



Return to Play Decisions

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Why should you listen to us?

- Urgent Care
- Sports Medicine Clinic
- Side line coverage
- Athletes
- And...





Case

- 16 yo male presents after helmet to helmet collision during Friday night's game. At the time of injury yesterday, he complained of headache, dizziness, and nausea which had resolved by bedtime. Now he feels better. He and his parents want him to play in this week's game because it is the playoffs, so they are at urgent care to get "cleared".
- *Would you "clear" this patient?*
- *What do you tell the family about return to school, return to sport, when to follow up?*



TABLE

1

PATHOPHYSIOLOGY OF CONCUSSION

- Release of excitatory neurotransmitters
- Altered cerebral blood flow
- Changes in glucose metabolism
- Production of lactic acid and free radicals
- Mitochondrial dysfunction
- Axonal injury

From Giza CC, et al.²

TABLE

2

PHYSICAL SYMPTOMS OF CONCUSSION

- Difficulty concentrating and completing tasks
- Dizziness or lightheadedness
- Fatigue
- Headache
- Noise sensitivity
- Poor cognitive performance
- Sleep disturbances
- Visual symptoms such as light sensitivity and double or blurred vision

From Centers for Disease Control and Prevention.¹

Concussion

- No longer graded
- Assign severity when symptoms are resolved
- Neuro exam
- SCAT 3/SCAT 3 child/SAC
- Neurocognitive testing



SCAT3™
 Sport Concussion Assessment Tool – 3rd edition
 For use by medical professionals only

Name: _____ Date of Assessment: _____ Location: _____

What is the SCAT3?
 The SCAT3 is a comprehensive tool designed to assist in the assessment of an athlete or patient, aged 12 years and older. It contains the original part 1 and the newly developed 2 and 3 parts. It is designed to be used for clinical purposes. It is not for research, unless the appropriate regulatory body has approved its use for that purpose. It is not to be used for diagnosing individual athletes.

What is a concussion?
 A concussion is a disturbance in brain function caused by a direct or indirect blow to the head or neck, or by a violent shaking of the head and/or torso, which causes brain injury and brain cells that may take days or weeks to recover. Concussion is usually a temporary condition and is not a disease.

INDICATIONS FOR EMERGENCY MANAGEMENT
 Seek a doctor's help as soon as possible if you or your athlete has any of the following signs: loss of consciousness, vomiting, severe headache, neck pain, or any of the following symptoms:

Potential signs of concussion?
 If any of the following signs are observed after a head impact, seek the help of a doctor as soon as possible. Do not allow the athlete to return to play until cleared by a doctor.

1 Glasgow Coma Scale (GCS)
 Best eye response (E): 4 = normal, 3 = open to pain, 2 = to light touch, 1 = no eye opening
 Best verbal response (V): 5 = oriented, 4 = disoriented, 3 = words, 2 = incomprehensible sounds, 1 = no verbal response
 Best motor response (M): 6 = obeys commands, 5 = localizes pain, 4 = withdraws from pain, 3 = flexion to pain, 2 = extension to pain, 1 = no motor response

2 Maddocks Score
 What year are you playing? (1-4)
 What sport are you playing? (1-4)
 What team are you playing for? (1-4)
 What time of day is it? (1-4)
 What day of the week is it? (1-4)

SCAT3™ CONCUSSION ASSESSMENT TOOL (FORM 3) © 2011 Concussion & Head Injury

TABLE 6 6-STEP RETURN-TO-PLAY PROTOCOL

PHASE	REHABILITATION	OBJECTIVE
Phase 1	Baseline	Patient must be on physical and cognitive rest with no symptoms for at least 24 hr.
Phase 2	Increase heart rate	The goal is to increase heart rate for 5-10 min through mild activity such as walking, light jogging, or an exercise bike.
Phase 3	Moderate exercise	In this phase the goal is limited body and head movement through more moderate intensity activities such as brief running or moderate weight lifting.
Phase 4	Noncontact exercise	The goal is to increase intensity but avoid contact. Activities could include more intense running, stationary biking, or noncontact sport-specific drills.
Phase 5	Practice	Reintegrate into full contact practice.
Phase 6	Play	Return to competition.

From May KH, et al.¹¹

TABLE 5 ACADEMIC ADJUSTMENTS FOR RETURN TO SCHOOL

- Shortened days
- 30 min of instruction with a 15-min break
- Providing class notes
- Tutoring
- Decreasing course expectations
- Decreasing exposure to classes that exacerbate symptoms

From Howell D, et al.⁹

Return to Play Following a Concussion

In the first few days following a head injury it is important that physical and mental rest occur. Activities that require concentration and attention may make the symptoms worse and delay recovery. Physical activity may also aggravate symptoms. Returning to sport too early could result in a repeat concussion and a prolonged period of post-concussive symptoms. While you still have symptoms it is best to rest completely. This means staying home from school and limiting any activity requiring concentration to very short time blocks (10-20 minutes).

The safest way to return to your sport or activity is by following a six step progression. Allow one day in between steps.

Step 1: Complete rest. No activity. This includes no school and no studying. Limit texting, TV or computer to one hour or less per day.

Step 2: Once all symptoms are gone it is okay to start light aerobic activity such as walking or riding a stationary bike.

Step 3: Sport specific activity including running or skating. For example: ball skills for soccer (no heading), puck handling in hockey, sideline throwing for football. Weightlifting may be added.

Step 4: Training drills specific to sport without contact. Examples include passing/dribbling a soccer ball, running plays in football without contact. Increase intensity of weight training.

Step 5: After being cleared by medical personnel it is okay to return to full contact in **practice only**.

Step 6: Game play.

If symptoms recur at any point in the progression then return to the previous step for one day and try to progress again after 24 hours. You should not use medicine to prevent symptoms during the return to play protocol. If you have a return of your symptoms after you have been cleared to play you should pull yourself from your activity and contact your pediatrician.

In addition to rest, it is important to eat properly, stay hydrated, and follow sleep hygiene practices.

Prolonged symptoms?

- Initial symptoms
 - Headache or trouble concentrating for >3 hrs
 - Retrograde amnesia
 - LOC > 1 min or observed seizures
- Co-morbidities
- Gender
- Previous concussion or recent concussion
- Age less than 18
- Genetics

Asplund Clin J Sport Med 2004; McCrory Clin J Sport Med 2009

Concussion

- PCS
- SIS
- Prevention
 - Report symptoms
 - Mouthguard?
 - Headgear?
 - Neck strengthening?
 - Helmet?



Case

- 12 yo boy left knee pain after landing directly on his knee after a layup. Has a history of knee pain during activity. Recent growth spurt. Can walk. FROM, but painful flexion, + swelling and tenderness over tibial tubercle. No effusion. No ligamentous laxity.
- *Xray or no xray?*
- *Would you immobilize, brace, or neither?*
- *Can he play?*



Know Your Rules

You **DON'T** need to get an Xray if...

Ottawa Knee Rules

- Age 2-55
- No fibular head TTP
- No isolated patellar TTP
- Able to flex 90 degrees
- Able to weight bear for 4 steps after injury **and** in ED (regardless of limping)

Validated in children age 2-16 (*Annals EM* 42:1, 2003)

Pittsburgh Knee Rules

- No fall or blunt knee trauma
- Age 12-50yo
- Able to walk 4 weight bearing steps in the ED

More specific than Ottawa (*Ann Emerg Med* 32:8 1998)

Views

- Sunrise: Best at evaluating the patella
- Tunnel: Best for evaluating intercondylar notch
- Lateral: Best at identifying fat-fluid levels (lipohemarthrosis) suggesting intra-articular fractures

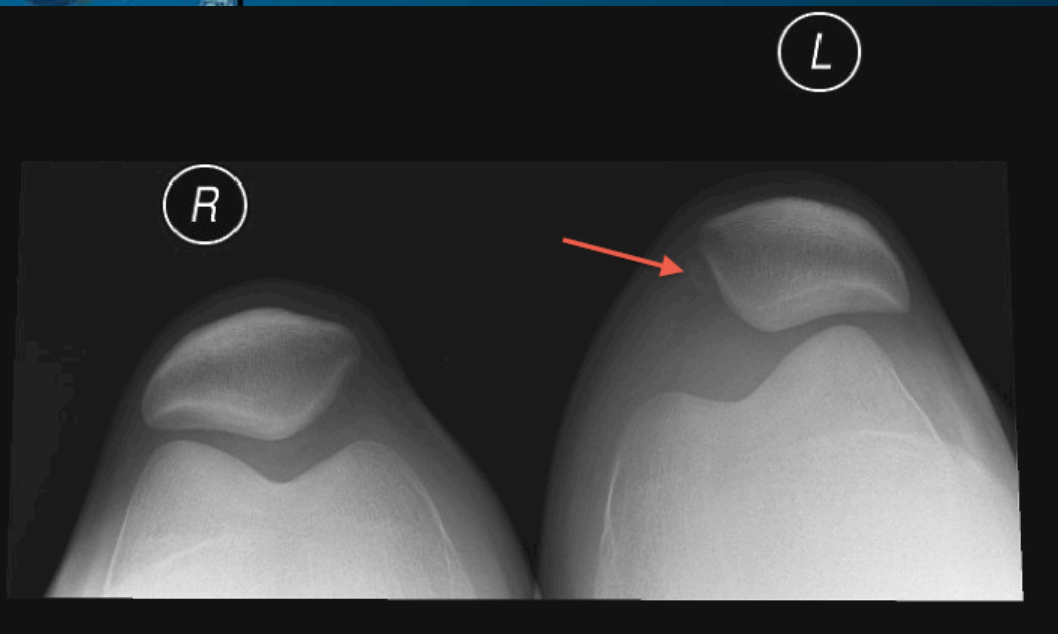
Standard Lateral View



Standard A/P View



- A/P and Lat (standard 2 view) is 79% sensitive for fx's
- Adding 2 oblique views (4-view) increases sensitivity to 85%











Tibial tubercle avulsion

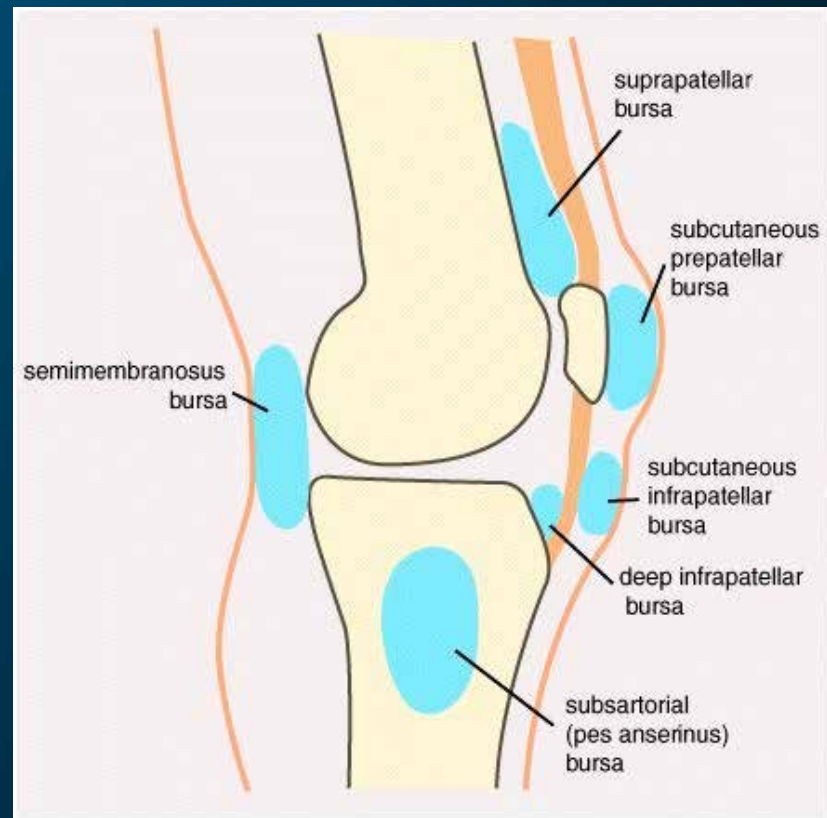
- Common in boys ages 12-15 nearing the end of growth
- Forceful quad contraction
- NWB
- Immobilizer
- Type I – near the patellare tendon distal insertion; cast/locked brace
- Type II/III – extends into and across the primary physis; open reduction





Osgood Schlatter

- Chronic pain
- Rapid growth
- Multisport athlete
- Relative rest



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Bursitis

- Superficial patellar swelling
- Kneeling sports
- Pain with flexion
- RICE

Case

- A 12 year old boy was kicking the soccer ball at school with friends and had immediate and sharp pain over the front of his hip. No recent illnesses, no fever, + tenderness over the proximal quad near the pelvis . He can WB, but is limping. Dad thinks that he's just pulled a muscle and will be fine for tomorrow's track meet.

-What do you tell the family?

-When and who do they see in follow-up?

-Can he play?



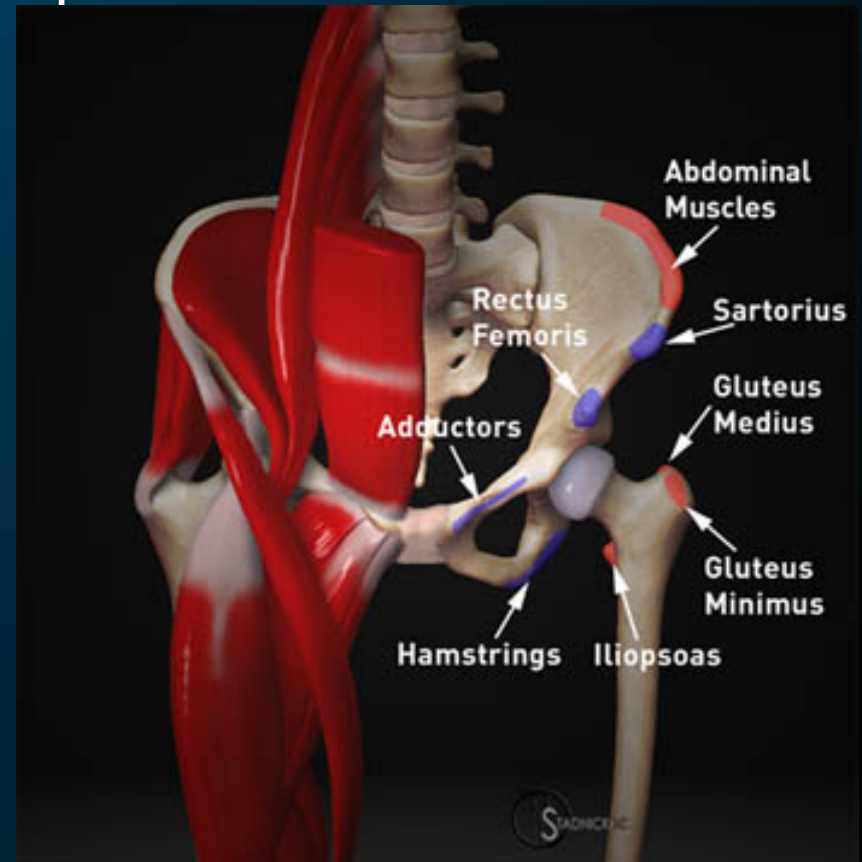
Avulsion Injuries

- Strong muscle contraction that pulls off the growth cartilage
- Occur at a variety of sites – ASIS, AHS, lesser troch are most common
- Treatment is rest with exception of 2

- Greater trochanter

- Ischial tuberosity

- >1cm displacement
considered surgery



Avulsion Injuries

- Rest, analgesics, ice
- Protected weightbearing
- Physical therapy for ROM, strength, return to sport – when ROM is full and strength is 90% of unaffected
- Time period is 6-8 weeks



Clinical Challenges in Sports Medicine: Return to Play

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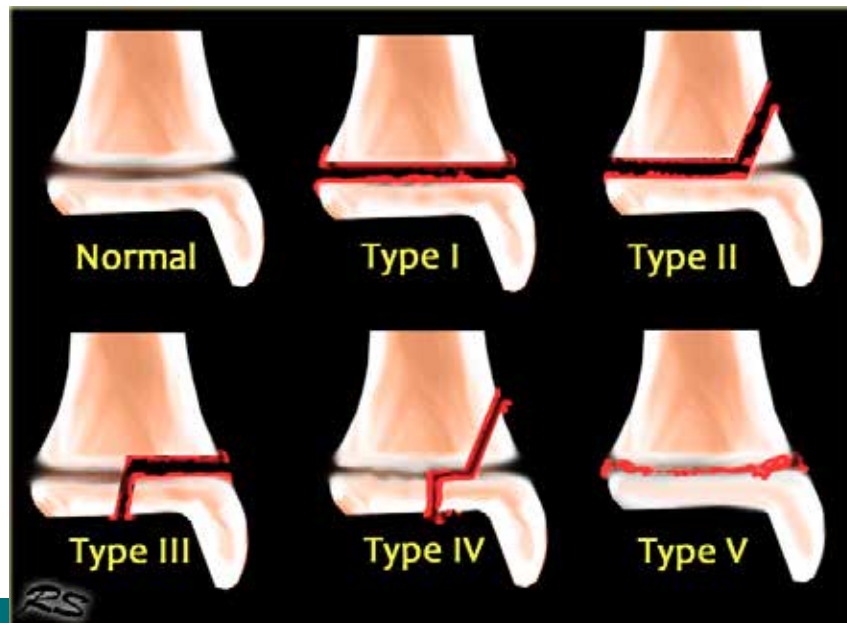
- 7 y/o male, jumped off swing tonight, unsure how he landed
- Lateral ankle injury, refuses to bear weight
- Pain and mild STS lateral ankle, TTP over lateral malleolus and diffusely over lateral ankle (“it hurts everywhere”); negative x-rays

Parents: When should they follow up? How long will he be out?

- 16 y/o female, “rolled” ankle during volleyball tonight
- Able to walk off court and 4 steps in exam room
- Bruising and STS present lateral ankle; TTP over anterior talofibular ligament, no bony tenderness
- Started menstrual periods at 13 y/o

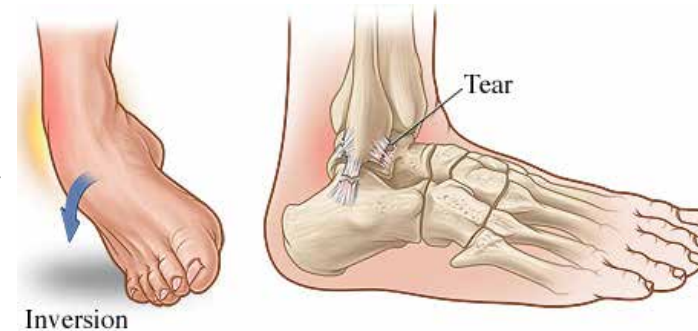
Patient: When can she return to volleyball?

- Ligaments stronger than bones, more likely to fracture than sprain
- SH I fracture, clinical diagnosis (tenderness over growth plate, may have STS visible on x-ray at level of growth plate)



- If clinical suspicion for SH I fx, immobilize, follow up with Ortho or SM in 2-7 days
- Apply splint, NWB
 - stirrup with footplate, avoid posterior splints if possible due to risk for pressure sores
 - Caution family to not rest heel on surfaces, place pillow under the calf for support
- Crutches if able (about 8 y/o for girls, later for boys, but varies with child)
- Other options: wheelchair, walking boot
- Cast 3-4 weeks

- Post-pubertal, after closure of growth plates
- ATFL most commonly injured, inversion and plantarflexion
- Grading of sprains
 - I: mild ligament damage, no instability
 - II: partial tear, ligament laxity
 - III: complete tear, joint instability
- Amount of swelling and bruising often (not always) correlates with severity of injury
- Difficult to grade with acute injury
- Will not significantly alter initial tx but has implications for expected RTP



- PRICE
 - Limit hemorrhage & edema, ↓ recovery time
 - Avoid heat, *excessive* weight bearing
- OTC analgesics or NSAIDs PRN
- NWB on crutches x 24 hrs if needed, then start partial WB
- Otherwise, WBAT with aircast, ACE wrap, or lace up brace
- After 48-72 hours, begin ROM, strengthening, proprioception
 - Early mobilization may reduce pain and swelling

- Factors affecting length of recovery include
 - Grade of sprain
 - History of previous injury and rehab
- Return to Sport requires
 - Normal proprioception
 - Perform functional, sport-specific activity without pain during or after activity
- Lace-up ankle brace recommended until ankle feels stable, then with sports for 6-12 months



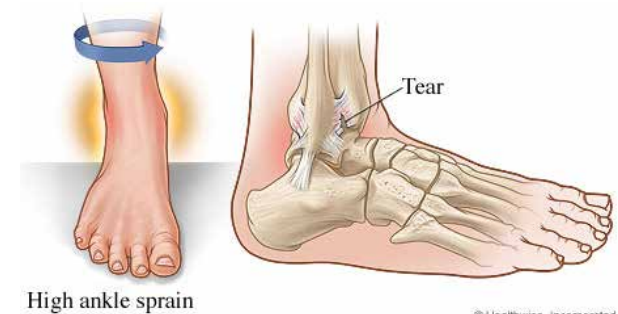
- Medial ankle sprain

- Eversion injury
- Less common than lateral
- More likely to be associated with fracture
- RTP may take 2x or longer than lateral



- “High” ankle sprain

- Injury to syndesmosis
- Dorsiflexion and external rotation
- Longer immobilization and recovery, higher grade may require surgical intervention

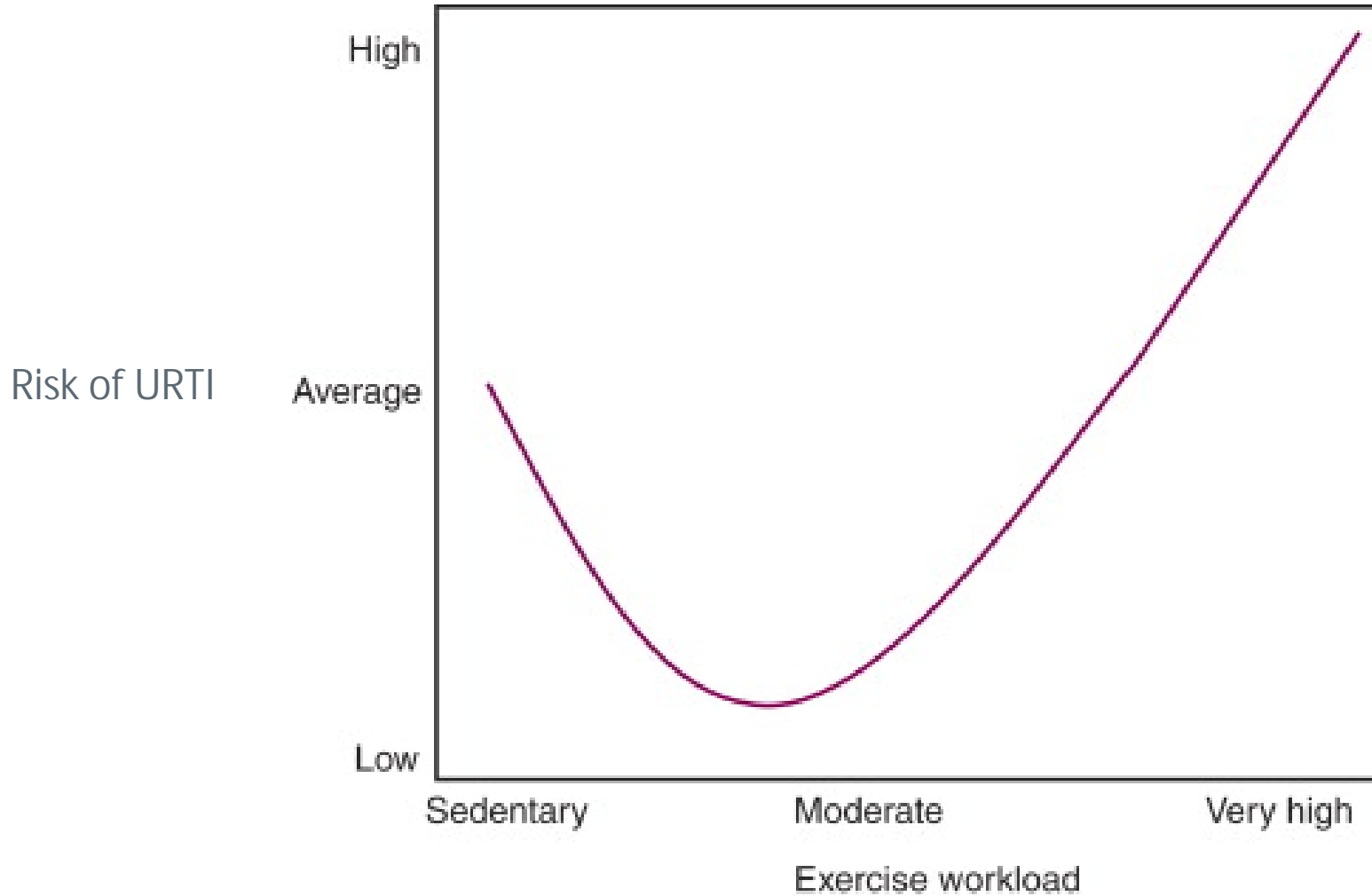


- 17 y/o female, select soccer player
- 4 d h/o fatigue, ST, tactile temp, HA
- No N/V, abd pain, rash, or rhinorrhea
- OP red, mild posterior cervical LAD; no exudate or HSM
- - RS, - monospot, Atypical lymphs on CBC with WBC of 15k

- Tournament this weekend, parents report she is the top scorer, college scouts will be present, the family has paid \$500 for her to play in tournament
- Parents want a note stating that she is OK to play this weekend
- *What are possible concerns?*
- *Will you clear her to play this weekend?*

- **Moderate exercise**
 - Improved immune function
 - 20-30% decrease in URTI compared to sedentary
 - Salivary IgA levels increased
- **Intense exercise**
 - Decreased immune function
 - Exacerbated if inadequate recovery
 - Marathon runners 2-6 times more likely to have URTI (compared to non-runners)

Infection risk (J-curve)



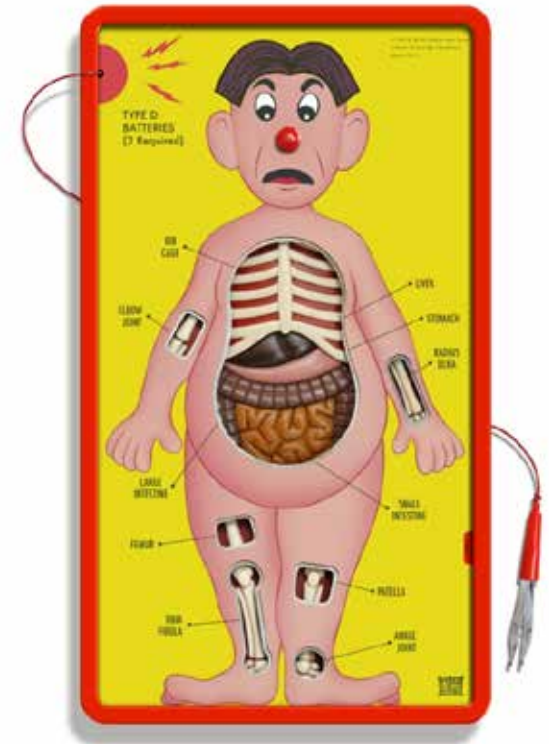
(Adapted from Nieman DC: Current perspective on exercise immunology. Curr Sports Med Rep 2:239-242, 2003.)

DeLee, Jesse C., MD, DeLee and Drez's Orthopaedic Sports Medicine, CHAPTER 3, 147-206

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- Intense exercise
 - ↑ risk of heat exhaustion, post-viral fatigue syndrome, viral myocarditis
- Avoid if...
 - systemic symptoms (malaise, excessive fatigue, myalgias, temp >100°F, resting HR > 10 beats above normal)
 - Ongoing water losses (V/D) due to risk of dehydration
- Continue moderate training or modify with less anaerobic or endurance training if...
 - Symptoms restricted to 1 system (usually respiratory) and afebrile

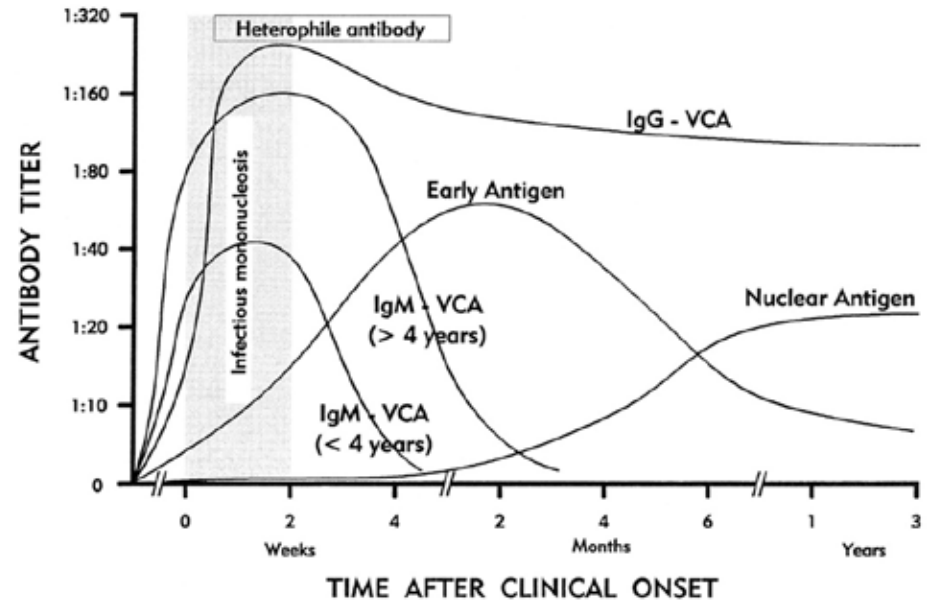
- “Neck check”:
 - symptoms above the neck train as tolerated
 - symptoms below the neck restrict activity
- No evidence for effect on severity or duration of illness



- “glandular fever”, “mono”
- Human herpesvirus 4 = Epstein-Barr virus (EBV)
- Fever, exudative pharyngitis, HA, fatigue, cervical LAD, HSM, atypical lymphocytosis
- Close contact and saliva
- Incubation: 30-50 days
- 1-3% of college students



- Diagnosis
 - Monospot 85% sensitive during 2nd wk of illness
 - Presence of atypical lymphocytes
 - Serology
- Negative monospot
 - Consider CMV, toxoplasmosis, primary HIV



Committee on Infectious Diseases et al. Red Book Online 318-321

- Lymphocyte infiltration → splenomegaly
 - 50% of cases
 - Peaks in 2nd-3rd week of illness
- Spleen palpation not reliable
- U/S: normal size varies b/w individuals
- Risk of splenic rupture: 0.1-0.2%
 - Can be fatal
 - Most reported cases in first 3 weeks of illness
- General consensus:
 - no contact sports within 21 days of sx
 - may still have some risk after 21 days

- 15 y/o HS wrestler
- Rash x 2 days, somewhat painful; no previous similar rash
- Wrestling tournament in 2 days, would like a note to allow participation
- *Any restrictions?*



- Herpes labialis (cold sores)
 - HSV-1
 - Skiers, exposure to cold stress or UV light at high altitudes
- Herpes gladiatorum (wrestlers)
- Herpes rugbeiorum ("scrum pox")
 - Skin-to-skin contact



- Incubation 2-14 days, shedding of viral particles
 - ± Prodrome: fever, malaise
- Crusted lesions 5-7 days
- Full resolution 2-3 wks
- Recurs during physical or psychological stress
- Systemic tx most effective in first 72 hrs



Figure 2-4 Herpes simplex. A, Early appearance consists of vesicles on an erythematous base. B, Lesions become umbilicated. C, Crusts form as lesions begin to heal. (From Habif TP: *Clinical Dermatology: A Color Guide to Diagnosis and Therapy*, 4th ed. Philadelphia, Mosby, 2004, p346.)

- **NFHS**

- *Lesions on exposed areas of skin* (not covered by clothing, uniform, or equipment) in sports resulting in *direct skin-to-skin contact* with another participant require that *player be withdrawn*.
- *Primary outbreaks* require 10-14 days of oral antivirals
- *Recurrent outbreaks* require 5 days of tx prior to RTP
- Lesions must be scabbed over, no drainage, no new lesions in preceding 48 hours
- Consider prophylactic antivirals for recurrent lesions

- **NCAA**

- No systemic symptoms
- no new blisters for 72 hours before examination
- no moist lesions, lesions must be dry and have a firm adherent crust
- Systemic antiviral therapy for at least 120 hours (5 days)
- Consider season-long prophylaxis if h/o recurrent herpes labialis or herpes gladiatorum

- **NFHS:**
 - require no tx or restrictions, but should be covered if prone to bleeding when abraded
- **NCAA:**
 - Lesions must be curetted or removed before the meet or tournament and covered
 - Solitary or localized, clustered lesions can be covered with a gas-permeable membrane, followed by tape



- **NFHS:**
 - require no tx or restrictions, but should be covered if prone to bleeding when abraded
- **NCAA:**
 - Wrestlers with multiple lesions of their face will be disqualified if the infected areas cannot be covered with a mask. Solitary or scattered lesions can be curetted away before the meet or tournament.
 - Wrestlers with multiple verrucae plana or verrucae vulgaris must have the lesions “adequately covered”



- *NFHS guidelines*
- Tx as MRSA
- RTP after 72 hours of oral abx, provided the infection is resolving.
- Lesions considered infectious until each has a well-adherent scab without any drainage or weeping fluids
- Then use bio-occlusive dressing until complete resolution.
- All team members should be carefully screened for similar infections.



- **NCAA:**
- Wrestler must have been without any new skin lesion for 48 hours before the meet or tournament
- No moist, exudative or purulent lesions at meet or tournament time
- Gram stain of exudate from questionable lesions (if available).
- Active purulent lesions shall not be covered to allow participation.

- Tinea capitis

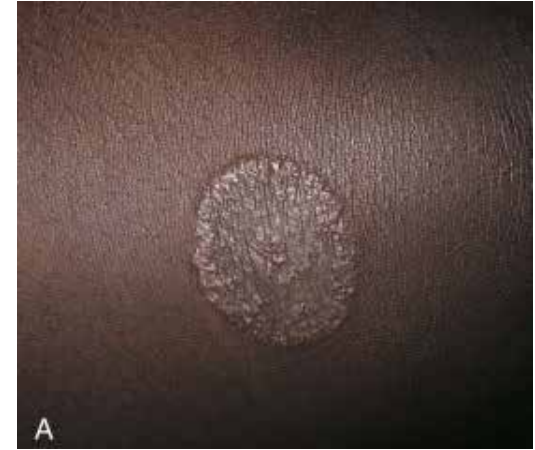
- *NFHS*: Oral antifungal >14 d
- *NCAA*: Oral antifungal >14 d

- Tinea corporis

- *NFHS*: Oral or topical antifungal >72 h, Written release from team physician to coach, lesions must be covered by occlusive dressing
- *NCAA*: Antifungal >72 h, Lesions must be covered.

- Tinea pedis

- No restriction



- American Academy of Pediatrics. *Red Book: 2012 Report of the Committee on Infectious Diseases*. Pickering LK, ed. 29th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012.
- *Clinical Sports Medicine* 4th edition. Brukner P, et al. McGraw-Hill Australia Pty Ltd: 2012
- 2012-2013 NCAA Sports Medicine Handbook
- *Netter's Sports Medicine 1st edition*. Madden CC et al. Saunders, 2010
- Tiemstra, J. D. (2012). Update on acute ankle sprains. *Am Fam Physician*, 85(12), 1170-1176.