Diagnosing and treating common sports related injuries

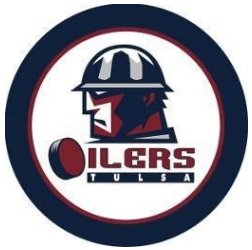
Nicholas Thompson, D.O.
OSU Medical Group
Team Physician ECHL Tulsa Oilers

Disclosures

- I have nothing to disclose

About Me

- Primary Care Sports Medicine Fellowship
  - Lake Erie College of Osteopathic Medicine
  - Team Physician for Mercyhurst University, OHL Erie Otters, NBA-D League Erie Bayhawks
- OSU Medicine Midtown/ Sand Springs
  - Team Physician ECHL Tulsa Oilers



Objectives

- Review conservative treatment strategies including NSAID selection
- Recognize and treat common sport related injuries related to trauma and overuse
- Review special testing to aid in diagnosis of musculoskeletal injuries
- Learn when to refer and when to treat
- Discuss RTP timelines regarding particular injuries
- Update on concussion

Why do We Care

- Approximately 90% of all sports injuries are non-surgical. (Which means YOU can treat them)
- Common things you see in primary care
- Knee injuries make up 55% of all sport related injuries.
- Returning people to the things they enjoy in a timely and safe manner
- Two categories of injuries:
  - Traumatic
  - Overuse

Sports Medicine Weekly

Conservative Management

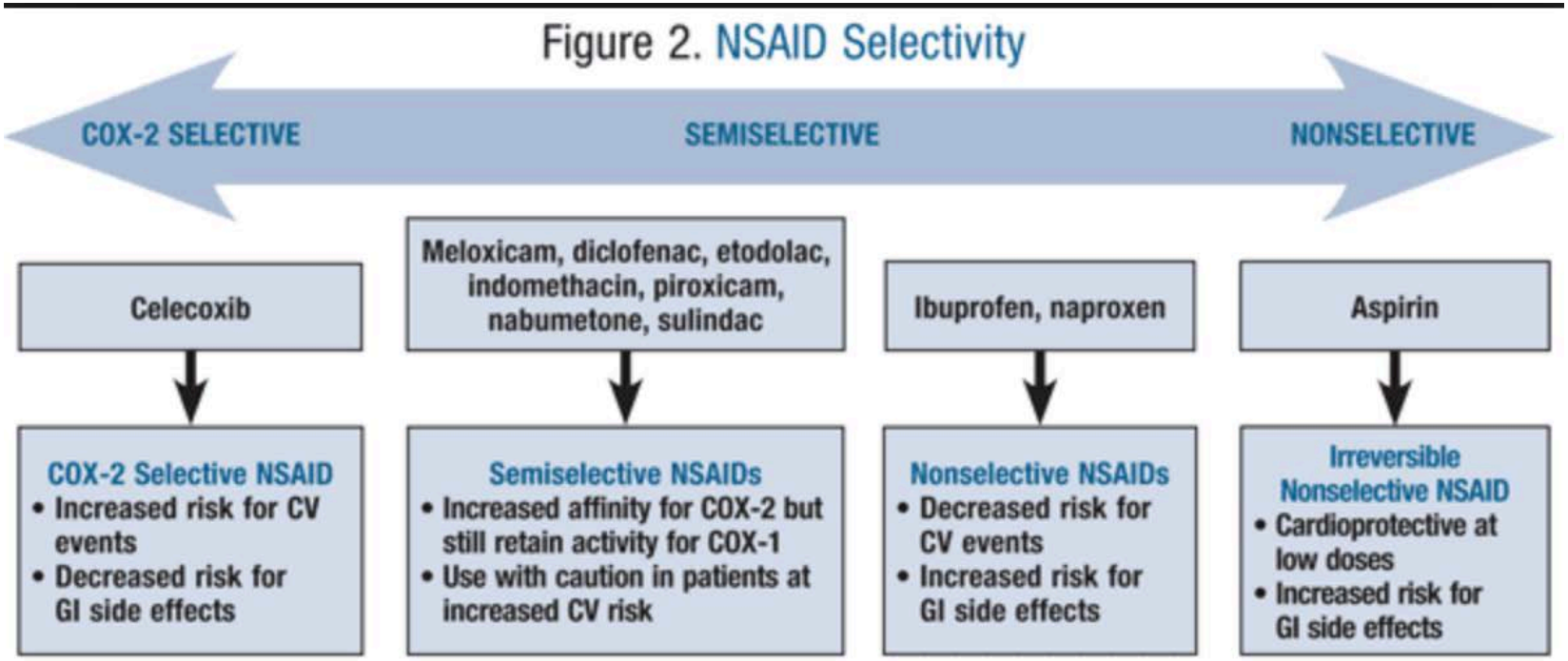
- PRICE not RICE
  - Protection
  - Rest
  - Ice
  - Compression
  - Elevation
- NSAIDs
  - When to use
  - Which one to use
  - Route
- Physical Therapy
  - Modalities

NSAIDs: Evidence Based Decision Making

- Acetaminophen should be used as a first line agent, particularly for mild pain.
- Ibuprofen at the lowest effective dose would be preferred NSAID
- Addition of mucosoprotective agents for those at high risk of developing GI events.
- Naproxen should be used as secondary choice when required.
- COX-2 inhibitors may have a place for high risk patients who could not take anti-ulcer co-therapy and for patients who have intolerance to other NSAIDs.
- Topical diclofenac solution is equivalent to that of oral NSAIDs in knee and hand OA.
- Decreased GI adverse events noted with topical NSAID vs oral.

Ong, C.k.s., P. Lirk, C.h. Tan, and R.a. Seymour. "An Evidence-Based Update on Nonsteroidal Anti-Inflammatory Drugs." *Clinical Medicine & Research* 5.1 (2007): 19-34. Web.
Jones, Peter, Stuart R. Dalziel, Rain Lamdin, Jennifer L. Miles-Chan, and Christopher Frampton. "Oral Non-steroidal Anti-inflammatory Drugs versus Other Oral Analgesic Agents for Acute Soft Tissue Injury." *Cochrane Database of Systematic Reviews Reviews* (2015): n. pag. Web.

WHAT'S THE DIFFERENCE?



***Acetaminophen (Paracetamol) – weak anti inflammatory properties, mechanism of action not entirely understood**

Chisholm-Burns M, Schwinghammer T, Wells B, et al. *Pharmacotherapy Principles and Practice*. 3rd ed. Columbus, OH: McGraw-Hill; 2013.

Physical Therapy Prescription

- **Name:**
- **Diagnosis:**
- **Precautions:**
- **Frequency/ Duration:** 3 times per week for 4-6 weeks, adjust as indicated
- Please evaluate and treat patient using the following modalities:
  - Ultrasound/ E-Stim
  - Heat/ Ice
  - Phonophoresis
  - Iontophoresis
  - Manual Therapy
  - Massage
  - Low Level Laser Therapy
  - Balance Training
  - Gait Training
  - Aquatherapy
  - Strength Training
  - Neuromuscular Re-education
  - Traction
- And other modalities as indicated per your recommendations with the goal of decreasing edema and pain and improving range of motion, flexibility, and functional mobility.
- Please include in your instructions a home exercise program that the patient can complete once discharged from your treatment.

Doc, My _____ Hurts

Doc, My Shoulder Hurts

- Traumatic
  - AC separation
  - Shoulder dislocation/ instability
- Overuse
  - RTC tendinitis
  - Biceps tendinitis

Doc, My Shoulder Hurts

- Exam
  - ROM
    - Forward Flex 180 degrees
    - Extend 40 degrees
    - Abduct 180 degrees
    - External Rotation 40 to 50 degrees
    - Internal Rotation 55 degrees
    - Apley Scratch test (IR and Adduction)
      - Spinous process level reached

Shoulder Exam

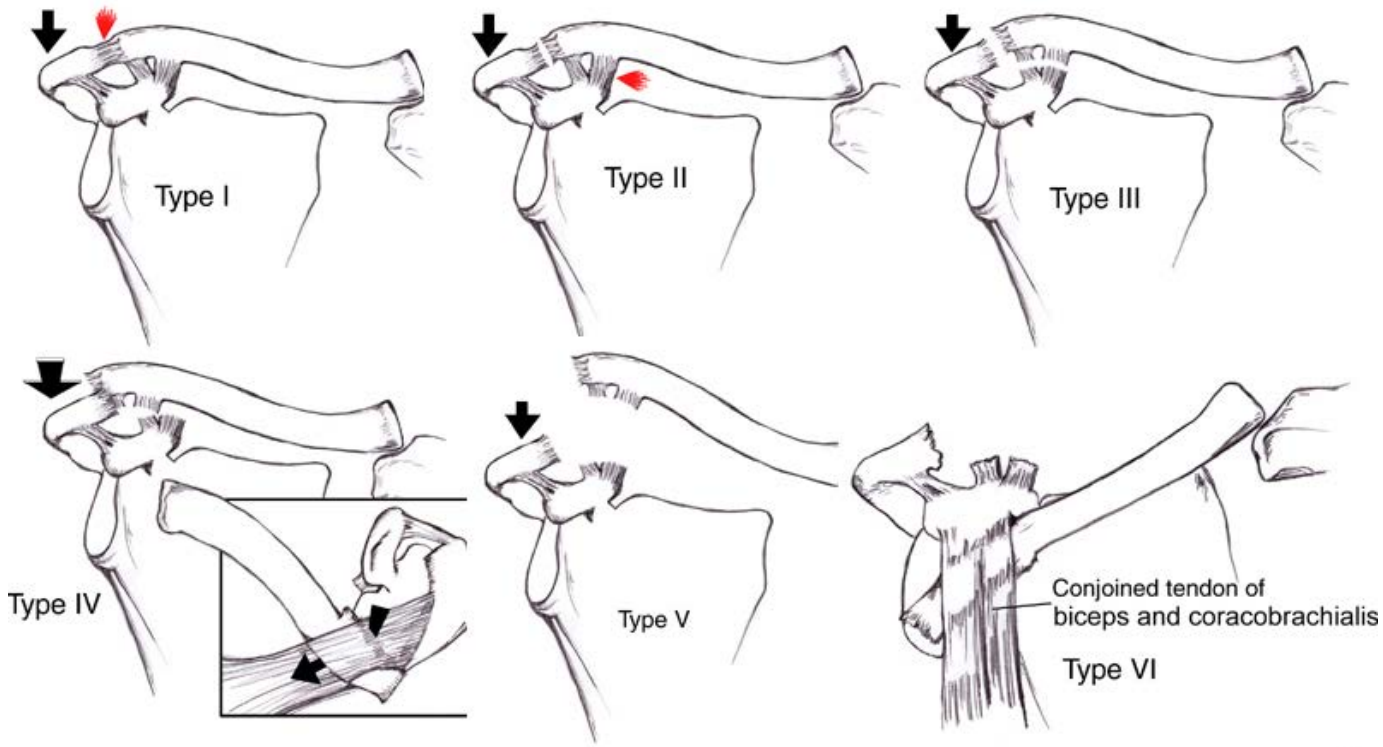
- Exam
  - Strength- Rotator Cuff
    - Supraspinatus (Arm Elevation)
      - “Empty Can” test
      - “Full Can” test
    - Infraspinatus (External Rotation)
      - Arm by side, elbow flexed
    - Teres Minor (External Rotation)
      - Arm by side, elbow flexed
    - Subsacapularis (Internal Rotation)
      - Lift off test

Shoulder Exam

- Exam
  - Palpation
    - Sternoclavicular joint → Clavicle → AC joint
    - Spine of scapula
  - Tests
    - Impingement
      - Neers
      - Hawkins
    - Biceps Tendon
      - Speed's
      - Yergason's
    - O'Briens
    - Apprehension/ Relocation

Injury: AC Separation	History	Physical Exam	XR	MRI
Type 1 & 2	Acute blow to shoulder; Land on corner of shoulder	TTP AC joint; swelling; minimal or no joint deformity	AP Shoulder 1: No step off 2: <50% step off	1: AC ligs intact; edema at AC 2: Edema and minor step off AC lig torn
Type 3	Same	TTP AC joint; obvious elevation of clavicle	3: > 50% step off; clavicle dislocated	AC & CC lig torn > 50% elevation
Type 4,5,6	Same	TTP AC joint; clavicle under skin	4: > 50% + post 5: >100% 6: Under coracoid	AC & CC ligaments torn, > 50% clavicle elevation 4: clavicle

Injury	Tx	RTP	Points
Type 1 & 2	Sling/ Ice/ Rehab	1-3 weeks	+/- injection
Type 3	Sling/ ice	3-6 weeks	Non-op vs operative
Type 4,5,6	Likely surgery	4-6 months	



Traumatic Injuries

Injury	History	Physical Exam	XR	MRI
Primary Anterior Dislocation	Fall or hit to abducted/ ER arm	Pain with ROM. Arm in ADD/ IR position	Not needed prior to reduction	Determine pathology once reduced

Traumatic Injuries

Injury	Tx	RTP	Points
Primary Anterior Dislocation	REDUCE	1-3 weeks	Surgery vs Rehab

Reduction Techniques:

- Traction-countertraction
- Stimson maneuver
- Scapular manipulation
- External rotation
- Milch technique
- Spaso technique

Signs of Successful Reduction:

- Palpable or audible clunk
- Return of rounded shoulder contour
- Relief of pain
- Increase in range of motion

Anterior Shoulder Dislocation

- Management
  - Non-operative
    - 1st time dislocations
  - Risks for secondary dislocation
    - age < 20 (highest risk)
    - male
    - contact sports
    - hyperlaxity
    - glenoid bone loss >20-25%
  - Physical Therapy
    - RTC and Periscapular
  - Bracing

Overuse Injuries

Injury	History	Physical Exam	XR	MRI
Rotator Cuff Tendinitis	Pain with overhead movements Decreased strength	Pain with Shoulder Abduction and Flexion +Neers +Hawkins	R/O other causes or prior to injection Acromial Types (1-4)	Evaluate for tear
Biceps Tendinitis	Anterior Shoulder Pain	TTP biceps groove + Speeds + Yergason	Not needed	Can show thickening or tenosynovitis

Overuse Injuries

Injury	Tx	RTP	Decision
Rotator Cuff Tendinitis	NSAIDs PT Steroid Injection	As tolerated	Timing of MRI
Biceps Tendinitis	NSAIDs PT Strengthening	As tolerated	Injection? Rupture- "Popeye deformity" Surgical release

Doc, My Elbow Hurts

- Traumatic
  - Distal Biceps Tear
  - UCL injury
- Overuse
  - Tennis Elbow
  - Golfers Elbow

Elbow Exam

- Palpation
  - Medial/ lateral Epicondyle
  - Olecranon
  - Radial head
  - UCL
- ROM
- Strength
- Special Tests
  - Varus/ Valgus stress
  - Tinels sign over Ulnar nerve

Traumatic Injuries

Injury	History	Exam	XR	MRI
Biceps Distal Tear	Felt a pop	Cannot hook tendon	Normal	Hematoma and torn tendon
UCL Injury	Medial Elbow pain	Milking Maneuver	Normal	Signal uptake to disruption

Traumatic Injuries

Injury	Tx	RTP	Decision
Biceps Distal Tear	ROM, ice compression	If surgery, 6 months	Early surgery or none
UCL	Avoid valgus stress	1-12 week	PRP? Surgery?

Overuse Injuries

Injury	History	Exam	XR	MRI
Lateral epicondylitis	Overuse	TTP lat epicondyle. Poor grip	Normal	Torn extensor tendon
Medial Epicondylitis	Swing at object and hit something hard	TTP medial epicondyle	Normal	Tendon with fluid

Overuse Injuries

Injury	Tx	RTP	Decision
Lateral Epicondylitis	Ice, Injection, stretching	If surgery, 3 months	Brace?
Medial Epicondylitis	Ice, Injection	If surgery, 3 months	

Doc My Finger Hurts

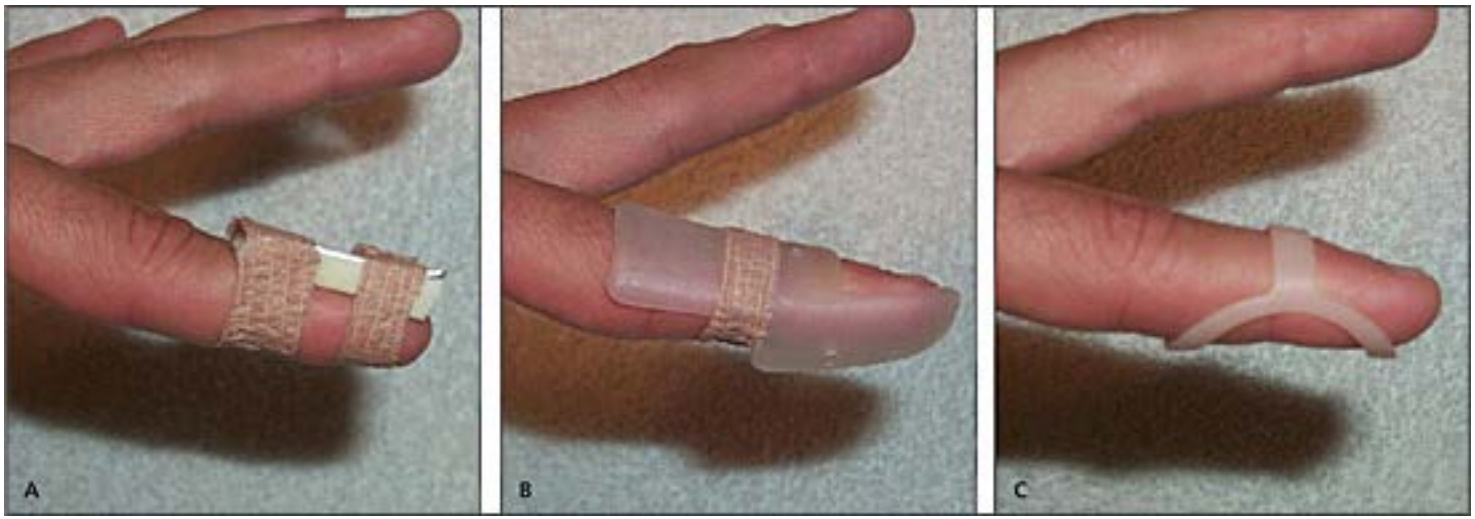
- Traumatic
  - Mallet Finger
  - Jersey Finger

Traumatic Injuries

Injury	History	Exam	XR	MRI
Mallet Finger	Tip finger hit by ball	Cannot extend distal phalanx	AP/ Lat	Not needed
Jersey Finger	Fingertip caught in jersey	Cannot flex distal phalanx	AP/ Lat	Localize retraction

Finger Injuries

Injury	Tx	RTP	Decision
Mallet Finger	Extension Splinting 6-8 weeks	1 week	
Jersey Finger	Buddy Tape, Hand Consult	Dependent on Surgery	Surgery needed



Doc, My Hip Hurts

- Traumatic
  - Hip Pointer
  - Rectus abdominal strain
  - Adductor strain
- Overuse
  - Labral Tear
  - Impingement
  - Snapping Hip

Hip Exam

- Palpation
  - Greater Trochanter / Bursa
  - Anterior Superior Iliac Spine
  - Ischial tuberosity
  - Iliac crest
  - Pain with oblique avulsions / hip pointers
  - Iliotibial band / TFL
- ROM
  - Flexion 135 deg
  - Extension 30 deg
  - Abduction 50 deg
  - Adduction 30 deg
  - Internal rotation 30 deg
  - External rotation 50 deg
- Special Tests
  - FADDIR
  - FABER
  - Log Roll
  - Thomas test
  - Ober's test

Traumatic Injuries

Injury	History	Exam	XR	MRI
Abdominal Strains	Throw/ swing/ twist/ pivot	TTP along muscles	Not needed	If persisting
Adductor Strains (MCC)	Lateral Lunge	Pubic tubercle to adductor tubercle	Not needed	If chronic
Hip Pointer	Direct Contact to iliac crest	Contusion	R/O Fracture	If concerned for growth plate injury

Traumatic Injuries

Injury	Tx	RTP	Decision
Abdominal strains	Rest, ice, core stability	1 day to 10 weeks	Inject?
Adductor strain	Rest, Ice, deep tissue, stim, strenghtening	0-6 weeks	
Hip Pointer	Ice, shield, stim	0-3 weeks	

Overuse Injuries

Injury	History	Exam	XR	MRI
Labral Tear	Deep groin pain, mechanical symptoms	FAddIR	AP pelvis, Dunn view	If conservative fails
Impingement	Deep groin pain	FAddIR	AP Pelvis, Dunn view	
Snapping Hip	Change in regimen	Dynamic-FABER to FAddIR	AP pelvis, Dunn view	

Overuse Injuries

Injury	Tx	RTP	Decision
Labral Tear	Rehab, core, Squat lunge	0-6 weeks	Injection?
Impingement	Rehab, core, squat, lunge	0-6 weeks	Injection?
Snapping Hip	Hip extension/ stretching	0-6 weeks	External: IT Band Internal: Iliopsoas Tendon

Doc, My Knee Hurts

- Traumatic
  - ACL
  - PCL
  - LCL
  - MCL
- Overuse
  - PFPS
  - Jumpers knee

Knee Pain

- Internal vs External Derangement
  - Locking
  - Catching
  - Giving Out
  - Swelling

Knee Exam

- Exam
  - Ambulation
    - Have patient walk down the hallway
  - ROM
    - 130 degrees flexion to 0/-10 degrees extension
  - Palpation
    - Anterior, lateral, medial, and posterior structures
    - Point tenderness can accurately determine LOCATION of the lesion 78% of the time

Knee Pain

- Exam
  - Patella
    - Bulge Test
    - Patellar grind
    - "J sign"
  - Ligaments
    - Lachman's test (ACL stability)
      - Sensitivity of 87%, specificity 93%
      - Varus/ Valgus Stress (MCL/ LCL)
    - Anterior/ Posterior Drawer (ACL/ PCL)
  - Menisci
    - McMurray test
    - Apley compression
    - Thessaly test

Knee Pain

- Exam
  - Other Tests
    - Ober's test (IT band)
    - Thomas' Test (Hip Flexion Contracture)
    - Neurovascular Exam

Traumatic Injuries

Injury	History	Exam	XR	MRI
ACL	Pop, 70% non-contact	+ Lachman + Pivot Shift	R/o fracture	Confirm dx
MCL	Blow to outside knee	G1: Stable G2: laxity at 20 degrees G3: Laxity at 0	R/o fracture	Grading
PCL	Fall directly on knee	+ Post drawer	R/o fracture	Partial vs complete
LCL	Blow to inside knee	Same as MCL	R/o fracture	Grading

Traumatic Injuries

Injury	Tx	RTP	Decision
ACL	Rehab, surgery	Min 6 months	
MCL	G1: Brace G2: Brace G3: Surgery	G1: 1 week G2: 1-4 weeks G3: High likelihood of ACL	
PCL	Rehab/ Brace	1-6 weeks	Partial vs complete
LCL	Brace	Same as MCL	

MCL/ LCL

- Pain and swelling over medial aspect of knee
- Varus/ Valgus testing performed at full extension and 30 degrees flexion
- Grade I
  - Pain with minimal laxity
- Grade II
  - Laxity with 5-10 mm of joint space opening
  - Firm end point
- Grade III
  - Soft end point or no end point
  - Complete tear
  - Strong correlation with ACL injury
- Treatment
  - Grade 1 – Ice, compression, bracing. RTP 2 weeks
  - Grade 2 – Ice, compression, bracing. RTP 4 weeks
  - Grade 3 – Orthopedic referral

Overuse Injuries

Injury	History	Exam	XR	MRI
PFPS	Anterior knee pain	+ Patellar compression, no effusion	Normal	Not needed
Jumpers Knee	Localized Pain	Focal pain	Normal	In severe cases

Overuse Injuries

Injury	Tx	RTP	Decision
PFPS	Rehab, Brace, NSAIDs, VMO	1 week	2-3 months MRI
Jumpers Knee	Rehab	1 week	Possible surgical consideration

Patellofemoral Pain Syndrome

- Most common knee overuse injury
- NSAIDs are more effective than steroids
- Patella stabilizing braces
- VMO strengthening
- Surgery only considered after one year of conservative therapy

VMO Strengthening

- Seated Isometric VMO And Adduction Contractions
- Foam Roller Leg Extensions
- Plie Knee Squats
- Ball squats
- Split Squats (Stationary Lunge)
- Single ¼ leg squats
- Step-ups
- Step-downs

Jumpers Knee

- Ice
- REST
- NSAIDs
- Activity Modification
- Counter Force Brace
- Physical Therapy
  - Quadriceps
  - Hip Flexor
  - Leg Extensions
  - Lunges and squats when pain allows
- Surgery only after conservative methods have failed

Doc, My Ankle Hurts

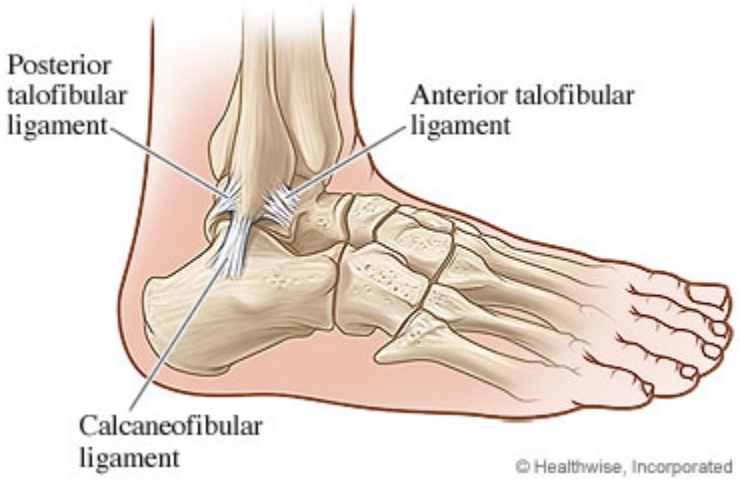
- Traumatic
  - Ankle sprains
- Overuse
  - Achilles tendinitis

Ankle Exam

- Exam
  - Palpation
    - Ottawa Ankle Rules
    - Achilles insertion
  - Special tests
    - Anterior Drawer Test (ATFL)
    - Talar tilt (CFL)
    - Thompson Test (Achilles)
  - ROM and Strength
    - Dorsiflexion
    - Plantarflexion
    - Eversion
    - Inversion
    - Achilles

Ankle Sprain

- Ankle Sprain
  - Lateral (85%)
    - ATFL- Most Common
    - CFL
    - PTFL
  - Medial
    - Deltoid- Uncommon



Classification of Low Ankle Sprains			
	Ligament disruption	*Ecchymosis and swelling*	*Pain with weight bearing*
Grade I	none	minimal	normal
Grade II	stretch without tear	moderate	mild
Grade III	complete tear	severe	severe

Ankle Sprain

- Treatment
  - XR to rule out fracture
  - Non-operative treatment initially for all injuries
    - PRICE
  - Consider short course of offloading for 1-2 weeks
    - High tide walking boot
  - ASO brace
  - Early physical therapy/ HEP
  - MRI at 8 weeks if not responding for all grades
  - RTP
    - Grade I- 1-3 weeks
    - Grade II- 2-4 weeks
    - Grade III- 5-8 weeks

Overuse Injuries

Injury	History	Exam	XR	MRI
Achilles Tendinitis	Posterior Heel Pain, swelling	TTP at insertion	May show bone spur	Degree of degeneration

Overuse Injuries

Injury	Tx	RTP	Decision
Achilles Tendinitis	Foam roll, heel lift, PT	2-4 weeks	Surgery, Prolo/ PRP

Doc, My Back Hurts

- Low back pain is a common source of pain in athletes, leading to significant time missed and disability. The general categories of treatment for low back pain are medications and therapies.
  - 60% recover in 1 to 3 weeks
  - 90% recover in 6 to 8 weeks
  - 95% recover in 12 weeks
- Take away point, no imaging until 4 weeks of conservative treatment failure, unless red flag symptoms are present.
  - Saddle Anesthesia
  - Bowel or bladder dysfunction

Doc, My Head Hurts

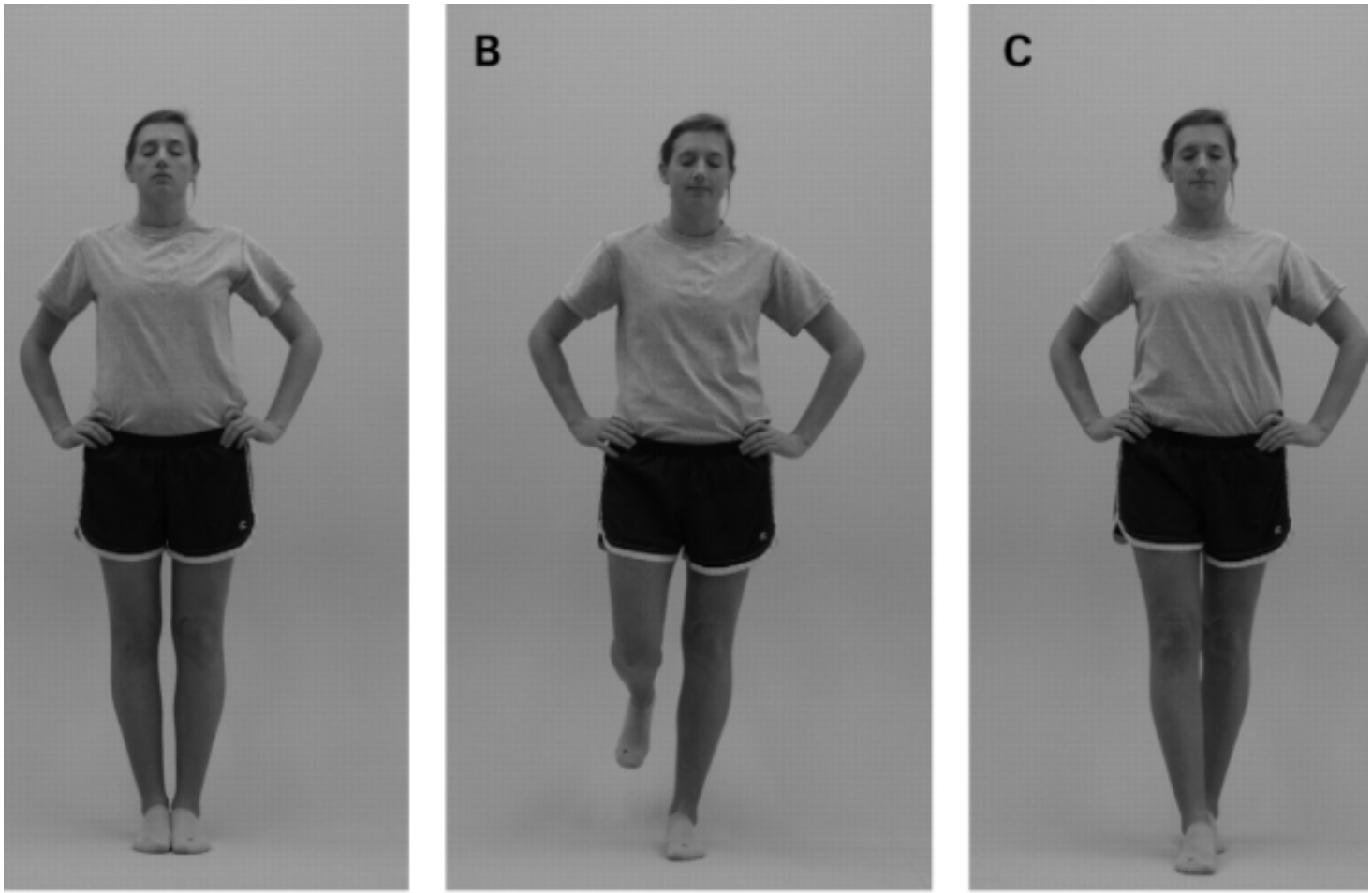
- 2017 Concussion in Sports Group (CSIG)
  - Sports Related Concussion (SRC)
    - Sport related concussion is a traumatic brain injury induced by biomechanical forces.
    - SRC typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously.

McCrory P, et al. Br J Sports Med 2018;51:838–847. doi:10.1136/bjsports-2017-097699

Concussion

- Removal from Competition
- SCAT5
  - The symptom checklist does demonstrate clinical utility in tracking recovery.
- BESS Balance Testing
- Neurocognitive Testing (If available)
- Symptom Resolution
  - Typically resolve within 10 days
  - 10% last over 3 months (Post Concussive Syndrome)
- RTP
  - Stepwise RTP
  - 1 day per step

BESS Balance Testing



Davis, G A, et al. “Contributions of Neuroimaging, Balance Testing, Electrophysiology and Blood Markers to the Assessment of Sport-Related Concussion.” *British Journal of Sports Medicine*, vol. 43, no. Suppl_1, Jan. 2009, pp. i36–i45., doi:10.1136/bjsm.2009.058123.

CSIG 11 R's of SRC Management

http://www.buffalo.edu/news/releases/2017/05/024.html

Return to Play/ School

Table 1 Graduated return-to-sport (RTS) strategy

Stage	Aim	Activity	Goal of each step
1	Symptom-limited activity	Daily activities that do not provoke symptoms	Gradual reintroduction of work/school activities
2	Light aerobic exercise	Walking or stationary cycling at slow to medium pace. No resistance training	Increase heart rate
3	Sport-specific exercise	Running or skating drills. No head impact activities	Add movement
4	Non-contact training drills	Harder training drills, eg, passing drills. May start progressive resistance training	Exercise, coordination and increased thinking
5	Full contact practice	Following medical clearance, participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6	Return to sport	Normal game play	

Table 2 Graduated return-to-school strategy

Stage	Aim	Activity	Goal of each step
1	Daily activities at home that do not give the child symptoms	Typical activities of the child during the day as long as they do not increase symptoms (eg, reading, texting, screen time). Start with 5–15 min at a time and gradually build up	Gradual return to typical activities
2	School activities	Homework, reading or other cognitive activities outside of the classroom	Increase tolerance to cognitive work
3	Return to school part-time	Gradual introduction of schoolwork. May need to start with a partial school day or with increased breaks during the day	Increase academic activities
4	Return to school full time	Gradually progress school activities until a full day can be tolerated	Return to full academic activities and catch up on missed work

Each step over 24 hours

New Findings

- A brief period (24–48 hours) of cognitive and physical rest is appropriate for most patients. Following this, patients should be encouraged to gradually increase activity.
- Cervical and Vestibular Rehabilitation
- Refer for persistent symptoms
  - Adults with symptoms > 2 weeks
  - Children with symptoms > 4 weeks
- Currently, there is limited evidence to support the use of pharmacotherapy.

McCrory P, et al. Br J Sports Med 2018;51:838–847. doi:10.1136/bjsports-2017-097699

References

- Uptodate.com
- Orthobullets.com
- Cleveland Clinic Sideline Guidelines
- Ong, C.k.s., P. Lirk, C.h. Tan, and R.a. Seymour. "An Evidence-Based Update on Nonsteroidal Anti-Inflammatory Drugs." *Clinical Medicine & Research* 5.1 (2007): 19-34. Web.
- Jones, Peter, Stuart R. Dalziel, Rain Lamdin, Jennifer L. Miles-Chan, and Christopher Frampton. "Oral Non-steroidal Anti-inflammatory Drugs versus Other Oral Analgesic Agents for Acute Soft Tissue Injury." *Cochrane Database of Systematic Reviews Reviews* (2015): n. pag. Web.
- Davis, G A, et al. "Contributions of Neuroimaging, Balance Testing, Electrophysiology and Blood Markers to the Assessment of Sport-Related Concussion." *British Journal of Sports Medicine*, vol. 43, no. Suppl_1, Jan. 2009, pp. i36–i45., doi:10.1136/bjsm.2009.058123.
- Schneider, Kathryn J, et al. "Rest and Treatment/Rehabilitation Following Sport-Related Concussion: a Systematic Review." *British Journal of Sports Medicine*, vol. 51, no. 12, 2017, pp. 930–934., doi:10.1136/bjsports-2016-097475.
- McCrory P, et al. Br J Sports Med 2018;51:838–847. doi:10.1136/bjsports-2017-097699

Questions?