Real-World Versus Textbook:

Practical Injury Management Techniques

SEATA EducATion Experience & Expo

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Atlanta, GA

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Conflict of Interest Statement

We have no conflicts of interest to report

Committee Involvement

Lynette is a member of the CAATE DEIA & Leadership Development Committee and District 9 Representative to the NATA LGBTQ Advisory Committee

Learning Objectives

1. **Compare textbook** injury management strategies with **real-world** scenarios.
2. **Apply critical thinking** to enhance differential diagnosis processes in athletic settings.
3. **Develop** practical **injury management protocols** that address common and complex cases.
4. **Assess the effectiveness** of various treatment strategies through case study analysis.
5. **Enhance referral processes** to ensure timely and appropriate care for athletes.

Case Study

- **H:** 17yo male high school baseball and basketball athlete
  - CC: LBP, increasing while lifting weights during basketball season
  - no prior LBP hx
- **O:** normal gait, no visual abnormalities or muscle spasms
- **P:** TTP TP and SP lower lumbar
- **S:** normal neuro, WNL ROM - pn with trunk ext, 5/5 strength, stork stand +
- **Plan** – conservative treatment in ATR (non-compliant)
- **Progression** - returned to ATR with increasing pain. AT referred to Team Physician. MRI ordered and f/u for POC

What are your differential diagnoses?

A. Lumbar strain

B. Lumbar sprain

C. Pars defect/spondylolysis

D. Degrative disc disease

E. SI dysfunction

Dx: Lumbar Degenerative Disc Disease

Is it a 'unicorn?'

Prevalence of DDD

- The overall prevalence of diagnosed spinal degenerative disease in people covered by Medicare (age 65 or older) was 27.3% and increased with age. (Parenteau et al., 2021)

- Majority of sport injuries to the back are sprains/strains
  - Sports with **repetitive spinal loading** like gymnastics, wrestling, weightlifting, and contact sports can increase the risk of early disc degeneration. (Patel & Kinsella, 2017)

Lumbar Degenerative Disc Disease Case Management

- Patient POC: pt decided to d/c basketball in favor of baseball
  - Sport specialization versus multi-sport athlete

- American Orthopaedic Society for Sports Medicine, NATA, IOC, (and many others)
  - "**Encourage Diversification in Youth Sports**: To foster comprehensive motor development, it is crucial to allow young athletes to engage in a variety of sports. Early specialization can hinder broad motor skill development, leading to an increased risk of injury and suboptimal long-term performance." (Mostafavifar et al., 2013)
  - **Either/Or or Yes/And**

Case Study #2

- CC: 17 yo football player asks for a knee brace at halftime of a high school football game
- MOI: sprinting and felt pain below his knee, but it was fine – just needs a brace
- Assessment: at-halftime, in-the-dark, on-the-grass found no significant ligamentous or boney injuries
- Plan: Knee brace is applied and completed fn testing after halftime. Athlete played the remainder of the game
- Progression: Athlete is seen the next morning at a Saturday Morning clinic due to increased pain overnight

What are your differential diagnoses?

A. Patellar tendonitis

B. Patellar tendon rupture

C. Fat pad inflammation

D. Patellar tendon avulsion fracture

E. Osgood-Schlatter Disease

Dx: patellar tendon avulsion fracture

not his image

What change(s) could I have made that would improve this outcome?

Case Study #3

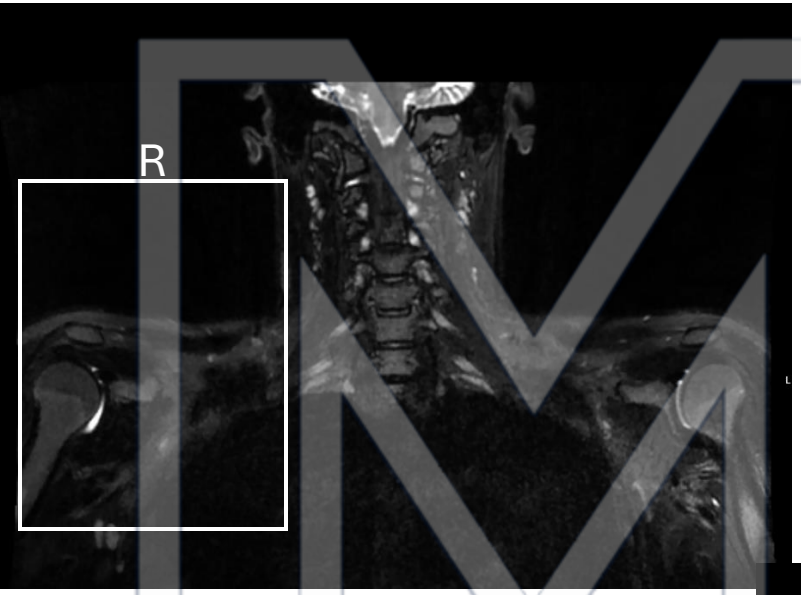
Subjective:

- Chief Complaint: 18-year-old softball middle-infielder with R-side (throwing arm) with significant pain (6/10) mid-shaft clavicle and pec that lasts several days after UE exercise
- History: Right hip labral repair approximately 2 months prior – allowed to lift with team for upper body. Ulnar nerve transfer at elbow and clavicle fracture, both on R side 5+ years prior with residual numbness in R pinky finger with traction to ulnar nerve from the surgery

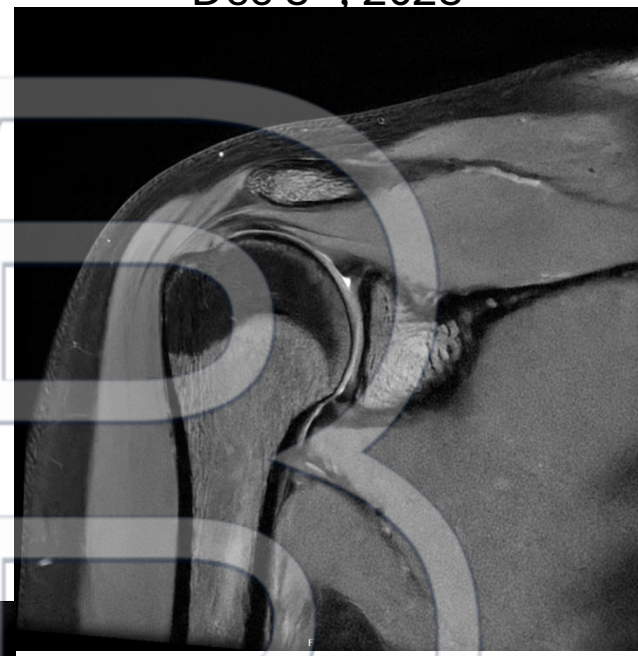
Objective:

- Range Of Motion: Noted hypermobility but no objective lack of stability in shoulder
- Manual Muscle Testing: Weakness in RTC compared contralaterally, and bilateral rhomboid inhibition
- Palpation: TTP over the clavicle, coracoid process, biceps LH tendon, trigger points in pec major and minor, with tightness in upper trap and bicep
- Special Testing: All Labral testing negative, fracture testing negative other than TTP over mid-shaft of clavicle
- Imaging: X-rays, shoulder MRI w/o contrast, brachial plexus MRI w/o contrast, and chest CT **all negative**

Brachial Plexus MRI w/o Contrast
Dec 8th, 2023



R Shoulder MRI w/o Contrast
Dec 8th, 2023



What are some differential diagnoses?

Chest CT
Dec 27th, 2023

Discuss your thoughts

A. Pectoral Strain

B. Biceps Tendinopathy

C. Labral Tear

D. Clavicle Bone Stress Injury

E. Scapular Dyskinesis

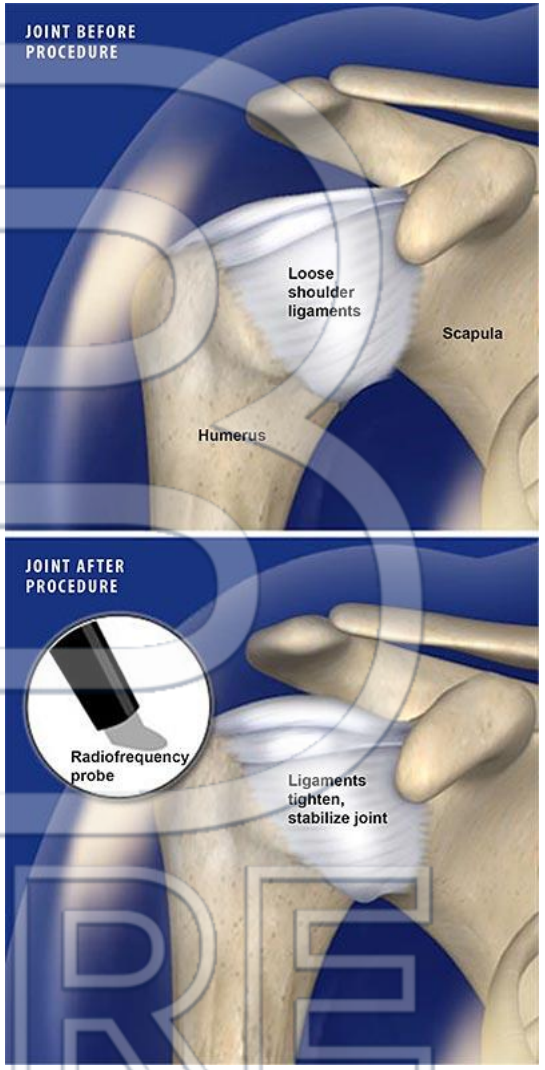
The Answer

C. Labral Tear

Dx: Posterior Labral Tear with shoulder multidirectional instability

Plan

- Exploratory arthroscopic surgery
  - Posterior labral repair
    - Tear from 7 o'clock to 11 o'clock
  - Anterior capsular plication
  - Posterior capsular plication
  - Supraspinatus tendon debridement
- Surgeon essentially repaired the labrum, shrink-wrapped the capsule to the joint and "cleaned everything up."



Timeline From Complaint To Resolution

October 2023
- Initial Injury – began conservative treatment with AT

Dec 2023
- Saw UE non-operative physician (X-ray and US)
- Saw UE Surgeon (Both MRI's)
- Saw Thoracic Surgeon (CT)

March 2024
- Saw another UE surgeon
- Diagnosed based on exclusion and surgeon's anecdotal experiences

May 2024
- Exploratory surgery and repair

November 2024
- Started throwing program

December 2024
- Biomechanical analysis of throwing motion
- Changed arm slot

February 2025
- Full Return to Play

What change(s) could I have made that would improve this outcome?

Critical Thinking

- The process of analyzing and evaluating thinking to make decisions

  (Paul & Elder, 2016)

- Critical thinking is: Highly **metacognitive** and **reflective**
- Critical thinking **exposes** assumptions, biases, beliefs, and points of view that influence clinical reasoning (Berg et al, 2021)
  - Implicit bias awareness
  - Cultural humility growth

Applying Critical Thinking Skills

- Think about a recent patient with a complicated presentation whom you misdiagnosed.
  - Did you look back at your evaluation process?
  - What did you learn from your mistake?
- Evaluate your PROCESS for coming to differential diagnoses.
- What personally held assumption and beliefs helped or hindered reaching a solution best for the patient?
- Did you jump to conclusions based on assumptions or beliefs?
- What were the patient outcomes and how will you continue to reflect on your thinking and listen more deeply, or withhold your assumptions until knowledge is gained?
- How has your perspective shifted?

Adapted from Berg et al, 2021

Applying Critical Thinking Skills

- Additional approaches include
  - Concept mapping
  - Debate
  - Role playing
  - Online discussions
  - Reflective journaling
  - Case based simulations
  - Case based learning

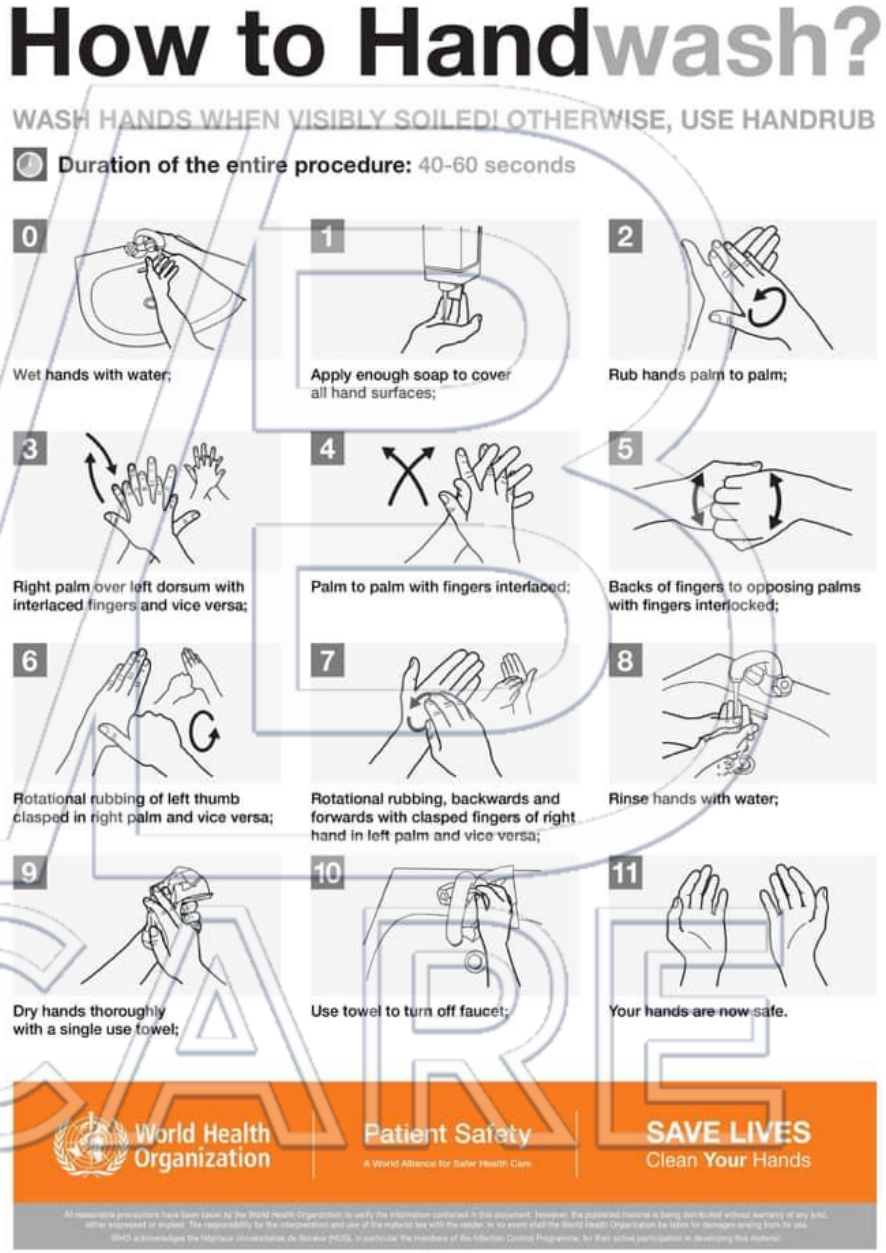
Real-World Critical Thinking: Non-textbook Pearls

- A clunk on an anterior drawer may indicate a PCL tear
  - starting with a tibial posterior shift on femur and a clunk when you return to neutral
- A clunk on a knee valgus test may indicate an ACL tear
  - think pivot shift
- With biceps long head pain, be overly suspicious of a SLAP tear – especially in overhead athletes – it's not tendinitis
  - BLHT originates and is continuous with the superior portion of the labrum and in can pull the superior labrum off the glenoid in OH athletes when the bicep is activated (Andrews et.al)
- Medial Tibial Stress Syndrome (shin splints) is a bone stress injury until proven otherwise
  - Double your suspicion if there are other RED-S symptoms, evidence of overtraining, the patient is a runner, or if the patient is a jumping athlete
  - Bony tenderness + pes cavus + prior BSI hx + increased training volume (any 3) = 97.5% sn and 54.2% sp for BSI distal to femoral condyles (Nye et al)
  - Shin Pain Scoring System 96% sn & 26% sp for predicting grade of BSI compared to MRI (Nussbaum et al [2])
  - Vertical SL Hop test 72% sn & 37% sp (Nussbaum et al [1])
- **Pain is a poor indicator of function and function is a poor indicator of injury severity**
  - Be thorough in your exams, especially when you think it's 'nothing'
  - Actively work to silence your internal biases as a clinician
  - Unicorns are possible

Injury Management Protocols

- Standardized injury management protocols are a staple of healthcare
  - Handwashing is a universally instituted protocol for reducing infection
  - Surgeons have protocols for post-operative care
  - Physical Therapists have injury rehab protocols
  - EMT's work off a variety of algorithms to make standardized care decisions
  - Athletic trainers rehearse emergency action plans

Think about what protocols athletic trainers utilize for injury management



Example: Emory University's Concussion Protocol

Suspected Concussion
- VOMS and SCAT6
- Sway as secondary assessment

Diagnosed Concussion
- Removed from activity
- F/u sx score w/in 24 hrs
- See physician ASAP
- Begin Sx moderated activity w/in 72 hrs

Stage 1
- Continue Symptom Limited Activity until symptoms resolved

Stage 2
- Aerobic exercise to increase heart rate

Prolonged Vestibular Symptoms
OR
Failure to progress past stage 2
OR
Persistent or worsening symptoms

Referral to Shepard Center
- Complex Concussion Clinic
- Will also address comorbidities
  - ADHD, depression, dyslexia, anxiety, POTS, etc

Care will include:
- Physicians
- Athletic Trainers
- Vestibular therapists
- Speech therapists
- Occupational therapists

All care and return to play decisions will be directed by concussion specialists

Stage 3
- Complete resolution of symptoms
- Neurocognitive testing (SWAY)

Stage 4
- Exertional Testing

Stage 5
- Non-contact Practice

Stage 6
- Full-contact Practice

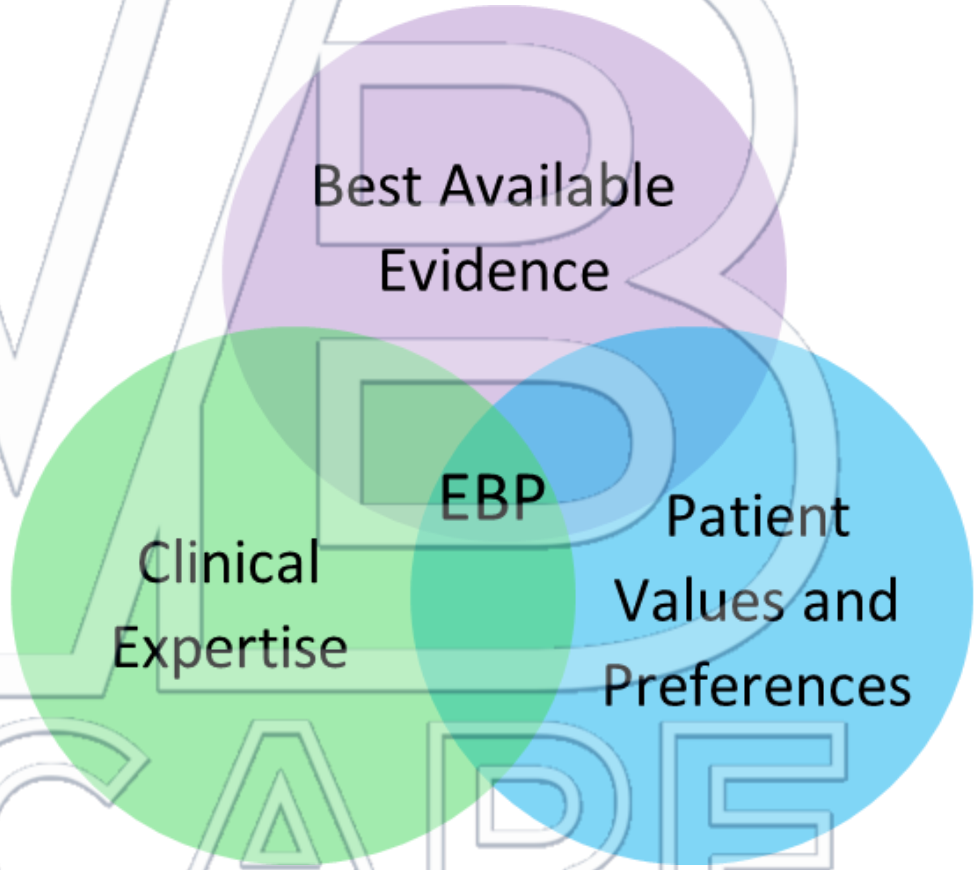
Stage 7
- Full Return to Sport*

*Return to sport CANNOT be completed prior to a return to learn

If athletic trainers can do this for concussions, why not other injuries?

Typical to only see protocols for legislated conditions (concussions, heat illness, etc.)

That doesn't mean you should be throwing the "kitchen sink" at everything else



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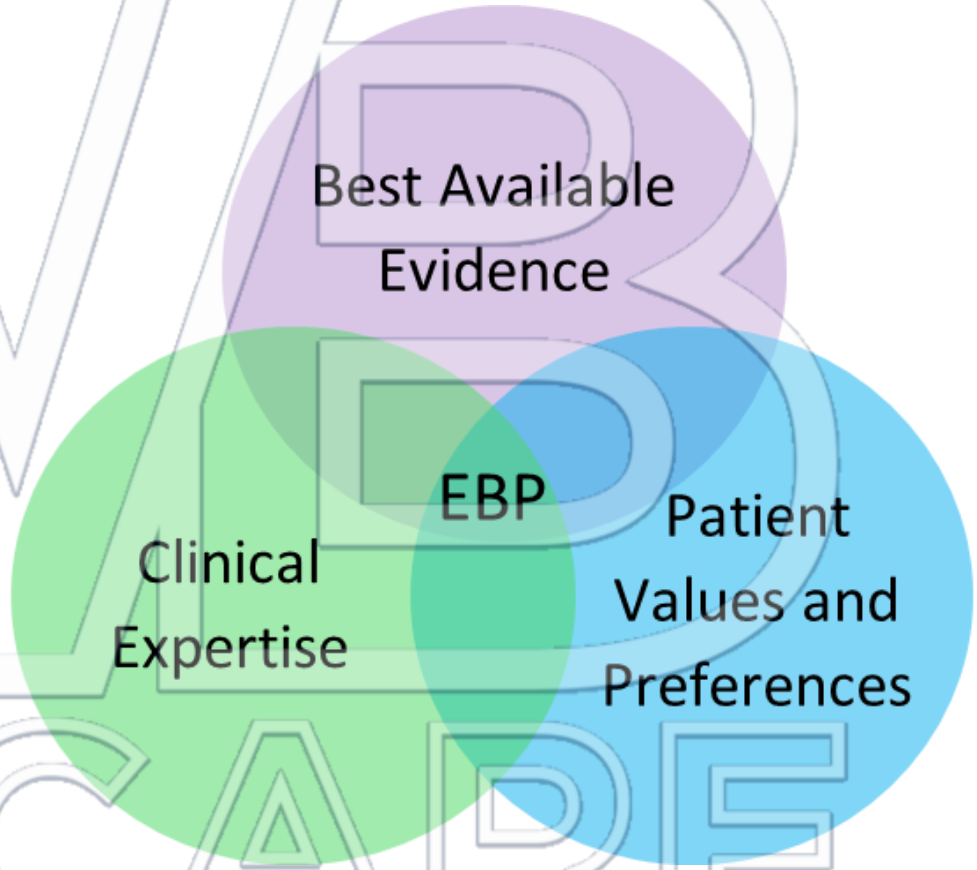
Why Not?

Leaves you, as a clinician, unsure what interventions worked or if some interventions could be impeding others

- It wastes your time and the patient's time
- Start with evidence-based medicine!!!



Why should AT's utilize protocols for common and complex injuries?

- Allows patient-centered and evidence-based care to be applied across the board
- Allows best practices to be followed intuitively from scenario rehearsal and familiarity
- Prevents re-injury through specific progression criteria designed to put patient health at the forefront
- Reduced clinician liability by following best practice with specific benchmarks

Why should AT's utilize protocols for common and complex injuries?

- Allows patient-centered and evidence-based care to be applied across the board
- Allows best practices to be followed intuitively from scenario rehearsal and familiarity

Protocols don't limit clinician skill sets or return-to-play timelines; they give AT's a framework to work from and utilize standardized progression criteria to reduce reinjury rates AND improve performance

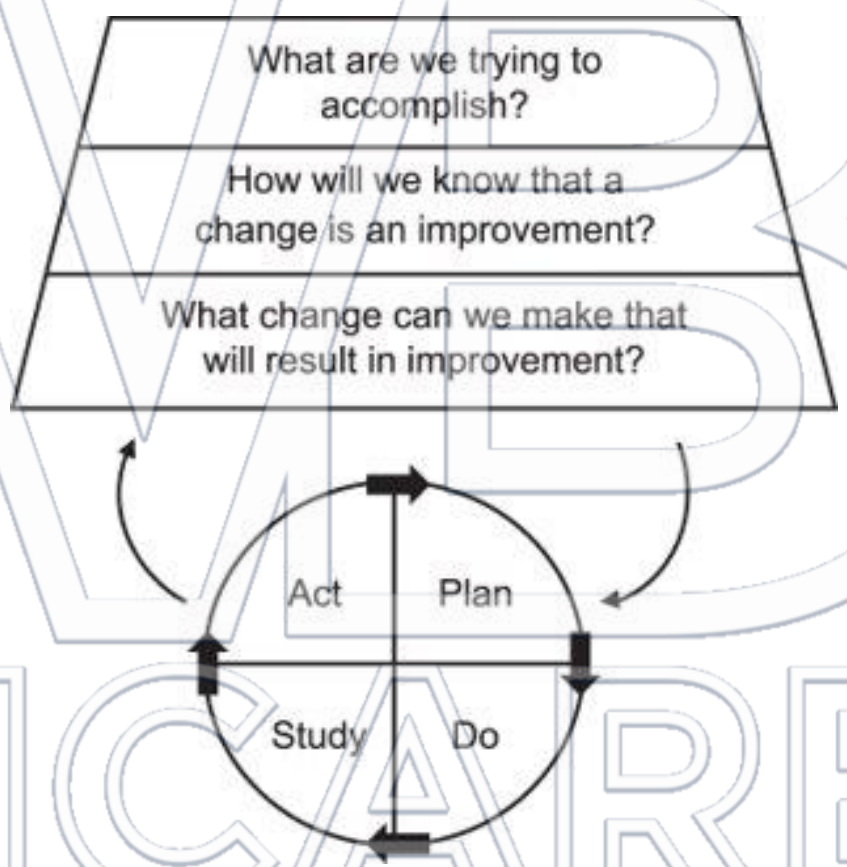
- Prevents re-injury through specific progression criteria designed to put patient health at the forefront
- Reduced clinician liability by following best practice with specific benchmarks

Best Practice in Developing Protocols

- Should start with a **self-analysis** with an emphasis on Continuous Quality Improvement (CQI)
- Clinicians should **review collected Patient Reported Outcomes** (PRO) to determine what is working from the **patient's perspective**
  - As clinicians, we collect PRO anyway (e.g. how's it feeling… better/worse/same) we just don't record them
  - Implementing standardized questions and quantitative responses will help with CQI and improve patient outcomes, **perceived or otherwise**

Measuring the Effectiveness of Treatment Strategies – CQI

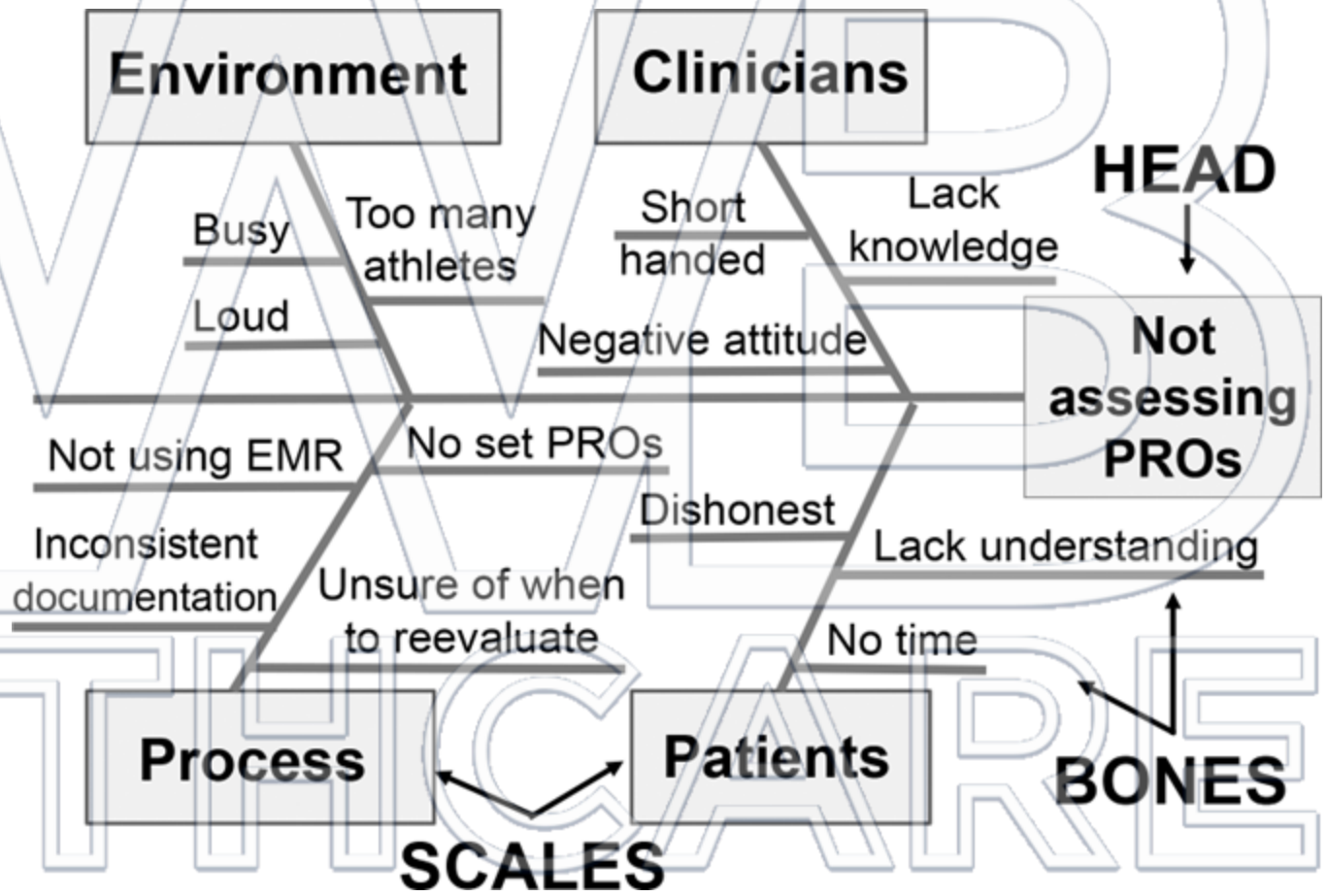
- Continuous Quality Improvement Goal
  - Address a specific quality gap
  - Improve the system



The Model of Improvement
Langley et al, 2009

Measuring the Effectiveness of Treatment Strategies – CQI

Snyder Valier, 2020



Example of a Fishbone diagram, Snyder Valier, 2020

STEEEP—common areas attacked by CQI

- Aims for improving health care
  - **S**afe = avoid harm
  - **T**imely = reduce wait times
  - **E**ffective = based on science
  - **E**fficient = Avoid waste
  - **E**quitable = does not vary based on location/population
  - **P**atient-centered = respects needs of patient and their preferences
- Examples
  - Reduce ACL injuries
  - Improve access to physician appts.
  - Reduce time lost after concussion
  - Coordinate AT schedules
  - AT access for out of season sports
  - Improve pre-game nutrition for vegetarian athletes

Sauers EL & Snyder AR, 2011

Measuring the Effectiveness of Treatment Strategies - PRO

Ortho ToolKit

- Implementation
  - Decide which patients are appropriate
    - Post-op and/or 4-6 weeks rehab?
  - Select most relevant PRO
  - Integrate data collection into clinical workflow
    - Forms
    - Send texts that integrates with your EMR
    - Add a tablet station where patients check-in
  - Provide clear instruction to patients
  - **Utilize data** to inform personalized treatment plans and quality improvement
    - Goal setting = patient motivation!
    - Trend PRO results

Measuring the Effectiveness of Treatment Strategies - PRO

- Most commonly used PROs in AT practice
  - Numeric Pain Rating Scale (single item scale)
    - Global Rating of Change Scale
  - Lower Extremity Functional Scale
  - Disability of the Arm, Shoulder, and Hand (DASH)
  - Oswestry Disability Index (back)
  - Foot and Ankle Ability Measure
  - Short Form-12 and Short Form-36 (generic scale)

Lam et al., 2019

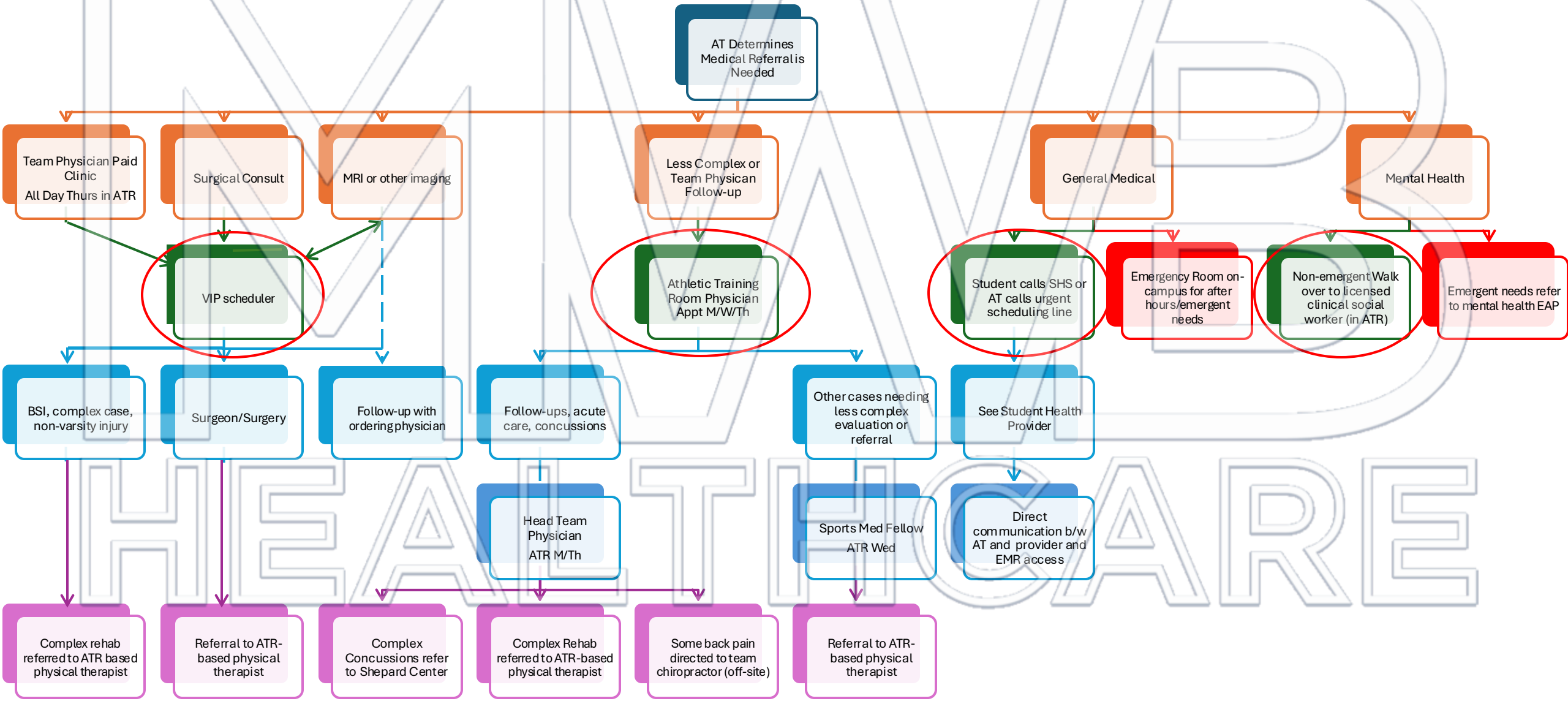
Measuring the Effectiveness of Treatment Strategies – Grand Rounds

- Grand rounds are an important learning tool
- Many healthcare settings utilize grand rounds to improve health outcomes

Example: Emory University Open Injuries

- Every 2 weeks, we go through open injuries as a staff focusing on athletes who are limited or out for 2+ weeks
  - Allows different perspectives, backgrounds, and experience levels to work together to learn and provide a higher level of care for patients
  - Constructive criticism offered and allows learning opportunities regardless of clinician level
  - Able to ask your colleagues questions if you feel a patient has plateaued
  - **Opportunity to clarify referral needs and steer the care of the patient to the correct provider if they are not improving**

Example: Emory University Sports Medicine's Referral Process with Emory Healthcare



Optimizing YOUR Referral Process

- For **smaller schools and communities**, the best way is to facilitate relationships between yourself and your team physician and local physical therapists
  - Providers will get increased patient volume and you'll have access to more resources in the community
  - Strive to have a weekly physician clinic in the athletic training room for follow-ups/acute injuries/disadvantaged patients to increase equitable access to care
- If hired at the **district level**, work to have the district pair with a local healthcare system
  - Healthcare system gets increased referral access and free advertising you get increased levels of care and set expectations of what access your athletes will receive
- For **hospital outreach** positions, designate a gatekeeper/scheduler position within the healthcare system **OR** as a stipend position for an outreach AT to direct priority scheduling
  - Can streamline the process with fillable forms automatically sent to designee when completed
  - Saves the provider and AT time by eliminating scheduling back-and-forth

What should you take home with you today?

Learning Outcomes

1. Compare textbook injury management strategies with real-world scenarios.
2. Apply critical thinking to enhance differential diagnosis processes in athletic settings.
3. Develop practical injury management protocols that address common and complex cases.
4. Assess the effectiveness of various treatment strategies through case study analysis.
5. Enhance referral processes to ensure timely and appropriate care for athletes.

Conclusions

1. Sometimes it is a unicorn.
2. Don't allow biases and assumptions to override critical thinking
3. Develop protocols to "standardize" individualized patient care through implementing evidence-based practices
4. Follow a "Plan – Do – Study – Act" process to assess treatment effectiveness through PROs
5. Develop relationships, utilize a team approach, and work within or build the referral structure

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