



# Concussions: Clearing the Cobwebs

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# Objectives

Why does this matter?

Understand the diagnosis

Recognize concussion mimics

Evidence based treatment

Set appropriate expectations







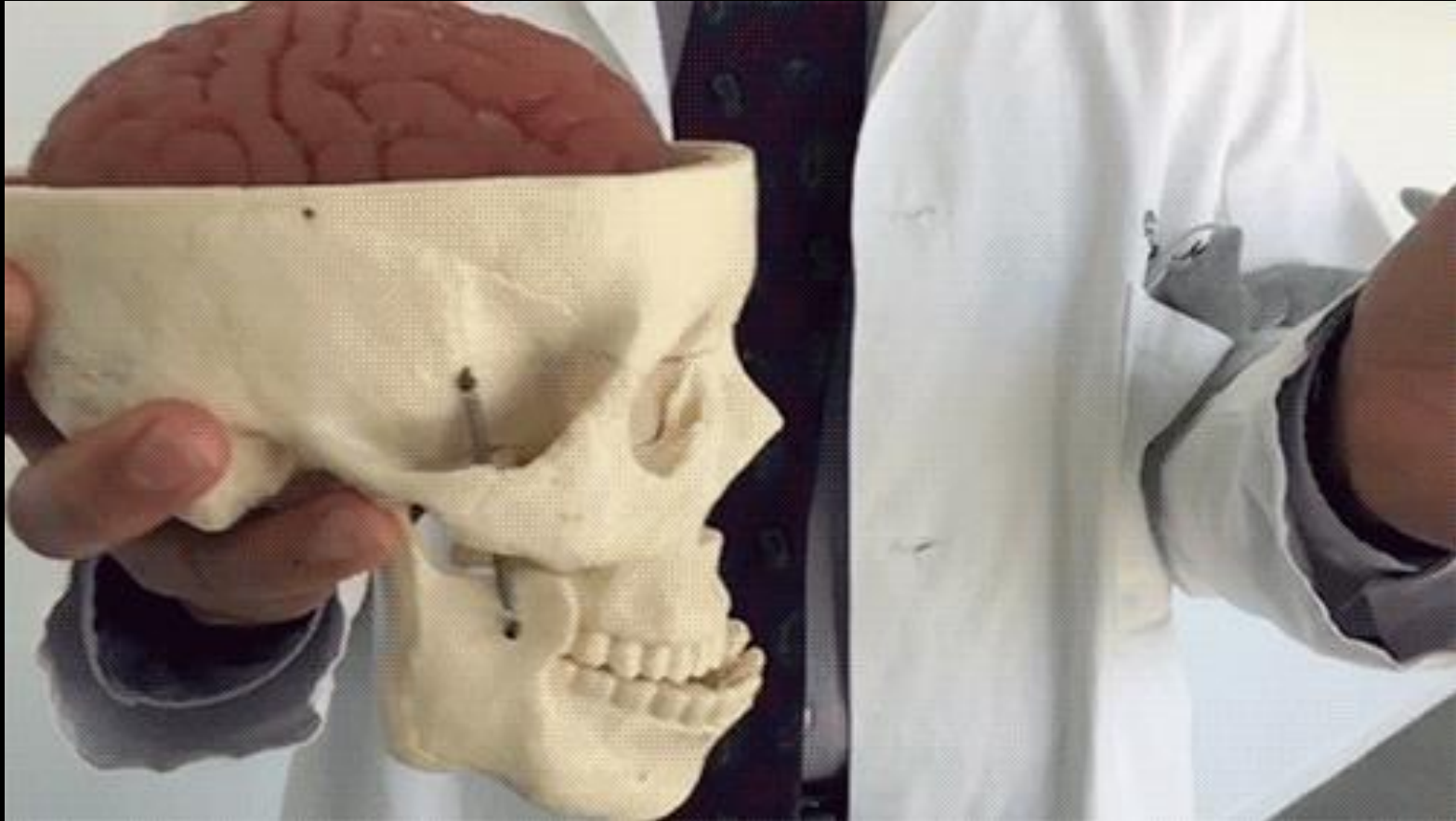












Concussion has  
become a big deal



A top-down view of a spiral staircase with a central well. The staircase is made of light-colored stone or concrete steps. The text labels are overlaid on the image in white, serif font. The labels are arranged in a circular pattern around the central well, following the curve of the staircase. The labels include: Alcohol Dependence, Cognitive Problems, Anxiety, Alzheimers Dementia, Depression, Substance Abuse, and Dementia Pugilista. The lighting is warm and focused on the central well, creating a sense of depth and perspective.

Alcohol Dependence

Cognitive Problems

Anxiety

Alzheimers Dementia

Depression

Substance Abuse

Dementia Pugilista















# Subconcussive Injury

AKA **Microtrauma**

Heading ball

Cheerleading

Wrestling

Gymnastics



# Concussion in Sports Group (CISG) 2017 Consensus Statement on Concussive Head Injury

Direct or impulsive force transmitted to head/neck/face

Neurological dysfunction that resolves spontaneously

Neuropathological changes, functional rather than structural

Recovery in sequential course

No alternative explanation



# History

Trauma

LOC

AMS

# Now

Headache

Nausea/Vomiting

Gait Instability

Visual Disturbance

# Exam

Photophobia

↓ Vision  
Acuity

Dysmetria

Somnolence



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# Are We Underdiagnosing Concussion?

40% of PEM

90% Met Zurich Diagnosis







When it's more than a  
concussion





A green frog is floating on a dense layer of green duckweed. The frog is positioned in the center of the frame, facing right. The duckweed consists of many small, round, green leaves that cover the entire surface of the water.

**Subdural Hematoma**

**SAH**

**Skull Fracture**

**Mass Lesions**



# When It's Not Just a Concussion

Who Needs  
Imaging?





Gestalt

PECARN

CHALICE

CATCH

ciTBI

NSU

Intervention

Intubated

Admitted

Death

# PECARN CATCH CHALICE

Sensitivity	99-100%	92%	93%
Specificity	52-59%	70%	77%



# MD+ CALC



Search “QT interval” or “QT” or “EKG”

What About Gestalt?



The image features four red flags on silver poles, arranged in a row from left to right, increasing in size. The flags are set against a plain, light-colored background. The text is overlaid on the largest flag on the right.

**Worsening Headache**

**Repeated Emesis**

**Focal Symptoms**

**Slurred Speech**

**Neck Pain**

**Seizure**

**↓ Mental Status**

**Intermediate risk?  
Observation over CT**

**FAST MRI?**



# Vomiting

Single Episode?

0.2% ciTBI

Multiple?

2% ciTBI





# 3 Minute Talk

A 3 Minute Talk Can Save  
Unnecessary Follow Ups

# Symptom Duration

75% at 1 week

50% at 2 weeks

33% at 4 weeks







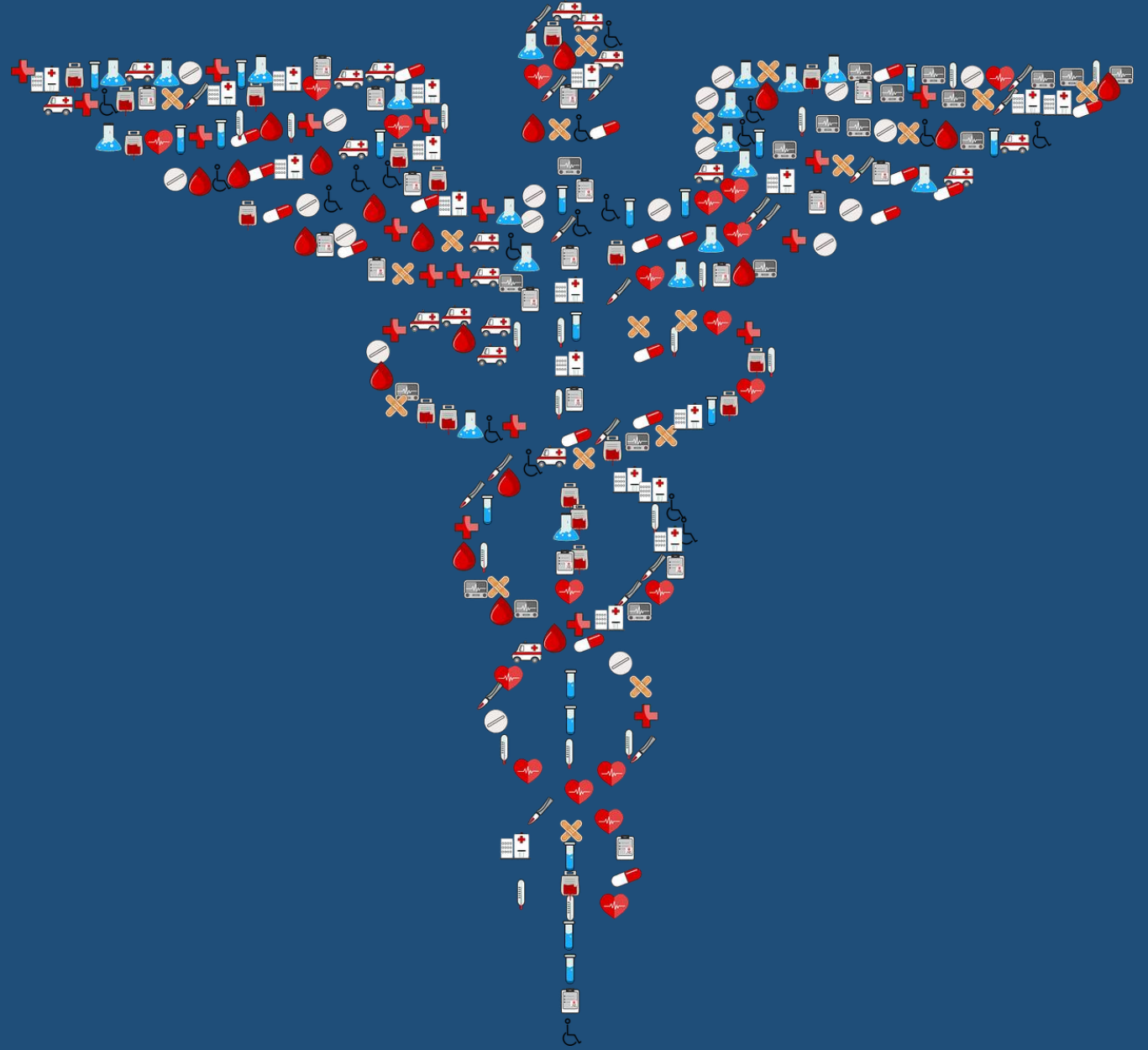


NSAIDs, APAP

Anti-emetics

Cognitive Rest

Eye Rest





# Bed Rest v. Return to Activity

Thomas et al, Pediatrics 2015

5d bed rest v. gradual return

No difference in neurocognitive outcomes

More postconcussive symptoms in bed rest

Benefits of Strict Rest After  
Acute Concussion: A Randomized  
Controlled Trial

Grool et al, JAMA 2016

Conservative rest v. early physical activity

Postconcussive sx at 28d

29% early activity

40% conservative

JAMA | [Original Investigation](#)

Association Between Early Participation in Physical Activity  
Following Acute Concussion and Persistent Postconcussive  
Symptoms in Children and Adolescents



**1: Home, brain rest**

**2: Return to school 1-3 hrs/day**

**3: Full day of school, maximal supports**

**4: Full day of school, moderate supports**

**5: Full day of school, minimal supports**

**6: Full school, no supports**





- 1: No activity, brain rest
- 2: Light aerobic exercise
- 3: Sports specific activity
- 4: Drills without body contact
- 5: Drills with body contact
- 6: Full return





# Post-Concussion Syndrome

Used to be sx after 3 mos

Now sx after injury

>3 months

Persistent post concussion syndrome



# Post-Concussion Syndrome

Headache

Fatigue

Behavior Change

Nausea

Photophobia

Dysequilibrium



# When Can I Get Back On The Field?





What's the Damage Doc?

# DUMB AND DUMBER





# Second Impact Syndrome

Concussion => PCS => 2<sup>nd</sup> Concussion

Cerebral Edema, Herniation, Death

94 suspected cases in 13 year period

# Neurocognitive Testing

May be done on follow up

Some have as a baseline

Objective data (no emotion)





# Who Does Follow Up?

Athletic Trainers

Family Medicine

Sports Medicine

Pediatricians







# To Review

## **Criterion to Diagnose**

Transmitted force to head/neck

Associated neurological symptoms

Sequential return

## **Don't miss dangerous mimics**

PECARN criteria

Red flag symptoms

## **Set expectations, assuage fears (tests)**

Disney method,  $\frac{1}{2}$  with symptoms at 2 wks

**OTC analgesia, rest**

**Structured return**



