
  - Instability
  - Inability to weight bear
  - Unexplained weight loss
  - Fever or systemic symptoms

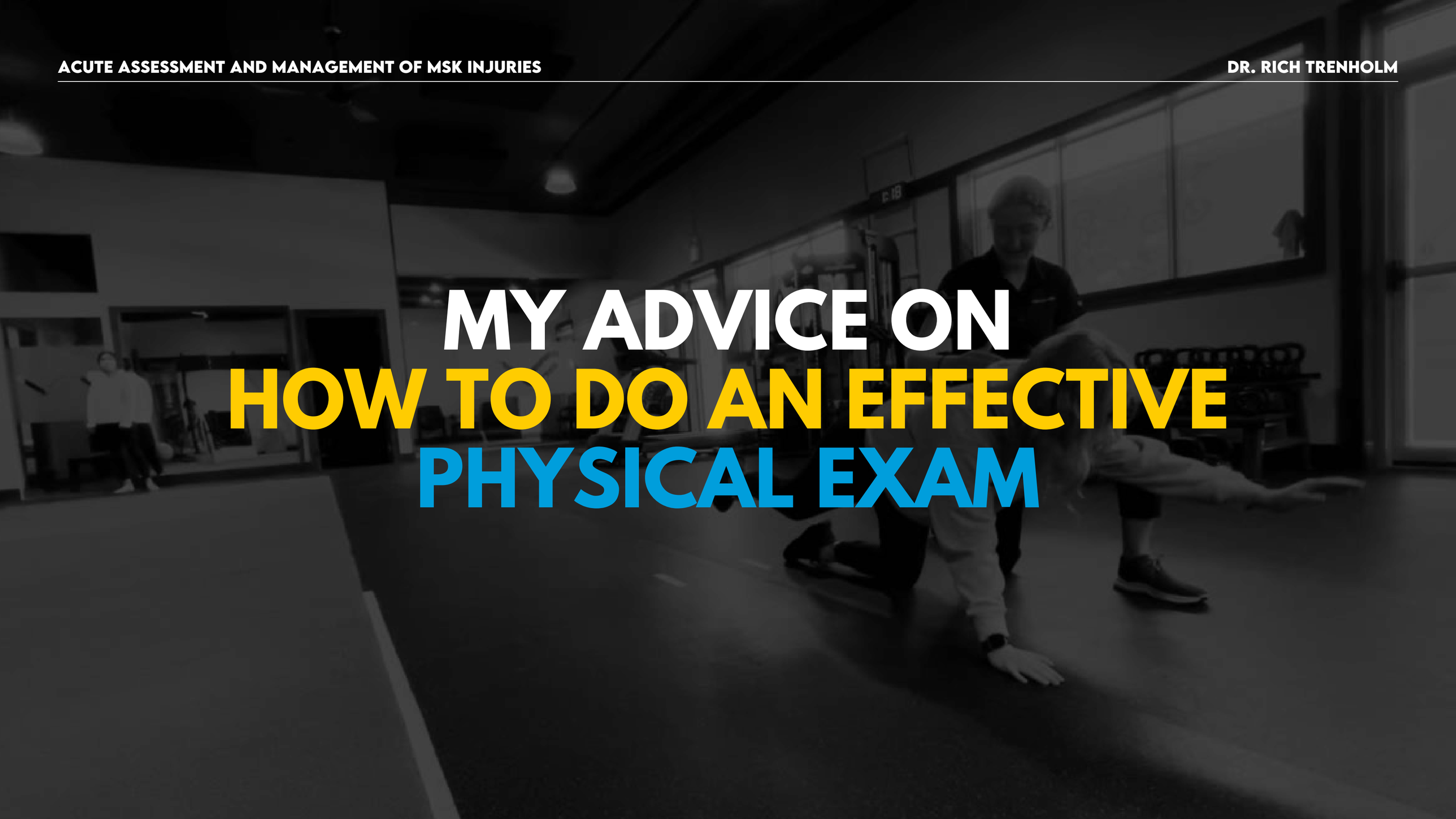
- **YELLOW FLAGS:**
  - Older age
  - High BMI
  - Low SES
  - Unemployment

HISTORY

- **PATIENT-REPORTED OUTCOME MEASURES**
  - Functional disability
    - Mobility impairment
    - Activity limitations
    - Participation restrictions
  - Functional pain
    - Constant vs intermittent
    - Activity during which pain is experienced
    - Worse with progressive loading or with rest

THESE ARE VERY IMPORTANT IN THE CONTEXT OF THE WHOLE TREATMENT PLAN





MY ADVICE ON HOW TO DO AN EFFECTIVE PHYSICAL EXAM

PHYSICAL EXAMINATION

- **THE REALITY OF PHYSICAL EXAM**
  - Poor interrater reliability
  - Only a few tests have “decent evidence” based on low to moderate quality studies
  - Evidence is inconsistent for most tests, but a few reliable tests do exist:
    - Thessaly: meniscus
    - Lachman and Lever Test: ACL
    - Joint line pain and valgus/varus deformity: compartmental OA
    - Patellar compression, lateral tilt test: PF pathology (PFOA vs PFPS)

PHYSICAL EXAMINATION

- **THE REALITY OF PHYSICAL EXAM TEST**
  - Confusion over the names and what they are testing
  - Confusion over what qualifies as a negative or positive test
  - Lack of evidence to support the diagnostic accuracy of singular tests

STUDIES HAVE DETERMINED THAT THERE IS NO PATHOGNOMONIC DIAGNOSTIC APPROACH FOR CONDITIONS WHICH ARE OFTEN EVALUATED IN THE PRIMARY CARE SETTING

PHYSICAL EXAMINATION

- **TEST THEM IF YOU ARE GOING TO TEST THEM**
  - You are testing the physical integrity of a structural system.
  - Load it enough to do so.

- **GIVE THEM CONFIDENCE THAT YOU HAVE CONTROL OF THEIR BODY**
  - When people are in pain, you have one shot at examining them
  - Lots of points of contacts
  - Listen to their voice
  - Watch their eyes
  - Feel muscles that are involuntarily guarding

PHYSICAL EXAMINATION

- **DON'T JUST DO DEAD PEOPLE TESTS**
  - Don't just do the test, understand what the test is testing
  - Move them functionally
  - Move them passively

- **ONE TEST. FIVE WAYS.**
  - Neutral
  - Loaded - IA > EA/Structural
  - Unloaded - IA < EA/Structural
  - Opposite direction - Eccentric vs Concentric
  - Try to move around the pain - Impinging or obstructing structure/fragment

PHYSICAL EXAMINATION

- **COMPOUND TESTS FOR MORE ACCURACY**
  - Each test has a number of things it tests
  - Find common threads through the various tests
- **TEST THEM FUNCTIONALLY**
  - Double OH squat, single leg stance, IFM activation
- **MINIMIZE CHEATING AND MODIFYING**
  - Position yourself for biomechanical advantage
  - Keep people in planes of motion
  - Touch muscles to feel involuntary contractions to help or protect

PHYSICAL EXAMINATION

- **WATCH THEIR BEHAVIOUR**
  - Watch when they think we aren't looking
  - Jacket, shirt, chair, gait, rotational movement, grip strength

- **MULTIPLE LAYERS = MULTIPLE POTENTIAL INJURIES**
  - Think about the layers of structures that could be injured
  - **Knee:** MCL, tibial plateau, lateral meniscus, ACL
  - **Ankle:** Deltoid ligament, syndesmosis, fibular fracture
  - **Shoulder:** Labral injury, SS/LHB traumatic compression injury, AC injury

MY ADVICE ON HOW TO ORDER IMAGING AND WHAT TEST TO ORDER


NEVER EVER EVER
DO IMAGING BECAUSE PATIENT ASKS FOR IT
NEVER EVER EVER
DELAY REHAB FOR IMAGING

IMAGING

- **X-RAYS:**
  - Alignment
  - Integrity
  - Cchanges that are the result of abnormal force loadig over time (aka OA)

- **TIPS**
  - Load the joint for integrity
  - Offload for instability
  - What you see isn’t always what you have

IMAGING

- **ULTRASOUND:**
  - Superficial extraarticular soft tissue integrity
  - The best is that this is a dynamic test
- **TIPS**
  - US is as good as MRI for rotator cuff
  - Can make inferences regarding marginal IA structures (mensicus >> labrum)

IMAGING

- **CT:**
  - Fine detail bony structures
  - Looking for stress fractures or occult fractures
  - Tumor confirmation/characterization
- **TIPS**
  - Don’t forget about this as this is general quick and easily accessible

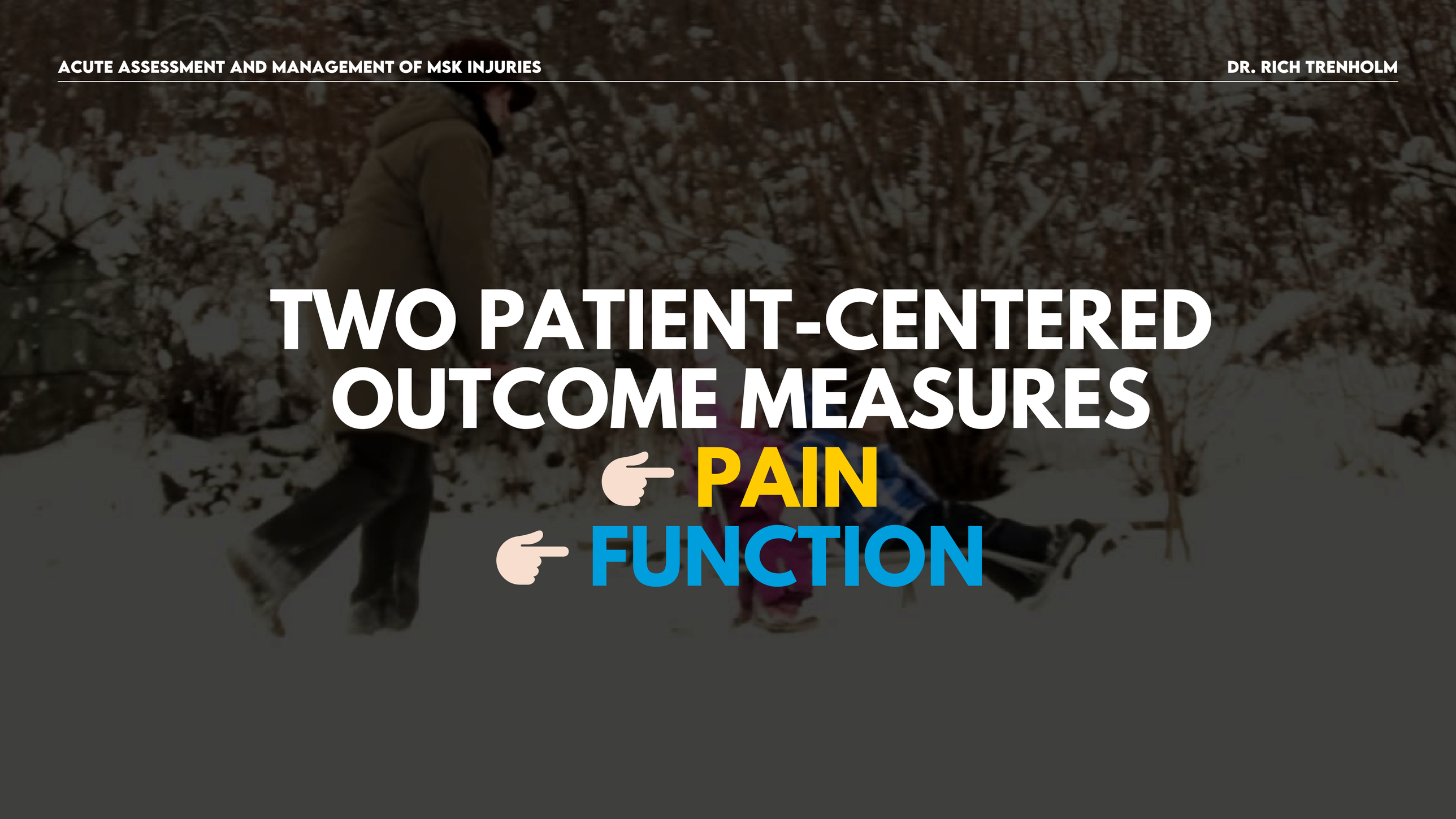
IMAGING

- **MRI:**
  - High-resolution anatomy images with unparalleled tissue contrast
  - Detects failure in soft tissues
  - Assessment of inflammatory lesions and bone edema

- **TIPS**
  - Often thought to be a better test by public because it is hard to get, it is loud, it is a big machine
  - Often finds incidentalomas
  - For labral tears, you will need to either do MRA on earlier machines, but high field (T3) machines do not require arthrograms to see the labrum

IMAGING

- **AN EXCELLENT RESOURCE:**
  - Canadian Radiologists Recommendations for MSK imaging
  - Evidence based document (June 2023)



TWO PATIENT-CENTERED OUTCOME MEASURES

👉 PAIN

👉 FUNCTION

INITIAL TREATMENT

- **RICE IS NO LONGER ADVISED**

- **PEACE & LOVE:**
  - **P**: Protect
  - **E**: Elevate as often as possible
  - **A**: Avoid NSAIDs
  - **C**: Compression to manage swelling
  - **E**: Education about passive treatments and timeline

  - **L**: Load the injured area and let pain guide the load
  - **O**: Optimism through education
  - **V**: Vascularization (pain free exercise, acupuncture)
  - **E**: Exercise (mobility, strength, proprioception)

INITIAL TREATMENT

- **NOTES ON NSAIDS**
  - Prostaglandins are required for the regeneration tissue
  - “Healing” is a process of regeneration of normal tissue, not the formation of scar tissue
  - So, don’t remove this by prescribing NSAIDs

- **SO, WHAT CAN YOU ADVISE PATIENTS TO TAKE?**
  - Acetaminophen
  - Tumeric Curcumin

IMPROVE PAIN

INITIATE MOVEMENT

NOT EVERYTHING NEEDS PHYSIO RIGHT OFF THE HOP

TIGHT/SPASM → MOBILIZE

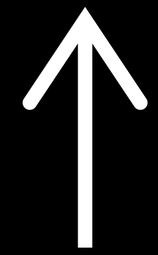
↓

UNSTABLE → STABILIZE/STRENGTHEN

NOT EVERYTHING NEEDS PHYSIO RIGHT OFF THE HOP

TIGHT/SPASM

MOBILIZE



UNSTABLE  STABILIZE/STRENGTHEN

INITIAL TREATMENT

- **SO, WHAT CAN TREATMENTS CAN BE HELPFUL?**
  - **Acupuncture**
    - Improved blood flow
    - Reduced protective tone
  - **Movement**
    - Applies low-intensity stressors that will stimulate tissue regeneration in a functional pattern with functional alignment
  - **Soft tissue mobility**
    - PT mobilizations or RMT deep tissue
    - reduces tone
    - reduces swelling
    - improves joint mobility

OVERARCHING GOALS OF REHAB

MOBILITY

STRENGTH

PROPRIOCEPTION

NEXT DAY BY NOON RULE

THINGS THAT NEED URGENT ASSESSMENTS AND TREATMENTS

CONCUSSIONS

- **INITIAL ASSESSMENT:**
  - SCAT-6 within first 72 hours (but can be up to 7d. After 7d, then use SCOAT-6 tools)
  - Rivermead Concussion Symptoms Score for longitudinal monitoring
  - CNS examination is nearly always normal
  - MSE
  - BESS
  - Neck examination
  - Vestibular testing

- **EDUCATION**
  - Treatment outcomes are up to the patient engagement, adherence to advice and rehab exercises and progression, and honest reflection regarding symptoms
  - 48h of relative rest
  - No more quiet rooms, sunglasses, screen restrictions

SCAT6 >12yo

SCAT6 8-12yo

Rivermead

SCAT6 >12yo

SCAT6 8-12yo

Rivermead

CONCUSSIONS

- **ACUTE TREATMENT:**
  - **ACTIVE REHAB:**
    - **Goal:** stress the system with sub-symptomatic stressors/exercises to create an environment where adaptive change can occur
      - Physiologic rehabilitation: BCTT with PT/AT/Kin
      - Vestibular rehabilitation with PT/AT
    - **Return to sport:** should be graduated and involve physiologic loading and progressive testing in the sporting environment
  - **PASSIVE REHAB:**
    - Cervicogenic headache management with Chiro for acupuncture, LVA, and soft tissue release

Initial Concussion Protocol

JOINT LOCKING OR INSTABILITY

- **PHYSICAL OBSTRUCTION PREVENTING FULL RANGE OF MOTION**
  - Meniscal or labral flap
  - Complete ligament rupture
  - Complete tendon/muscle rupture
  - Osteochondral defect

- **WHY IS THIS IMPORTANT**
  - It affects periarticular joint stability/motion
  - Damage to other intraarticular structures
  - Progressive tissue atrophy and fatty infiltration which complicates surgical repair

JOINT LOCKING OR INSTABILITY

Table 1. Key clinical history and examination findings in the locked knee

Diagnosis	History	Clinical examination findings
Meniscal tear	Twisting mechanism, acute onset of pain, pain on movement of knee	■ Episodes of painful or painless locking that occur intermittently (particularly in bucket handle tear) ■ Reduced range of movement ■ Joint line tenderness ■ Positive Apley grind, Thessaly or McMurray test may be present ■ Delayed haemarthrosis
Anterior cruciate ligament rupture	Twisting mechanism, acute onset of pain, pain on movement of knee	■ Challenging to examine in acute setting because of haemarthrosis, acute pain and/or inability to move knee ■ Reduced range of movement ■ Acute haemarthrosis ■ Positive Lachman test, anterior drawer or pivot shift may be present ■ Episodes of painful or painless locking
Loose body	History of trauma may be present, may be painful or painless, may have preceding symptoms	■ Episodes of painful or painless locking that occur intermittently ■ Normal knee examination between acute episodes of locking

Rhind, JH et al. British Journal of Hospital Medicine 2024 85:1, 1-9

JOINT LOCKING OR INSTABILITY

- **URGENT ASSESSMENT AND TREATMENT**
  - **Consult Sports Medicine or Ortho** for thorough assessment and to facilitate a treatment plan
  - **Initiation of appropriate intraarticular imaging**
    - XR to look for fracture segments
    - MRI within 1-2w to assess for IA pathology. Time is tissue.
  - Bracing, offloading, and active physiotherapy to maintain functional ROM and strength
- If **pseudo-locking** suspected then analgesia and mobility with PT/AT/chiro

FRACTURES AND DISLOCATIONS

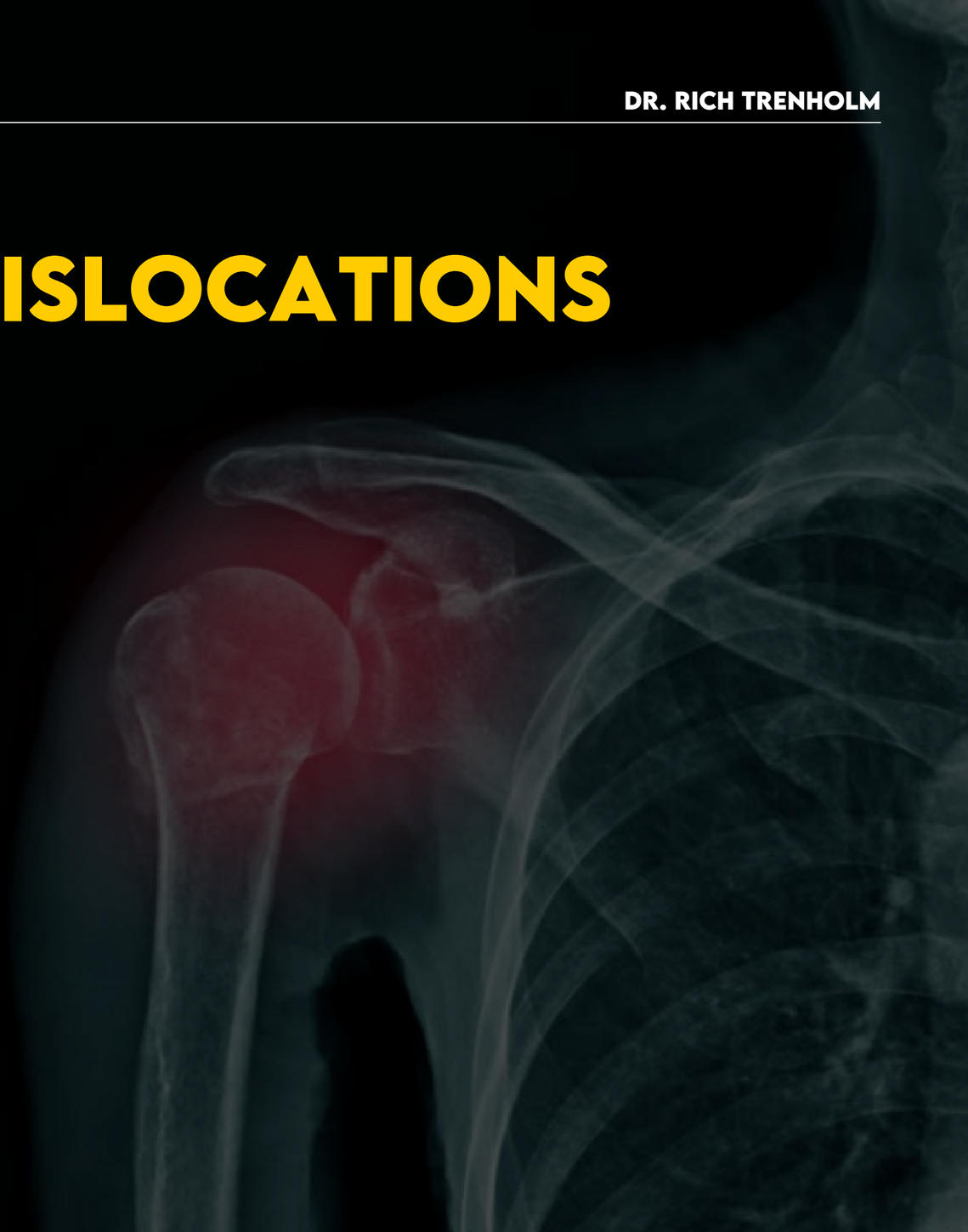
- **IMAGING**
  - Fractures are missed on ER films approximately 9% of the time
  - The radiologist does not have the benefit of having assessed the patient
    - They can only go on the history that you provide.
      - **Look at the actual images and don't rely on the radiology report only**
  - If your clinical suspicion is high you can:
    - Splint and repeat XR in 10d
    - CT
    - US
    - Bedside fracture tests: tuning fork and stethoscope tap tests

FRACTURES AND DISLOCATIONS

- **TREATMENT FOR FRACTURES:**
  - Fracture clinic follow up
  - Early weight bearing:
  - Contralateral limb strength training

FRACTURES AND DISLOCATIONS

- **TREATMENT FOR DISLOCATIONS:**
  - high rate of recurrence (35%)
  - unaffected limb is the benchmark
  - early mobilization
  - instability dictates the splinting duration
  - angle of splinting
  - mobilize early
    - physio for movement
    - acupuncture for activation



OTHER

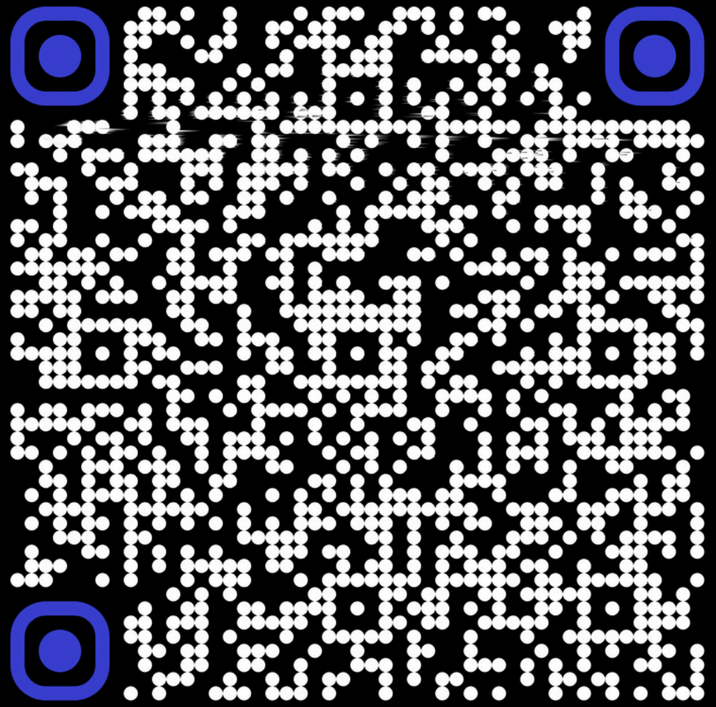
- **NEUROVASCULAR COMPROMISE**
  - always look for pre- and post-reduction changes
  - acute traction injuries
  - impingements
    - subacromial space
    - radial and ulnar tunnels
    - tarsal tunnel
    - fibular head
    - tarsal tunnel

OTHER

- **ASK ABOUT CRPS SYMPTOMS**
  - ask about complex regional pain syndrome
    - peripheral injuries and fractures
    - delayed presentation
    - youth > women > men
    - allodynia, hyperalgesia, rubor/palor/mottling, atrophy

- **SEPTIC JOINT**
  - fever, redness, malaise, joint warm to the touch
  - recent instrumentation/surgery/injection, IVDU
  - CBC, ESR, CRP, blood cultures, joint fluid culture
  - IV antibiotics

Alberta Soft Tissue Knee Assessment Clinical Pathways



Alberta Shoulder Assessment Clinical Pathways

Rapid Review MSK Injuries Series - Emergency Medicine Australasia

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