Heads Up: Concussion Management

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Speaker’s Bureau, Allergan



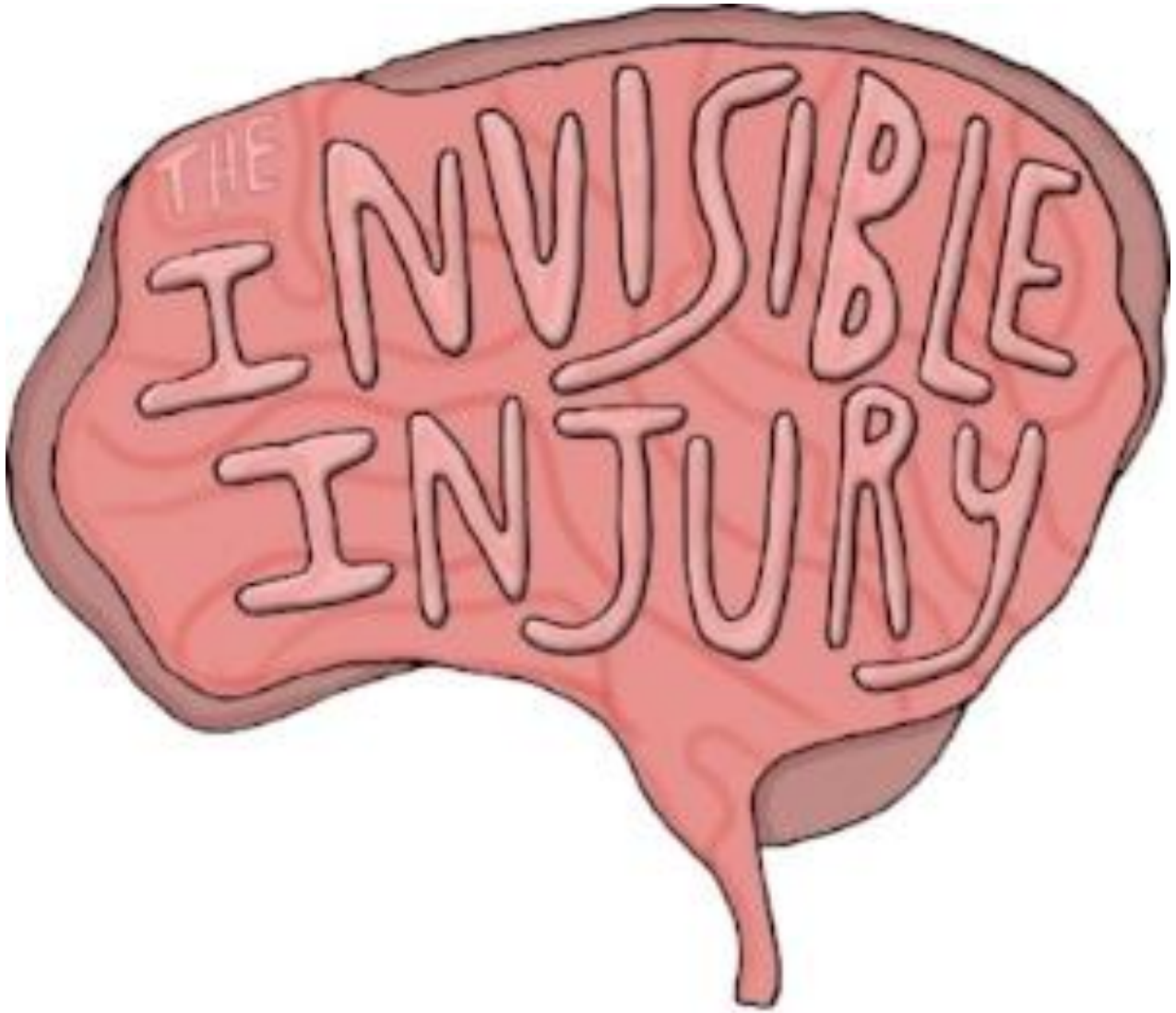
Objectives

- Define concussion and mild traumatic brain injury (mTBI)
- Discuss epidemiology and risk factors for concussion
- Identify screening tools and clinical presentation of concussion
- Describe pharmacologic and nonpharmacologic therapies for treatment of concussion and postconcussion symptoms



Traumatic Brain Injury and Concussion

- 2.5 million TBI per year in U.S.
- 80% of TBI is mild TBI (mTBI)
- 3.2 million living with TBI-related disability
- Sports-related concussion is likely under-estimated
- Common Causes



Concussion: a form of brain injury

Mild TBI

Tramatically induced physiologic disruption of brain function including 1) LOC 2) memory loss immediately before or after 3) altered mental state at time of injury 4) brief or lasting neurologic deficits

Concussion

A complex pathophysiological process affecting the brain, induced by biomechanical forces



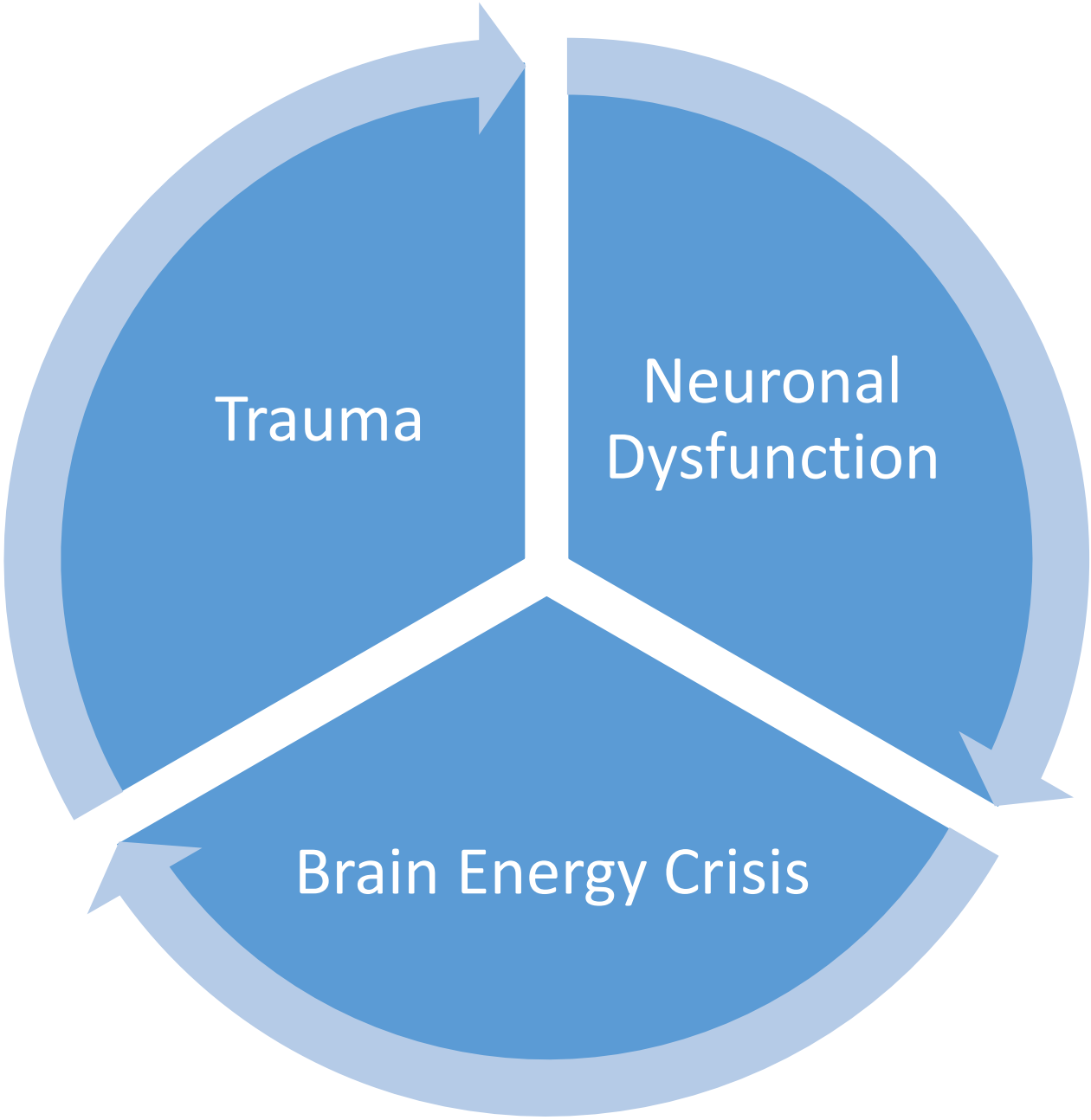
The American Congress of Rehabilitation Medicine; International Concussion in Sport consensus panel

Key Features of Concussion

1. Caused by direct OR indirect force to the head
2. Usually results in rapid onset of short-term neurologic impairment (but symptoms can progress)
3. May cause neuropathologic changes, but **typically a functional problem with no abnormality seen on diagnostic imaging**
4. Concussion leads to a spectrum of symptoms that may OR may not cause LOC. Symptoms usually resolve in a predictable manner, but postconcussion syndrome can develop.

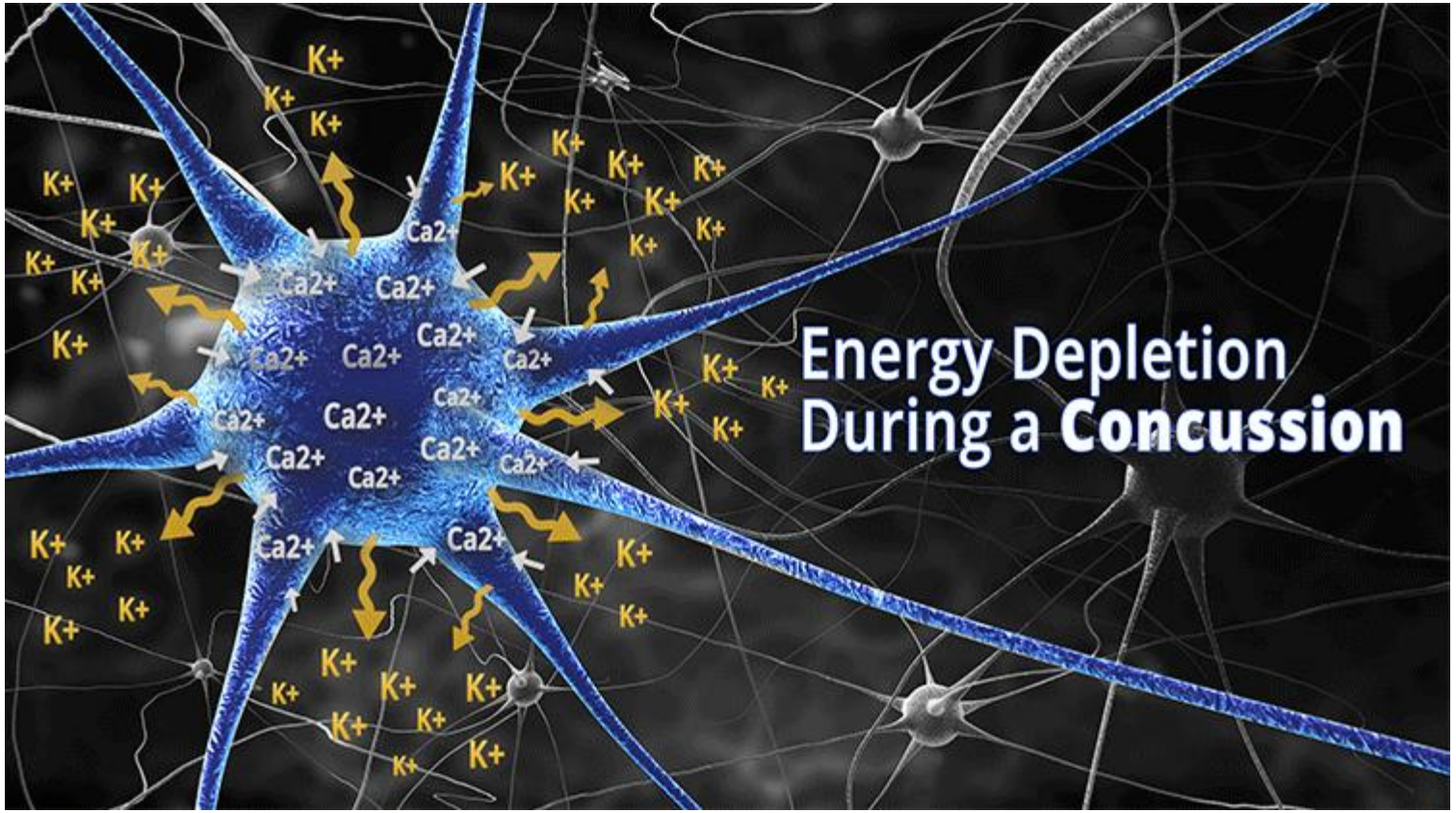
Pathophysiology





Neuronal Dysfunction

- Described as a neurometabolic cascade
- Ionic shifts
- Altered metabolism
- Changes in neuro-transmission





Assessment



Symptoms



Red Flags

Assessment

History

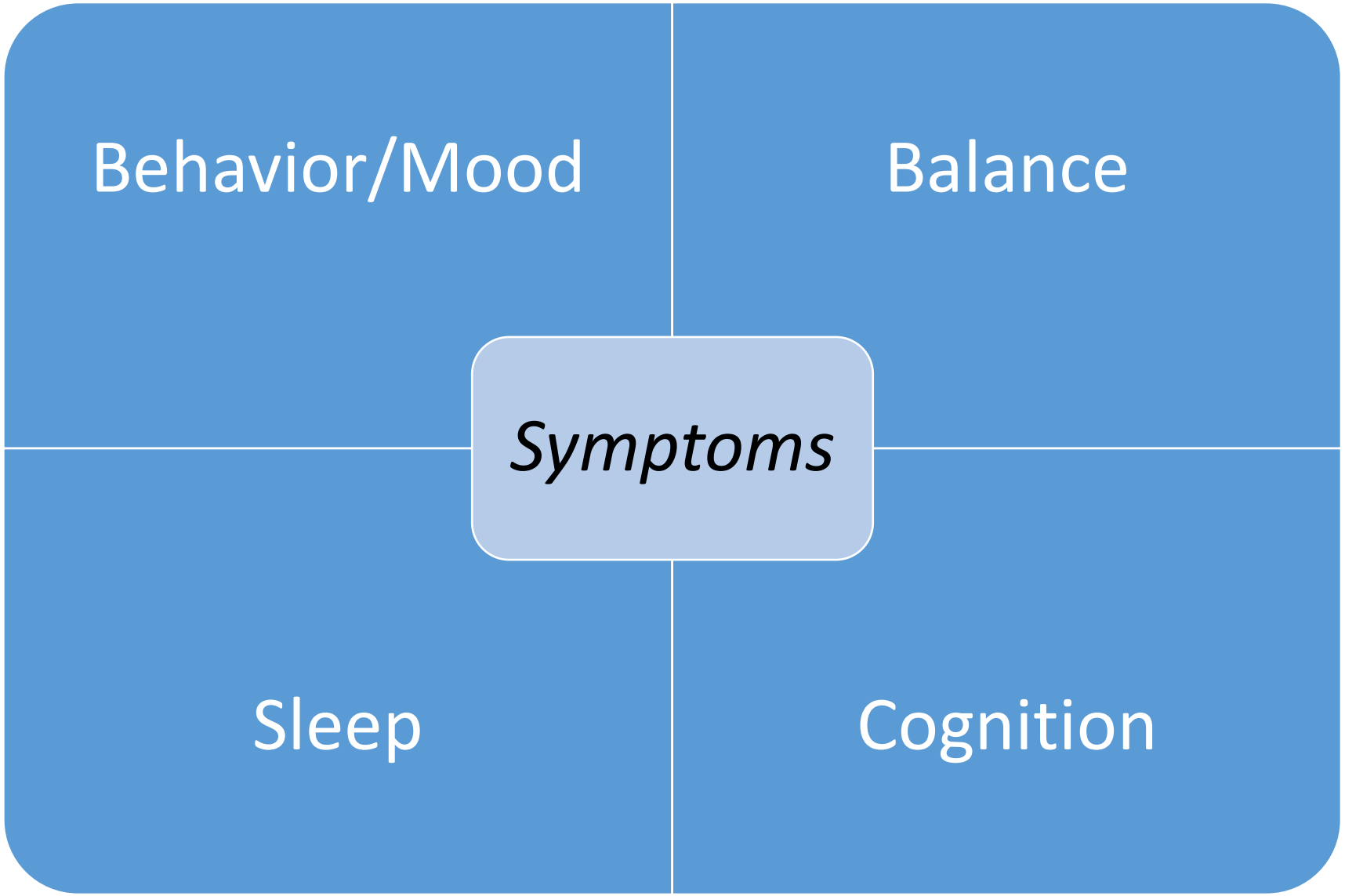
- Date of injury
- Mechanism, location, severity
- Amnesia before or after, LOC, seizures
- Signs/symptoms at time of injury and currently
- Aggravation of pre-existing issues (e.g. headache)

Physical Exam

- Mental status, cognitive function
- Cranial nerves
- Strength and tone, sensation
- Deep tendon reflexes
- Gait, balance
- Special tests as needed

Diagnostic Tools

- Balance Error Scoring System
- Post-concussion Symptom Scale or Graded Symptom Checklist
- Neuropsychological Testing
- Sensory Organization Test
- Standardized Assessment of Concussion


Behavior/Mood
Balance
Symptoms
Sleep
Cognition

Early and *Delayed* Symptoms

Confusion

Amnesia

Feeling overstimulated

Headache

Dizziness

Nausea

Impaired balance

Vision changes

Photophobia, phonophobia

Emotional liability, irritable

Difficulty Focusing

Distractibility

Poor memory

Difficulty maintaining train of thought

Fatigue

Sleep disturbance

Headache

Neck pain

Depression, Anxiety, Sadness

Red Flags: Send to ER!



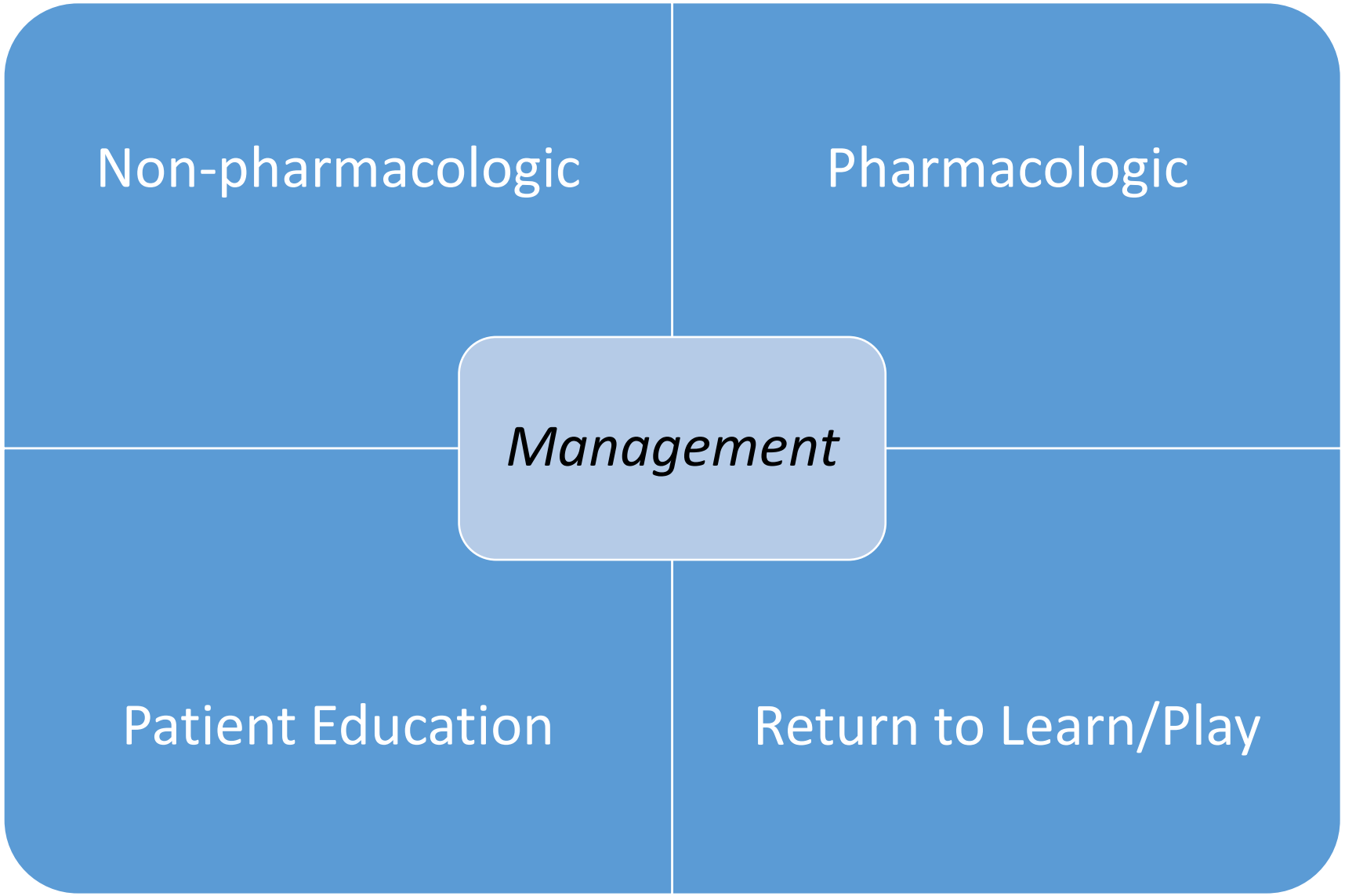
- Current altered consciousness or declining neuro status
- Papillary edema or asymmetry, diplopia
- Seizures
- Repeated vomiting
- Worsening headache
- Disorientation to person, place, time, or family/friends
- Altered behavior and/or slurred speech
- Poor balance

Is Diagnostic Imaging Needed?

Not unless there is concern for more serious TBI – Review Red Flag symptoms

Neuroimaging is not indicated after 72 hours post-injury, unless there is a decline in neurologic function




Non-pharmacologic
Pharmacologic
Management
Patient Education
Return to Learn/Play

Non-Pharmacologic Therapies

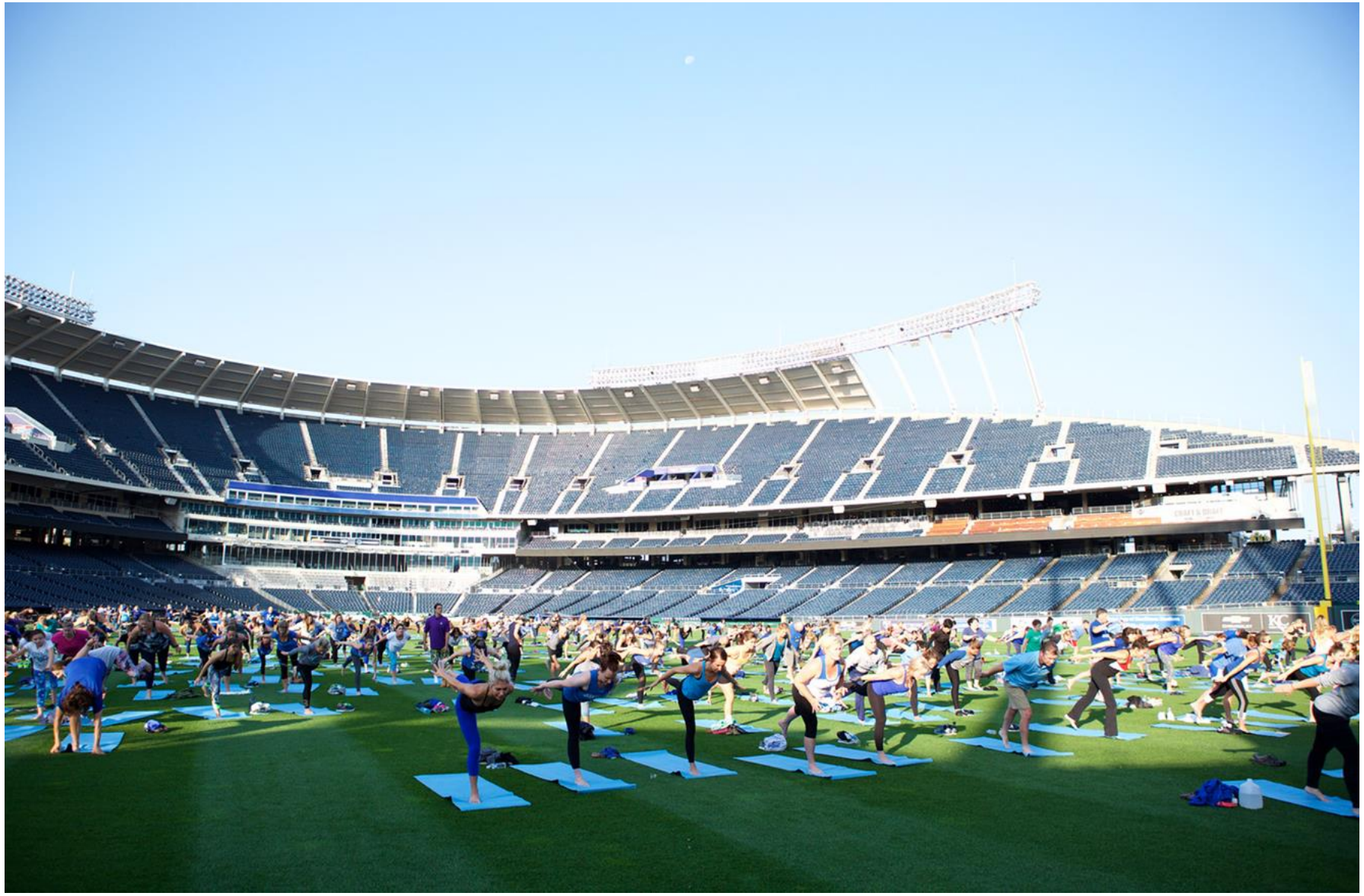
- Headache and neck pain: Modified activity, pacing, physical therapy
- Vision and balance symptoms: vestibular therapy
- Cognitive deficits: speech and occupational therapy, vocational rehab
- Insomnia: sleep hygiene, guided relaxation, exercise as tolerated
- Nausea: nutrition education, dietician
- Depression/Anxiety: counseling, CBT
- Substance abuse: mental health





Nutrition after Concussion

- Limit Sugar and processed foods
- Increase Omega 3/Healthy fats
- Turmeric supplement or fresh turmeric
- Anti-inflammatory focus
- Quiet environment for meals
- Good hydration
- Magnesium supplement



Pharmacologic Treatment



- Headache (more common in those with history of HA or migraine!)
  - **Acute** therapies for episodic or worsening symptoms
  - NSAIDs, triptans
  - Short-course of prednisone for severe/intractable headache

  - **Preventive** medications for high frequency or lack or response to acute therapy
  - TCAs (amitriptyline, nortriptyline)
  - Antiepileptics (topiramate, divalproex)
  - Beta-blockers (propranolol, metroprolol)
  - OnabotulinumtoxinA (Botox) if symptoms meet criteria for Chronic Migraine
  - Supplement options: Magnesium, riboflavin, coenzyme Q10

Pharmacologic Treatment

- Depression: SSRI first line (venlafaxine, duloxetine can also be effective for chronic pain)
- Anxiety: buspirone, followed by SSRI paroxetine
- Insomnia: melatonin (first line), trazodone, and amitriptyline
- Neck pain: NSAIDs, low-dose tizanidine (shortest required duration), **trigger point injections**
- Nausea/Vomiting: ondansetron, prochlorperazine, promethazine

Patient Education



- Minimize stimulation (lights, noise, crowds, etc) – **short term**
- Limit screen time- watch for symptom aggravation
- Use symptoms to guide activity tolerance
- Gradual activity progression
- Pacing & energy conservation

- Assess need for 504 plan or individualized education for students
- Return to school when he/she can tolerate 30 minutes of reading or computer
- Educate on risk of recurrent injury

Return to Play



- Risk of second impact syndrome
- Trial of return to sport or play should not start until individual is tolerating school or work activities without symptoms
- Gradual return to play or sport- determine who is guiding the process (trainer, school nurse, NP, etc)
- Monitor for recurrence of symptoms
- Reinforce education on reducing future concussion risk

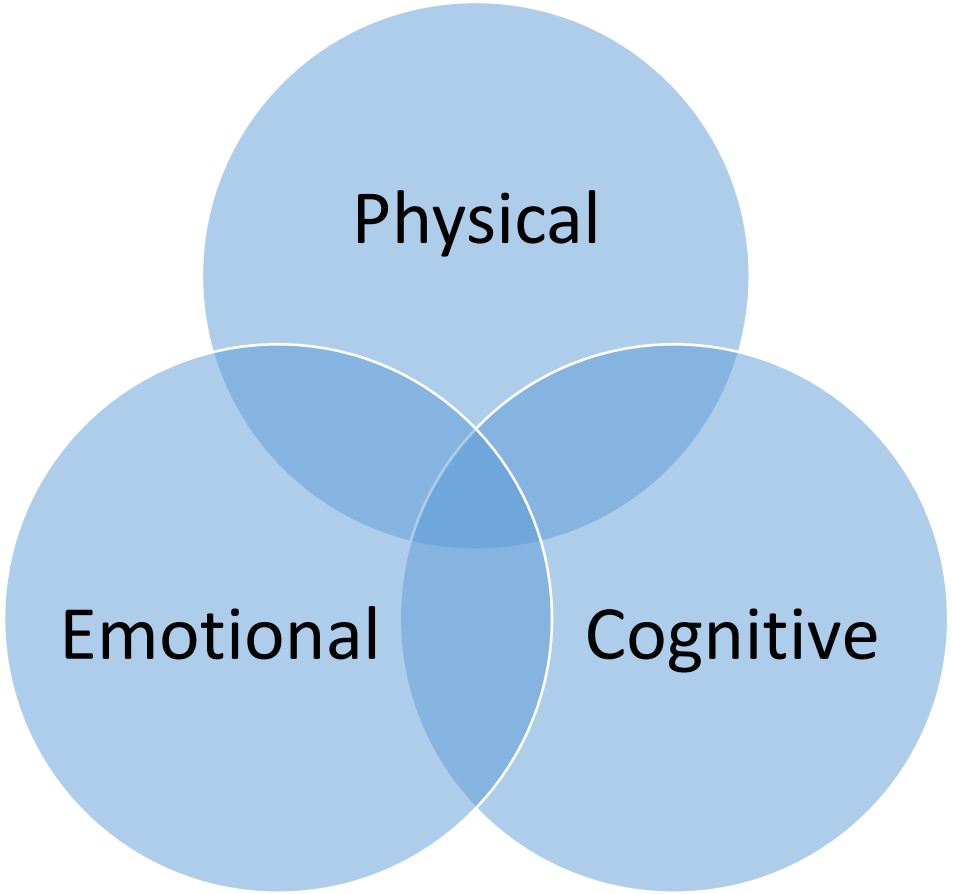
Sample Graduated Return to Play

REHAB STAGE	FUNCTIONAL EXERCISE	OBJECTIVE
1. No activity	Complete physical and cognitive rest	Recovery/Rest
2. Light Aerobic Activity	Walking, swimming, stationary cycling. Mild intensity	Increase heart rate
3. Sport Specific Activity	Running or skating drills. **No head impact** activities	Increase intensity
4. Non-contact training drills	Progression to more complex training drills	Coordination, cognitive load
5. Full contact practice	Normal training activities following medical clearance	Restore confidfencve, assesment of functional skills by coaching staff
6. Return to play	Normal game play	

https://concussionfoundation.org/concussion-resources/checklist

Postconcussion Syndrome

- Persistence of concussion symptoms for greater than six weeks post-injury (ICD-10)
- ~10% sports-related, up to 33% non-sport related concussion
- Physical exam is usually normal



Postconcussion Syndrome: At least 3 symptoms for at least 3 months

- Headache
- Dizziness
- Fatigue
- Irritability
- Disordered sleep
- Difficulty in concentrating and performing mental tasks
- Impaired memory
- Reduced tolerance to stress, emotional excitement or alcohol

When to Refer



- ✓A majority of concussion symptoms resolve within 2 weeks
- ✓Symptoms may persist for 1 month in youth

- ✓Consider referral if symptoms are not improving in 1-2 weeks
  - Neurology or concussion specialist
  - Physical (including vestibular), Occupational, Speech therapy
  - Mental Health
  - Opthalmology/Optometry

Resources

- CDC: https://www.cdc.gov/headsup/youthsports/index.html
- PM&R Knowledge Now: https://now.aapmr.org/mild-traumatic-brain-injury-mtbi/
- ImPACT: www.impacttest.com/
- American Academy of Pediatrics: www.aap.org
- Concussion Legacy Foundation:
- https://concussionfoundation.org/
- Podcasts: Ask Concussion Doc and Pain Reframed



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