Primary Care
Pediatric Sports Medicine

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Objectives

• What is Pediatric Primary Care Sports Medicine?
• What is the best approach to diagnosis and management of sports injuries
• Who needs referral? MRI?
• Best way to facilitate care?
Pediatric Sports Medicine

• Diagnosis of common peds sports injuries
• Non operative management of acute/chronic injuries
• Encompasses >90% of all pediatric sports injuries from diagnosis to RTP
• Who falls in the 10% that requires more?
Common Pediatric SM injuries

• Most fall into 3 categories:
  • Fractures
  • MSK injuries
  • Concussions/TBI

* Misc Exercise Rx (DM, EIA, CF, obesity, cardiac, female triad), Exercise Intolerance, Sports Nutrition/Perform, Injury Prevention
Common MSK Injuries

• Overuse injuries (stress fractures, PFPS, apophysitis)
• Physeal injuries
• Avulsion Injuries
• Joint instability (MDI, patellar instability)
• Ligamentous (ACL, ATFL, UCL, etc)
• Chondral injuries (Labral tear, OCD, etc)
• Musculotendinous (strains, tendonitis, spasm, tendinopathy)
Know your Apophyses...
Approach to diagnosis

• History is key! (when, where, why, how...)
• Acute or chronic?
• Mechanism of injury
• Aggravating factors? (what level of activity)
ACUTE or CHRONIC

ACUTE:
- Fractures
- Avulsions
- Ligament sprains
- Ligament tears
- Dislocations
- Contusions

CHRONIC:
- Stress fractures
- Apophysitis
- Instability
- Subluxations
- PFPS
- Tendonitis
- OCD
Diagnosis

- History and Exam
- “IPRNS” examination
- Knowledge of anatomy/spec testing critical
- Knowledge of athletes sport, level, demand
- Proper Imaging
Imaging

• Typically begins with X-rays
• MRI: soft tissue injuries, physeal, and early bone injuries
• CT: characterizing boney injury
• MSK U/S: superficial soft tissue injuries (tendinopathy, bursitis) and dynamic stability/function
Management of Peds SM injuries

- RICE?....
- Also need to consider stability/protection
- Rest needs to specified (length, limits)
- Pain/swelling relief
- Appropriate REHAB needs to begin ASAP
- ROM, flexibility, stability, proprioception, strength, sport specific exercises, graded RTP
Management

- Majority improve with activity modification and Rehab
- Education on diagnosis and rehab is critical
- Formal PT referral versus home program
- Always follow up for sports clearance
Management

• Need to identify <10% that require further testing, MRI, or surgical referral
• WHO do I REFER?
• WHEN do I MRI?
Myths/Facts

• Contrary to what the Pre – NBA, NFL, or Olympic athlete’s parents believe
  • H & P more important than MRI

• MRI should be used to confirm diagnosis of suspected injury
When to MRI a joint

- Objective:
  - Effusion
  - + specialized testing of specific joint
  - Indicated by X-rays

- Subjective:
  - True Instability
  - True Mechanical symptoms
  - Non responsive to appropriate PT trial
Don’t Miss Diagnoses

- ACL tear (internal derangement of knee)
- OCD/loose body
- Disrupted knee extensor mechanism
- Meniscus/labrum tear
- Fractures of joint surface (CT or MRI)
- Stress fracture, growth plate injury
OCD

- Osteochondritis dissecans
- MFC/LFC, capitellum, talus
Patellar sleeve Fx
Traumatic Brain Injury (TBI)

• Currently majority of patients at SPARCC
• Distinguish Concussion from TBI with structural lesions (SDH)
• Distinguish Simple Concussion from Complex Concussion or PCS
Definition

Simple
✓ Resolves by 7-10d
✓ No complications
✓ Imaging/Formal neuropsychological evaluation unnecessary
✓ Most common form (75-90%)
✓ Rest until symptoms resolve
✓ Graded RTP Protocol

Complex (PCS)
✓ Persistent symptoms
✓ Specific sequelae
  ✓ Prolonged cognitive impairment
✓ Imaging/Formal neuropsychological evaluation
✓ Specialist expertise
✓ Directed therapy
Concussion Management (acute)

- Activity restriction
- School accommodations
- Trigger avoidance
- Sleep, nutrition, hydration
- Impact testing prior to clearance (contact sports)
• Discourage excessive brain stimulation:
  ▪ Eliminate or limit...
  ✗ **TEXTING**
  ✗ VIDEO GAMES
  ✗ INTERNET
  ✗ T.V.
  ✗ LOUD MUSIC
  ✗ KNOWN TRIGGERS
Do not go over the symptom threshold!

- Allows the brain to continue healing without prolonging symptoms
- Keeps the student stimulated (avoid potential for increase in depressive symptoms)
Cognitive Rest

• Depending on severity of symptoms may need up to 1-2 days off (RED)
• Early return with full individualized accommodations (ORANGE)
• RELATIVE cognitive rest (YELLOW)
• Gradual return to normal school work as tolerated (GREEN)
Concussion Guidelines for Teachers

RED ZONE
• Student needs total cognitive rest. Should not be in school or doing academic work.

ORANGE ZONE
• Half days; Attendance may be inconsistent
• Prioritize assignments based on most essential goals of course
• If symptoms worsening, send student to the nurse
• Expect limited class participation
• Avoid tests, quizzes, and computer or screen-based assignments
• May need audio books, scribe, or oral exams
• Help student accommodate light and noise sensitivity

YELLOW ZONE
• Excuse past assignments and units as possible
• Student should only take one test or quiz a day
• Extended time on tests or large assignments

GREEN ZONE
• For new work, academic expectations can be back to usual
• Make up tests and missed critical work (not all work)
PCS Management (chronic)

- Neurocognitive or NP testing
- Active rehab protocol
- Vestibulocular rehab
- PCS labs?
- MRI brain?
- Targeted pharmacologic options
What is “Active Rehab”

• Activity is used in a controlled supervised manner as PART of PCS treatment
• Typically started at 3-6 weeks post injury after PCS assessment
• Sub-symptom threshold exercise!
• Terminated if Sx exacerbated

Wiler et al. 2012
Gagnon et al. 2009
SPARCC Active Rehab Protocol

• Step 1: 50-60% HRM for 10-12 min
• Step 2: 60-70% HRM for 12-15 min
• Step 3: 70-80% HRM for 15-18 min
• Step 4: Full exercise tolerance testing (80-90% MHR)

• All steps include cervical and vestibular exercises post exertional exercise
VOMS

- **Smooth Pursuits**
- **Accommodation (<6-8cm)**
- Saccades (V/H)
- VOR/dolls eye (V/H)
- Visual Motor sensitivity

VOMS
Vestibular Rehab

• Utilizes movement-based therapy to retrain the vestibulo-ocular system
• Incorporate desensitization, eye/head exercises, and balance retraining
• Moderate to strong evidence in support of these vestibular interventions

Hillier et al; 2011
Vestibular Rehab
Role of Medications in PCS

- Can help with symptomology
- No impact of PCS outcome/duration
- OTC (Tylenol/Advil), sleep aids, SSRI, TCAs
- Focus on non pharm, prevention strategies
- Discontinue meds if not helping
Nutrition & Hydration

• Dehydration and poor nutrition are known symptom triggers
• Fresh non processed foods
• EPA, fish oil (1000mg BID)
• Magnesium (400mg qd), Vit D (2000IU)
• Avoid high glycemic index, caffeine, alcohol
Vestibular Rehab
Cervical Rehab

PHYSICAL
- Symptoms: Dizziness/balance problems, Neck pain, Headache/nausea, Blurred vision, Noise sensitivity, Sunglasses, Photophobia/blurred vision
- Interventions: Strategic rest/scheduled environment in classroom, Quiet room/breaks in classroom, Frequent recess and dance classes without penalty

COGNITIVE
- Symptoms: Workload reduction in the classroom/homework, Adjust due dates, Exempt/postpone large tests/audit classwork, Slowed processing, Mentally foggy, Remembering
- Interventions: Alternative testing, Allow for “buddy notes”, Allow for extra time, Do not penalize for work not completed during recovery

EMOTIONAL
- Symptoms: More emotional, Sad, Angry, Nervous, Signal
- Interventions: Help staff understand that mental fatigue can manifest in emotional meltdowns, Allow student to remove him/herself to de-escalate

MAINTENANCE
- Symptoms: Mentally fatigued, Sleeping too much, Can’t initiate, Drowsy, Sleeping too little
- Interventions: Maintain sleep, Allow for rest breaks, Allow student to leave school early, Later in the day

Active Rehab

Cognitive Behavioral Therapy
Sleep Hygiene
Nutrition

School Accommodations
Case

• 15 year old healthy boy with elbow to head playing HS basketball
• Brief LOC, dizziness, mild amnesia
• Expected to improve after 1-2 week rest
• Continued to have HA, dizziness
Case (4 weeks later)

- Has been instructed to rest and focus on nutrition and sleep
- Part time school, no activity
- Now having insomnia, anxiety, worsening headaches and neck pain
- Normal Brain MRI
- Watchful waiting for brain healing?
Case

• 17 yo girl, soccer
• Acute, non-contact, twisting injury
• Patella noted dislocated
• Brought by ambulance to ER for reduction
• Placed in immobilizer, crutches
Knee Exam

• Inspection - Large effusion, **deformity**
• ROM - **Limited by pain and swelling**
• Palpation - **Tender over medial retinaculum**
• Neurovascular - **Intact**
• Special maneuvers -
  • **Positive patellar apprehension**
Patellar Dislocation

Torn Medial Retinaculum
Patellar Dislocation: Role of MRI Imaging

- Osteochondral injury
- High grade medial patellar stabilizer disruption
- Associated injury (e.g. ACL)
Patellar Dislocation

- If MRI negative, PRICEMMM
  - Progressive Rehabilitation
  - Knee bracing (immobilizer 1-2 weeks)
  - RTP 6-8 weeks

- If MRI positive-Early arthroscopy
Case

- 16 yo female soccer player, felt a “pop” in right knee after twisting injury
- Collapsed, could not ambulate
- Swelling immediately
Diagnosis
Presumed ACL Rupture
Tx ACL Rupture

- Radiographs to eval for fracture
- PRICEMMM
- Knee Immobilizer for comfort
- Rehab to begin after pain improved
- Referral for surgical consultation
Case

- 15 yo wrestler, acute twisting knee injury while opponent driving him into the mat
- Knee flexed at the time of injury
- Rapid onset swelling and pain
Knee Exam

- **Inspection** - Moderate intra-articular effusion
- **Palpation** - Diffuse tenderness, max pain over medial joint line
- **ROM** - Limited flexion
- **Neurovascular** - Intact
- **Special maneuvers** - Deferred
Joint Line Palpation
Imaging

MRI
Meniscus tear
Tx Meniscal Tear

- PRICEMMM
- Knee Immobilizer for comfort
- Rehab to begin after pain improved – goal is to have increased ROM and minimal effusion
- Referral for surgical consultation
Knee Braces...
More braces...
Splints
Conclusions

• >90% of pediatric sports medicine injuries are encompassed by PCSM
• Critical to prescribe timely rehabilitation
• Identify your RED FLAGS for MRI/referral
Sports Medicine Referrals

- EMR order: PEDIATRIC Sports Medicine
- Order Multiple view X-rays if ANY indication
- Acute injuries: (Fx, TBI, MSK) same day/week
- Chronic/Overuse injuries: 1-2 weeks
- Exercise Rx 2-4 weeks
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Great PCSM References

http://www.wheelessonline.com/
http://www.radiologyassistant.nl/
Sparcctucson.com