

Chronic Conditions in the Athlete

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Outline

- Importance of thorough screening physical
- Athlete with Diabetes
- Hypertensive Athlete
- Neurologic Problems in Athletes
- Exercise Induced Asthma
- Anaphylaxis and Allergic Reactions
- Single Organs, Vision, Renal/GU
- Hematologic Problems in Athletes
- Connective Tissue & Rheumatologic Issues
- Infections in Athletes





Pre-participation Physical

- Often the first interaction between physician and athlete.
- Helps identify personal and familial conditions that may put the athlete at increased risk
- Additional testing may need to be performed based on findings during exam
- Should be performed at least 6 weeks prior to start of season
- Several states (including Mississippi) require an annual full screening examination
- NCAA requires initial comprehensive exam followed by interim history in intervening years
- Important to be performed by a physician that is familiar with risk factors for sports participation.

Athlete with Diabetes

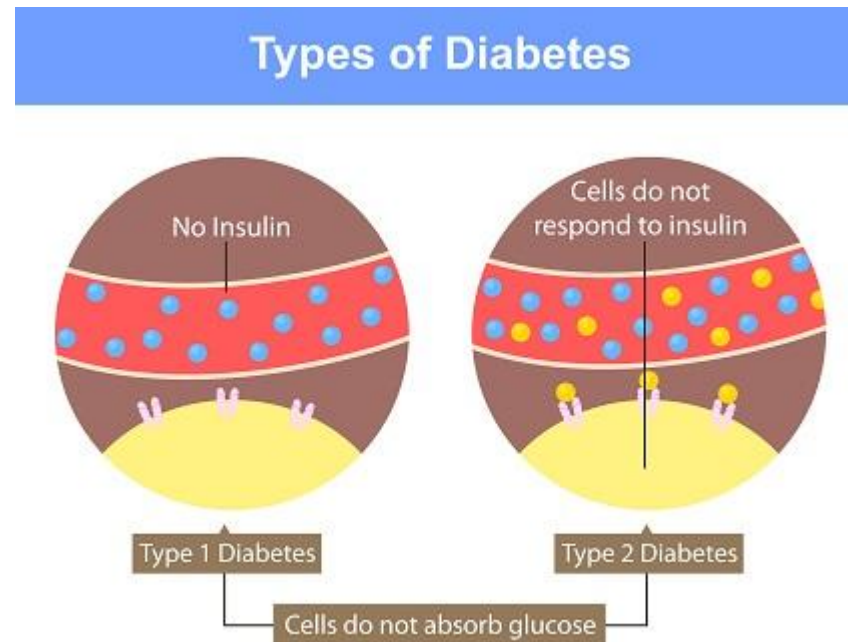
Overview: Type 1 vs Type 2

Type 1

- Onset before age 30; peak in adolescence
- Autoimmune (1A) or non-autoimmune (1B)
- Insulin deficiency due to beta cell destruction

Type 2

- Common in patients >40 years
- Combination of insulin resistance and loss of secretion
- Influenced by both genetics and environment
- Seen in athletes with higher BMI or lower cardio activity



Benefits of Exercise for All Diabetics

- Decreases insulin resistance in peripheral tissues
- Improves glycogen metabolism in skeletal muscle
- Improves post-meal glucose and insulin levels



Type 1 Athlete Considerations

- Emphasize hydration and glucose level monitoring
- Excitement and catecholamine release may cause hyperglycemia
- Morning sports: less hyperglycemia (due to diurnal cortisol/GH)
- Later-day events may need insulin and food intake adjustment
- Risk of DKA from lack of insulin + dehydration

Type 2 Athlete Considerations

- Early stage: athlete produces insulin
- Late stage: dependent on exogenous insulin
- Athletes may reduce insulin needs by 50% during competition
- Medication needs often decrease with active training seasons

Insulin Pump (CSII)



- Device that contains a reservoir of rapid acting insulin with a pump.
- Delivers basal and bolus doses of rapid-acting insulin through a subcutaneous catheter. Can be paused for <60 minutes safely.

Continuous Glucose Monitor (CGM)



Implanted subcutaneous sensor monitors interstitial glucose levels in real-time.

Glucose Targets

ADA Recommendations	
Fasting Glucose	90-130mg/dL
2-hour Postprandial Glucose	<180mg/dL

Symptoms of Hypoglycemia

Hunger, sweating, anxiety,
tremors, palpitations,
confusion



Slurred speech, weakness,
odd behavior, seizures, loss
of consciousness

Prevention of Hypoglycemia

Occurs most commonly in Type 1 DM athletes during/after exercise

Avoid insulin injection into exercising muscles

Continuous caloric replacement during prolonged activity

Monitor glucose during activity to personalize intake needs

Management of Hypoglycemia



Treat with 15-20g fast-acting carbohydrates (e.g., glucose tabs or juice)



Repeat treatment if no improvement after 15 minutes



Severe hypoglycemia (arrhythmias, seizures) = medical emergency

Athlete with Diabetes – Key Risks

- **Hypoglycemia (especially in Type 1 DM)**
- **Hyperglycemia and progression to ketoacidosis**
- Neuropathy-related injuries (e.g., foot/ankle)
- Autonomic dysfunction: sweating, HR, heat response

Training Bag Essentials and Key Points for Diabetic Athletes

- ✓ Glucose tabs or sugar-sweetened beverage
- ✓ CGM or glucose monitor/Insulin delivery device
- ✓ Measure blood glucose prior to activity
- ✓ Emergency contact information
- ✓ Written emergency response plan

Hypertensive Athlete

Hypertension in Athletes – Key Facts

- 76.4 million Americans over age 20 have HTN
- HTN is the most common cardiovascular issue in athletes
- Incidence in athletes ~50% lower than general population
- ~80% of adolescents with BP >140/90 at pre-participation screening have HTN



HTN Diagnosis Criteria

- Average of 2+ properly measured, seated BPs $>140/90$ on 2+ visits
- Measure after seated rest in a quiet environment
- Use appropriately sized cuff
- Avoid measuring immediately post-exercise



Sports Participation by Stage: Bethesda Guidelines

Prehypertension (120/80–139/89): No restrictions

Stage 1 HTN (140/90–159/99): No restrictions; monitor

Stage 2 HTN (>160/>100): Restrict from high static sports until controlled

End-organ damage: Recommend low-intensity sports

Severe HTN: Avoid collision sports due to kidney risk

HTN Medications & Sports

Some medications
banned by NCAA
and IOC

Review medication
list with sports
physician

Check latest bans
via regulatory
websites

Neurologic Problems in Athletes



Seizures & Epilepsy

- Seizure: transient brain dysfunction from abnormal activity
- Epilepsy: predisposition to unprovoked recurrent seizures

On-Field Management

- Standard management of airway, breathing and circulation should be followed.
- Assist patient to the ground and clear airway of any potential hazards.
 - Do not restrain athlete
 - Rolling while convulsing may lead to injury, wait until seizure is over before attempting this.
- Do not place anything in athlete's mouth. Remove mouth guard if this can be safely performed.
- IF concern for status epilepticus, activate EMS
- If first seizure OR different from patient's baseline seizures, then patient should be transported for evaluation.

Sport-Specific Guidelines

- Contact sports
 - No restrictions unless newly diagnosed or uncontrolled
- Water sports
 - Generally permitted with appropriate precautions (avoid open water, supervised by qualified personnel)
 - Scuba diving and diving- generally prohibited with active epilepsy but may be considered if 5 years free of seizures
- Motor sports
 - discouraged with active epilepsy
- Sports at Heights
 - Equestrian sports should be avoided with active epilepsy.
 - Certain gymnastics events (high bar) should be discouraged
- Shooting sports
 - Specific considerations on type and frequency of seizures should be considered.

Exercise Induced Asthma

Symptoms & Triggers

- Variable and occurring with exercise
- Symptoms: wheezing, chest tightness, poor exercise tolerance, cough
- Can be aggravated by temperature (worse with cold), allergens, infections, humidity



Regulatory Considerations



NCAA: requires prescription from physician for medication



IOC: requires positive exercise challenge and completed therapeutic exemption form (TUE)

Training Bag Items – Asthma

- ✓ Albuterol inhaler
- ✓ Written emergency instructions
- ✓ Knowledge of athlete's asthma triggers

Anaphylaxis/Allergic Reaction



Allergic Reaction Management

- Range of responses: rash to full anaphylaxis
- Know individual athlete's allergy history- food, seasonal, environmental
- Immediate access to EpiPen is critical (ensure at least 2 are in training bag at all times)
- Coaches and athletes should be trained in recognition and response
- [EPIPEN® \(epinephrine injection, USP\) and EPIPEN JR® \(epinephrine injection, USP\) Auto-Injectors](#)

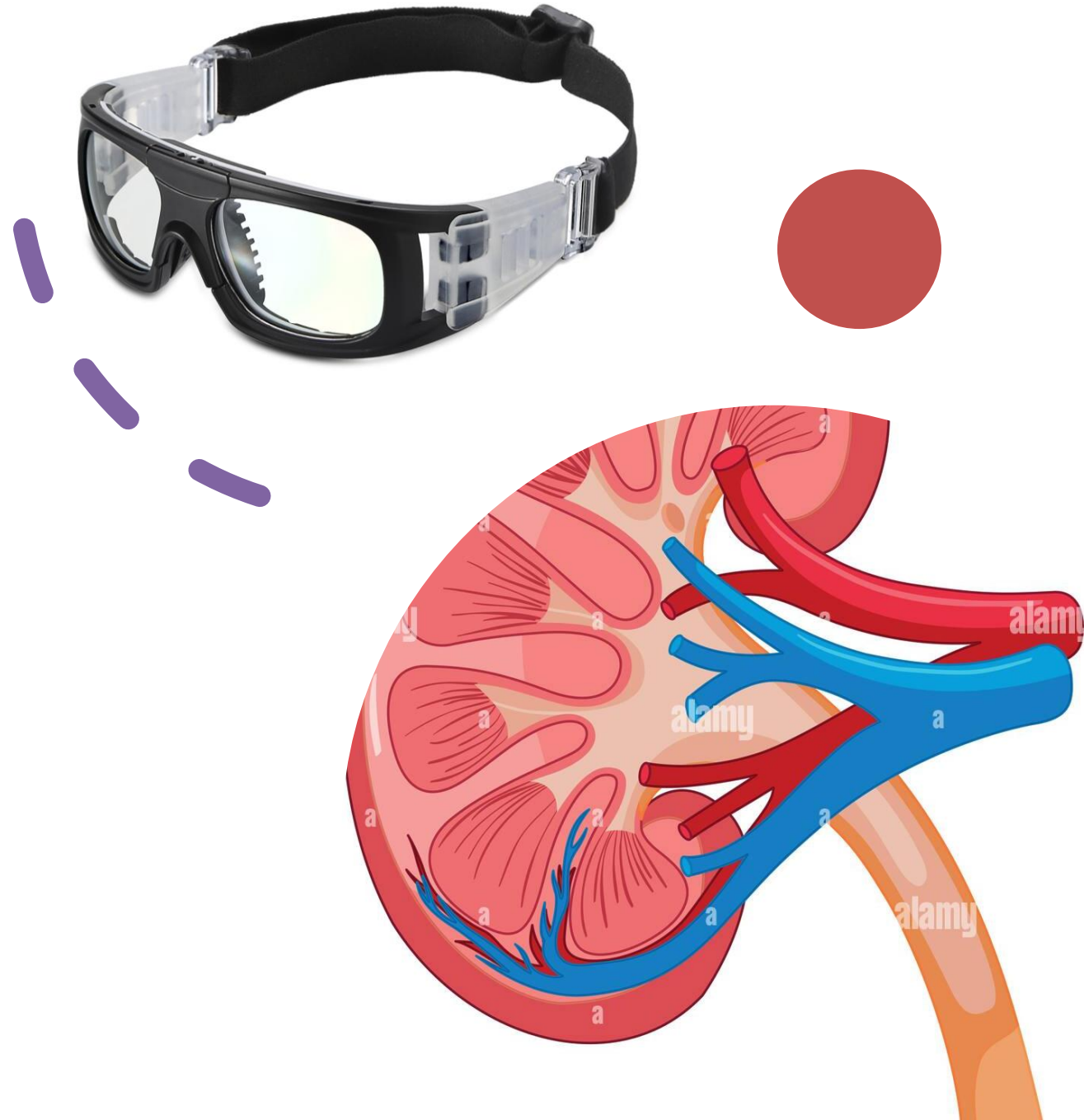
Training Bag Items – Anaphylaxis

- ✓ EpiPen
- ✓ Benadryl
- ✓ Knowledge of athlete's food or environmental known allergies

Single Organs, Vision, Renal/GU

Single Organs

- Common single organs- Kidney, testicular, and eye injuries. These can be congenital or acquired from disease or trauma.
- Clearance and sport-specific adaptations needed in single-organ athletes
- Eye- must wear protective lenses for any contact sport. This includes for those that have unilateral vision lost.
- Kidney- recommendations typically include avoiding all contact sports.
- Testicle- Must wear protective gear.



Vision Considerations

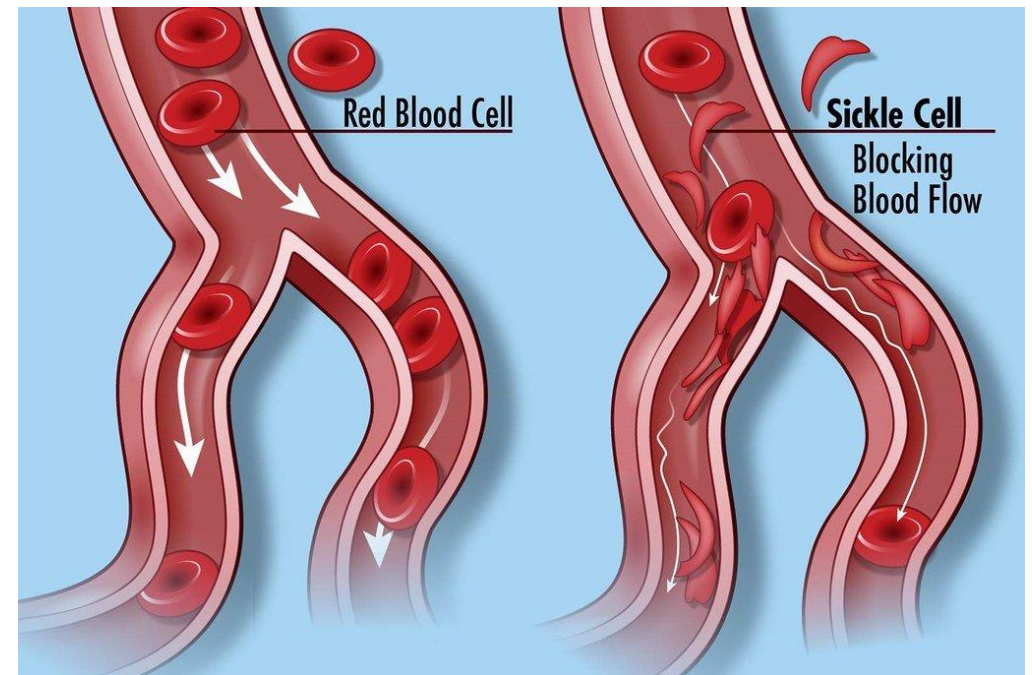
- Vision impairment may impact participation and a thorough preparticipation evaluation should be performed. Referral to ophthalmology for further evaluation may be recommended.
- Recommendation is for corrective lenses with sports participation if vision is less than 20/40
- Boxing and full contact martial arts not recommended for functionally one eyed athletes due to the risk of irreversible vision loss. All other contact sports recommendation is for protective lenses.



Hematologic Problems in Athletes

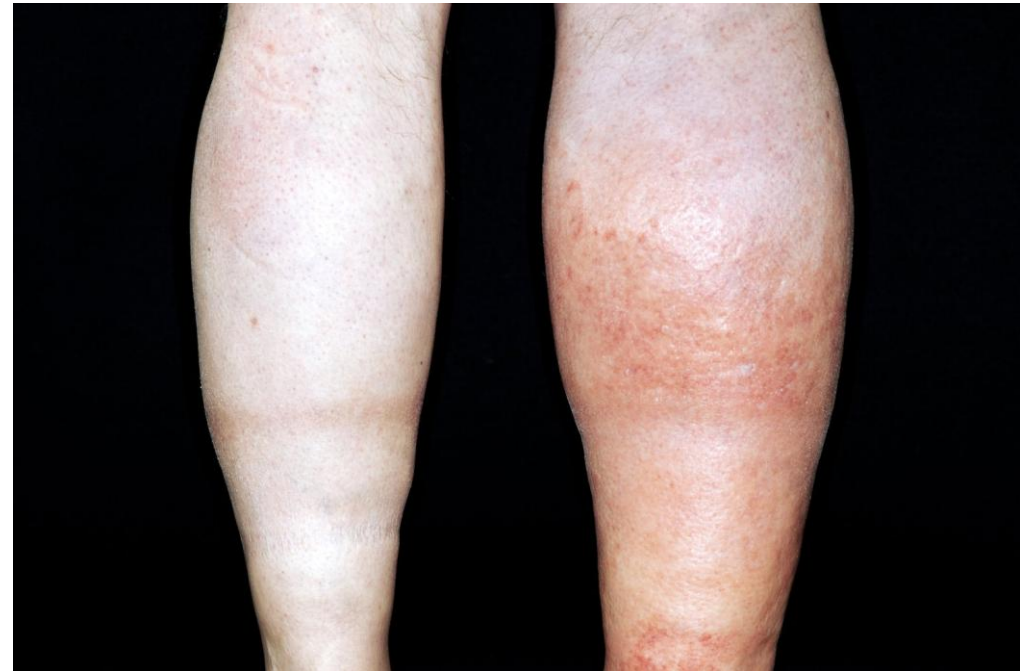
Sickle Cell Trait (SCT)

- Found in 5–8% of African American population
- NCAA requires SCT screening at physicals
- Risk of collapse with dehydration, heat, altitude, asthma
- SCT athletes may have difficulty concentrating urine (hyposthenuria) which aids in increased risk of dehydration
- Regular exercise is encouraged and benefits athletes with SCT.
- Acclimatization is especially important for SCT athletes



Venous Thromboembolism (VTE)

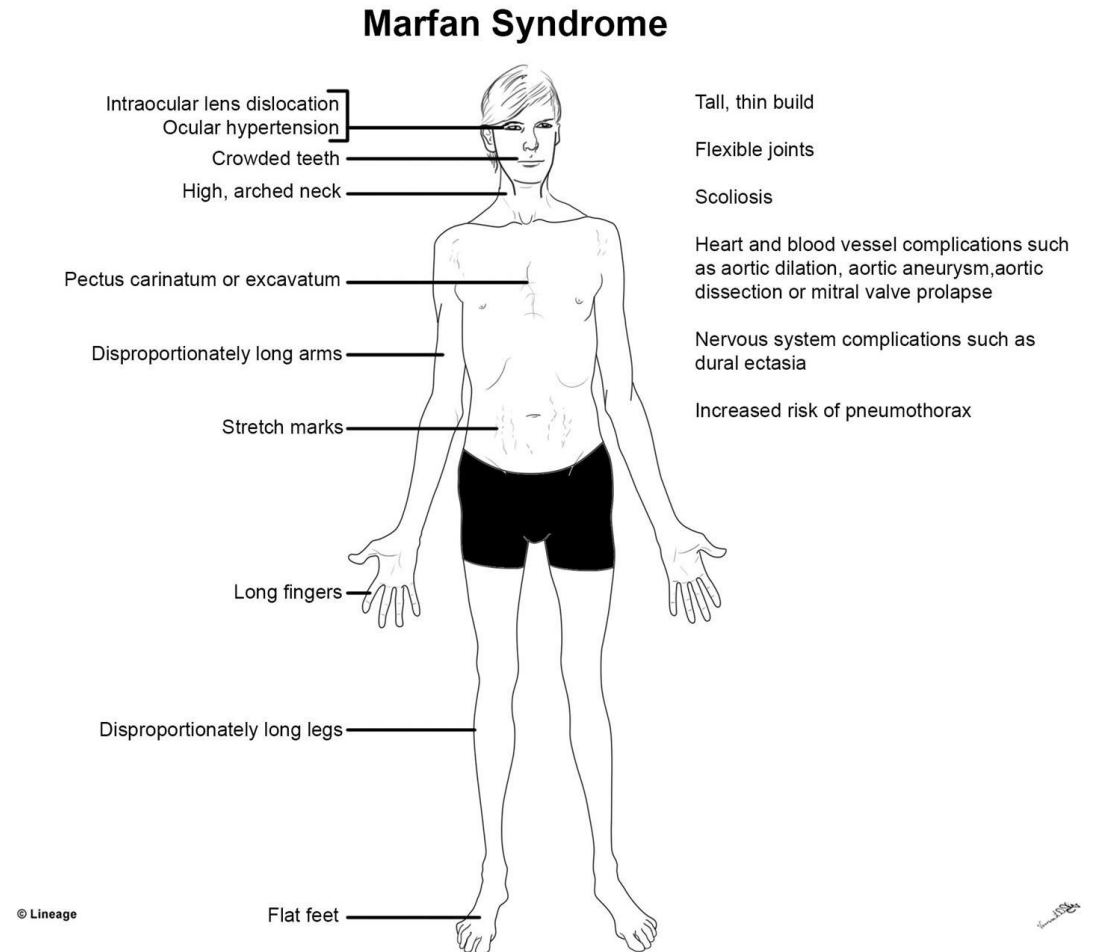
- Risk factors: trauma, travel, immobilization, dehydration, OCPs
- Prevention: walk/stretch on flights, wear loose clothes
- Acute VTE on anticoagulants: avoid contact sports. May participate in noncontact sports and exercise with appropriate counseling.



ective Tissue and Rheumatologic Condi-

Marfan Syndrome

- Inherited autosomal dominant genetic condition
- Genetic disorder affecting fibrillin (connective tissue)
- Involves aorta, eyes, joints
- Sports Considerations:
 - May participate in low and moderate static/low dynamic competitive sports if they do not have one of the following:
 - Aortic root dilation
 - Moderate to severe mitral valve regurgitation
 - Family history of aortic dissection
 - Avoid sports with collision



Rheumatologic Diagnoses

- Rheumatoid Arthritis:
 - Exercise is strongly recommended. There is no evidence that moderate or high intensity exercise worsens disease activity or radiographic progression in hands and feet- caution to those with significant large joint damage.
 - May need to have special equipment- coordination with Sports Medicine physician and PT.
 - Management should consider medication effects and disease activity

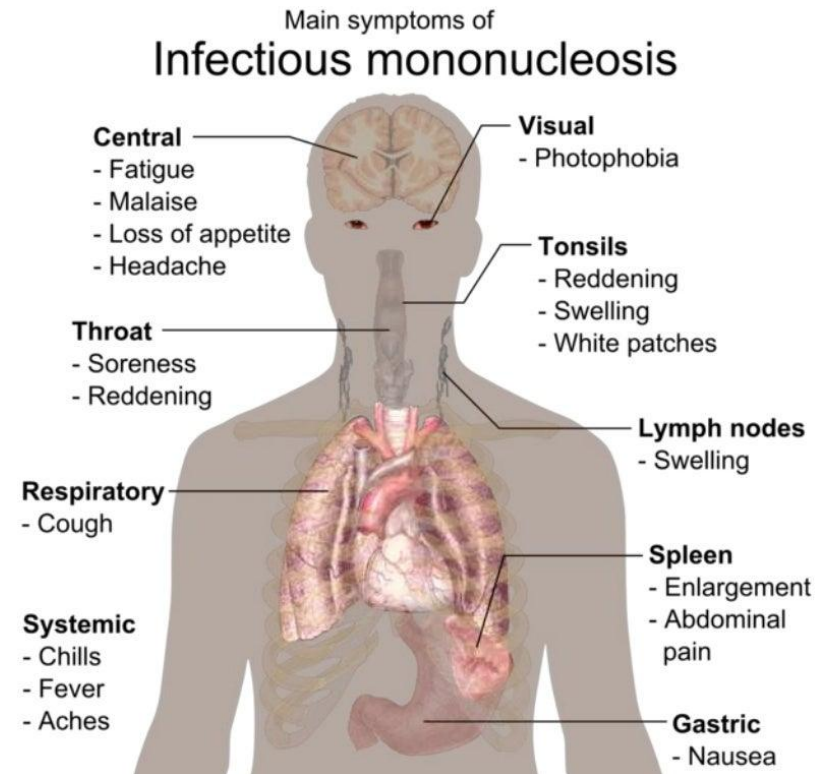
Rheumatologic Diagnoses

- Lupus
 - Chronic, multisystem disease. Key clinical feature relevant to athletes include profound fatigue, musculoskeletal pain, and potential organ involvement (renal, cardiac, pulmonary)
 - May require supportive equipment including braces.
 - Need clearance and guidance from rheumatology if organ involvement

Infections in *Athletes*

Infectious Mononucleosis

- Caused by Epstein-Barr virus; transmitted via saliva- “kissing disease”
- Classic triad: pharyngitis, fever, lymphadenopathy
- Most concerning risk = splenic rupture
- Return to play: minimum 3 weeks, 4 weeks or more if splenomegaly present and/or symptoms persist
- Prevention- do not share water bottles, hand washing





Influenza

- Airborne, viral respiratory illness: fever, chills, myalgias
- Return when afebrile without medications and symptoms resolved
- Prevention: vaccination, isolation of ill athletes

MRSA (Staph Infection)

- High risk in contact sports with shared equipment
- Symptoms: rapid-onset painful skin lesions
- Return to Play: all lesions must be dry, scabbed, and no new lesions x48h
- Wrestlers: 72h antibiotics + no moist lesions per NCAA
- Prevention: hand washing, thorough washing of all equipment and shared training spaces



References

- Netter's Sports Medicine 2nd Edition
- UptoDate
- Google Image Search

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