



Current Concepts in Concussion Management

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Disclosures

- No disclosures

Overview

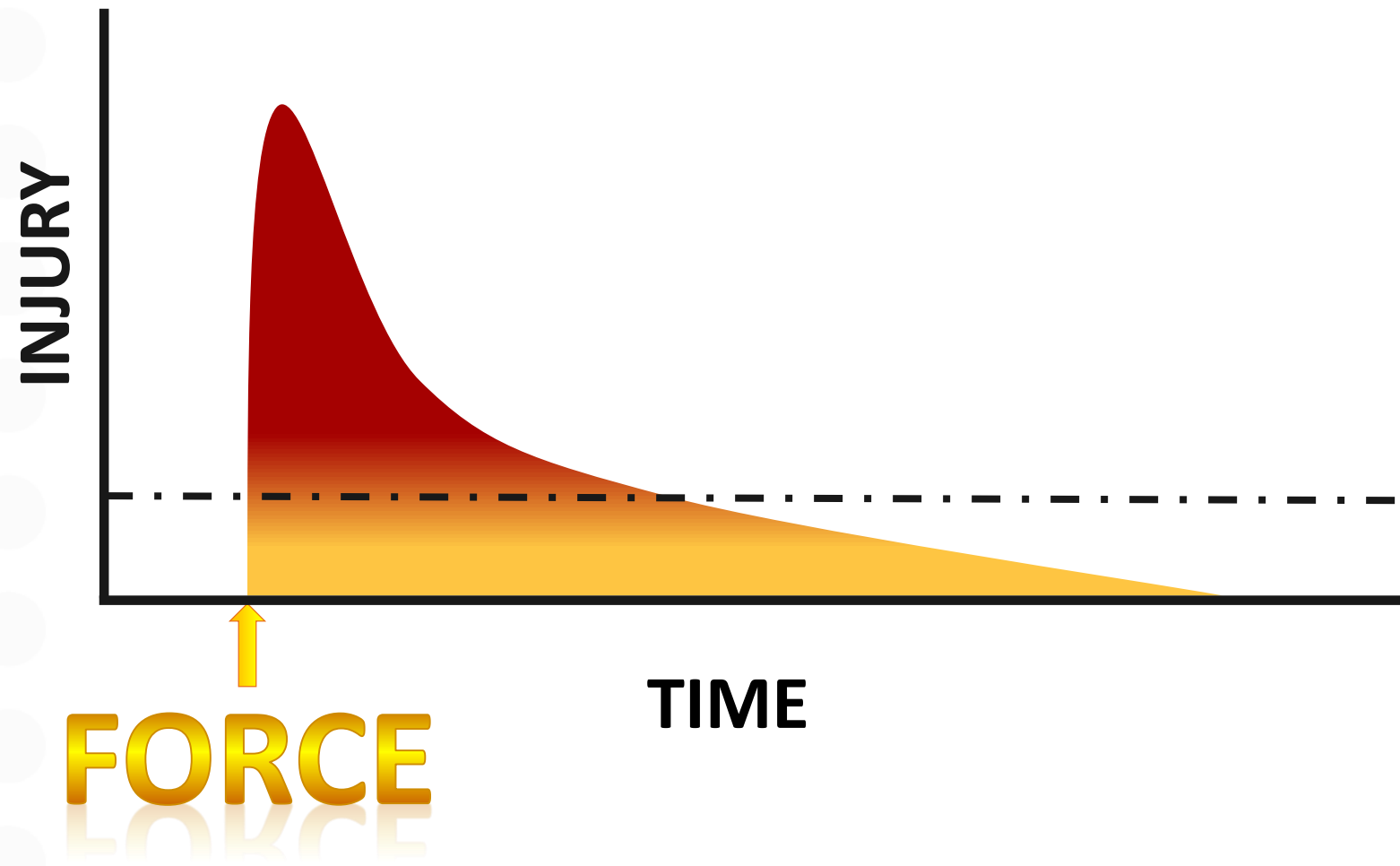
- Background
- Classification
- Assessment
- Management

Concussion Definition

- A transient, complex pathophysiologic response to biomechanical forces imparted to the brain, resulting in onset of neurologic symptoms that predominantly reflect a functional disturbance, rather than a gross structural injury.
 - Distinction of *sports-related concussion*: implicit assumption that the athlete will purposely be returning to contact risk (vs. MVA-related etc)

Concussion

Slide Credit:
Dr. Jeffrey Kutcher



FORCE

TIME

Classification of Concussion

- Possible: In a list, concussion is not most likely
 - Other possibilities: dehydration, viral illness, migraines, hyperthermia
- Probable: In a list, concussion is most likely
- Definite: Concussion is only explanation

**Situational
Treatment**

**Treat as
Concussed**

Classification of Concussion

- **Based on:**

- **Mechanism – Not every hit to the head is a concussion**

- Enough impact/velocity/rotation for brain to shift in skull?

- **Symptom course – first 24-48 hours**

- Ex: Headache resolved in 12 hrs and no further symptoms
 - Ex: Headache with migraine features, sleep issues, persistent nausea/change in appetite, dizziness – lasting longer than 24 hours

*** PRO TIP ***

- **Primary decision during competition: triage for safety, not diagnosis**
- **It is OK not to immediately diagnose concussion within the first few hours of initial presentation**
 - **The symptoms often take time to develop and reveal itself in 24-48 hours**
- **Include it in the differential and give the athlete some education on signs, symptoms and red flags**

Exam

- **Full neuro exam**
- **Cervical Exam – AROM, muscle spasm tenderness**
- **VOMS – abnormalities, symptoms produced**
- **Balance**

Vestibular Ocular Motor Screening

- **Smooth pursuits**
- **Saccades:**
 - **Horizontal**
 - **Vertical**
- **Convergence**
- **VOR**
 - **Horizontal**
 - **Vertical**
- **Visual motion sensitivity test**



Total Symptoms and Symptom Severity

Postconcussion Symptom Scale (no Symptoms, 0; Moderate, 3; Severe, 6)							
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble falling to sleep	0	1	2	3	4	5	6
Excessive sleep	0	1	2	3	4	5	6
Loss of sleep	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Light sensitivity	0	1	2	3	4	5	6
Noise sensitivity	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervousness	0	1	2	3	4	5	6
More emotional	0	1	2	3	4	5	6
Numbness	0	1	2	3	4	5	6
Feeling "slow"	0	1	2	3	4	5	6
Feeling "foggy"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Visual problems	0	1	2	3	4	5	6

Migraine:

Postconcussion Symptom Scale (no Symptoms, 0; Moderate, 3; Severe, 6)							
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble falling to sleep	0	1	2	3	4	5	6
Excessive sleep	0	1	2	3	4	5	6
Loss of sleep	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Light sensitivity	0	1	2	3	4	5	6
Noise sensitivity	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervousness	0	1	2	3	4	5	6
More emotional	0	1	2	3	4	5	6
Numbness	0	1	2	3	4	5	6
Feeling "slow"	0	1	2	3	4	5	6
Feeling "foggy"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Visual problems	0	1	2	3	4	5	6

Poor Sleep Night Before:

Postconcussion Symptom Scale (no Symptoms, 0; Moderate, 3; Severe, 6)							
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
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Feeling "slow"	0	1	2	3	4	5	6
Feeling "foggy"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Visual problems	0	1	2	3	4	5	6

After a big meal:

Postconcussion Symptom Scale (no Symptoms, 0; Moderate, 3; Severe, 6)							
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble falling to sleep	0	1	2	3	4	5	6
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Management

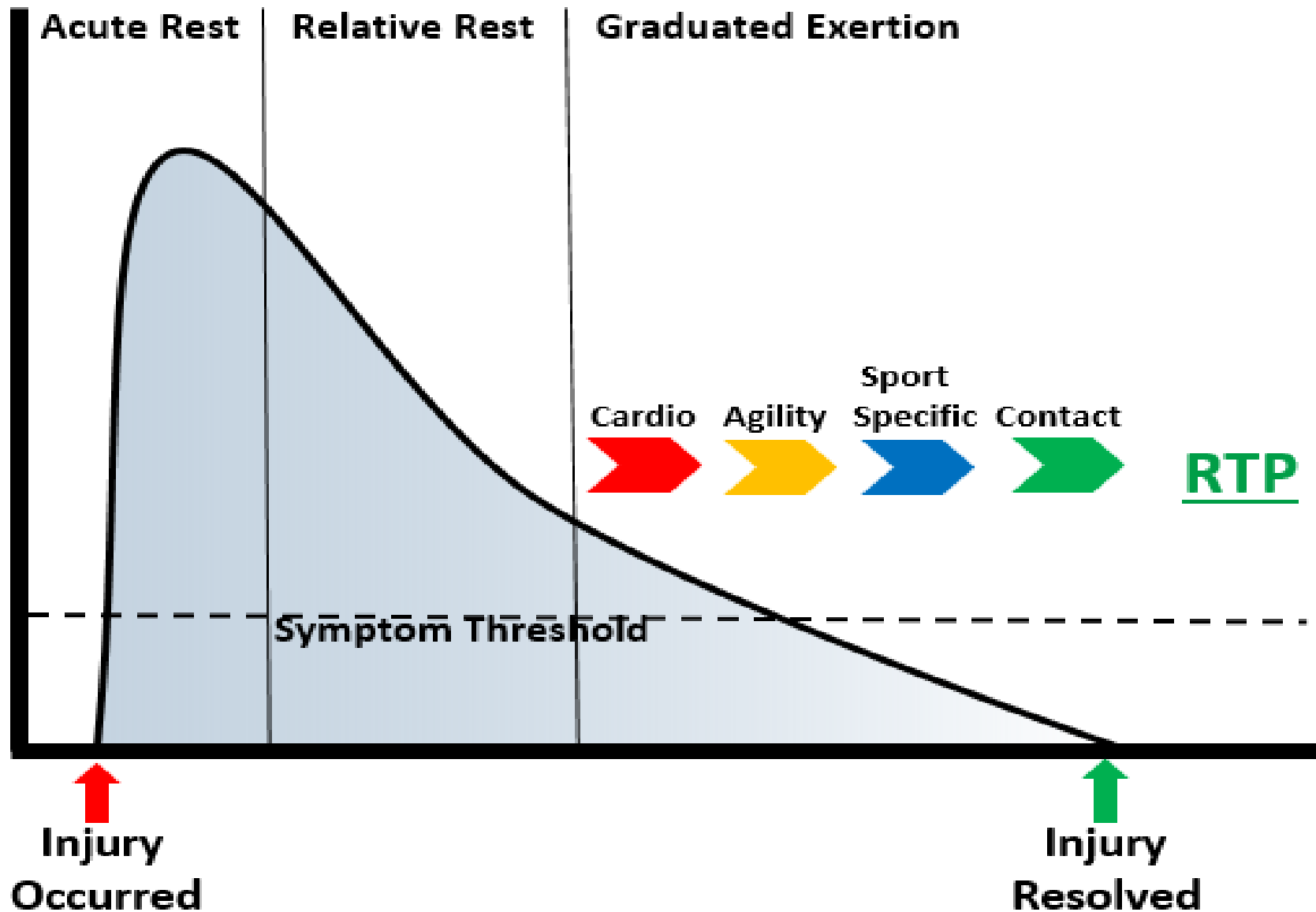
- The brain likes:



Management Cont'd

- As a principle, use the fewest prescription medications and maximize lifestyle changes
 - Use lowest effective dose possible





Management Cont'd

- Avoid Avoidance!
 - Activity/light/sound etc.
 - Leads to prolonged recovery/difficulty when reintroduced
- REST IS NOT BEST
 - “Brain rest” leads to prolonged recovery

After first 48 hours, can always do ***something!***

Thomas, 2016
Leddy, 2019

Factors Which Prolong Recovery

- **Pre-injury Conditions:**

- Migraines
- ADD/ADHD
- Anxiety
- Depression
- Other psychiatric/personality disorder

Factors Which Prolong Recovery Cont'd

- **Post-Injury Conditions:**

- Neck strain
- Vestibular/Oculomotor issues
- Occipital neuralgia
- Adjustment disorder
- Sleep issues
- Autonomic dysfunction
- Too much rest and lack of activity
 - Ex: Deconditioned to screens and lights from unnecessary avoidance

Treatment and Management

- **Must be a comprehensive approach identifying and addressing all factors**
- **No effective cookie-cutter protocol exists with this condition**
 - **Examples:**
 - **TCAs, B blockers etc**
 - **Neuropsychology testing has a role but not for all**



If it isn't concussion, what is it?

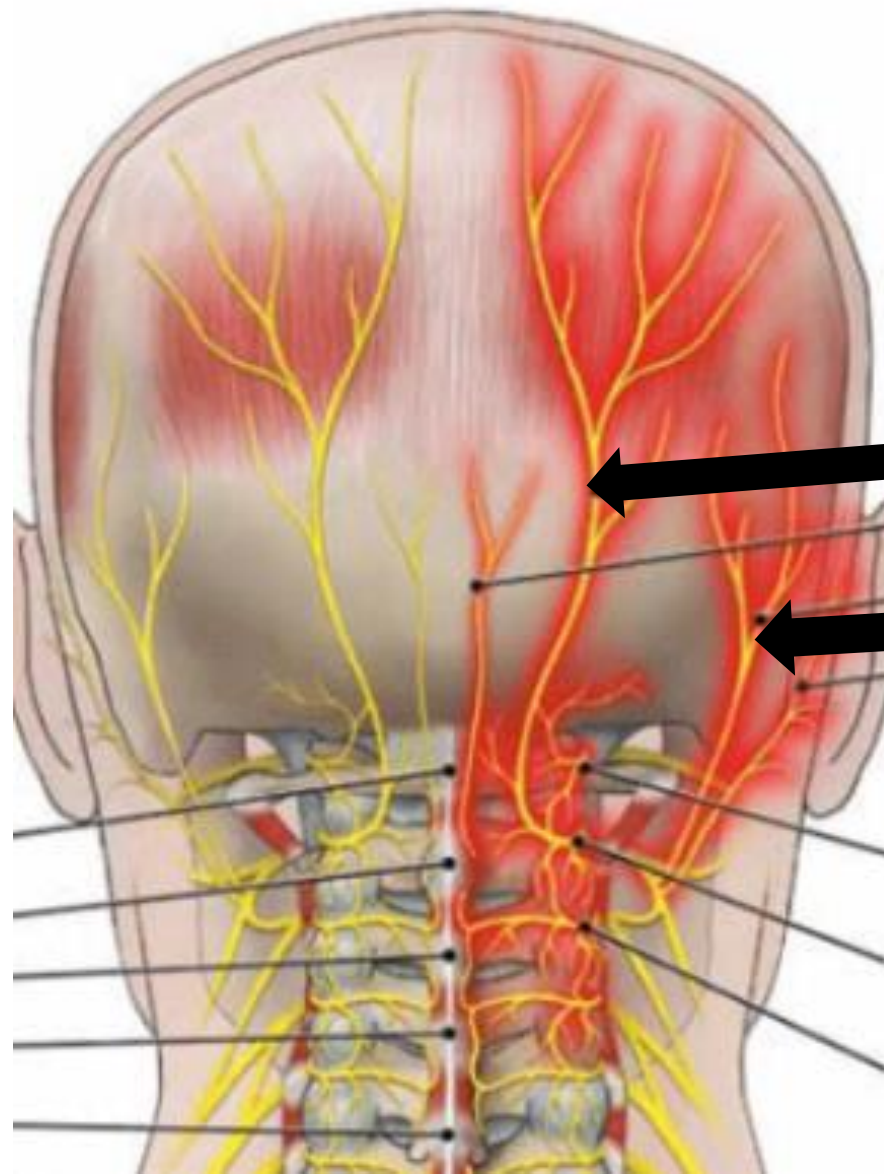
- **Traumatic migraine**
- **Occipital neuralgia**
- **Cervical strain**
 - **Causing headaches or dizziness**
- **Viral illness/Dehydration**

Traumatic Headache/Migraine

- **Impact to the head which triggers a headache, may have migraine features**
 - **Light/sound sensitivity, nausea, etc**
- **Headache is the most commonly reported symptom of concussion**
- **A tool for resolved traumatic migraine vs. concussion:**
 - **A controlled but complex workout to see how symptoms develop with pre/post exam**

Occipital Neuralgia

- **Irritation of the greater/lesser occipital nerves either from direct trauma or from spasm of local muscles**
- **Shooting, shocking, throbbing, burning, or aching pain/headache**
- **Starts at the base of the skull and spreads along the scalp on one or both sides of the head**



Greater
Occipital Nerve

Lesser
Occipital
Nerve



Cervical Strain

- **With headaches**
 - Neck strain that is associated with a predominantly occipital headache
- **With dizziness**
 - Cervical proprioception issues
 - VOMS test can be limited

Take-Home Points

- **Not every hit to the head is a concussion, think about mechanism and symptom course.**
- **Do not rely on computerized tests to make decisions.**
- **Rest is not best - get athletes moving as tolerated and on normal sleep schedule after 48 hours.**
- **Consider mimickers of concussion as well in order to treat appropriately.**
- **Plans do not depend on “concussion or not” they should be individualized and comprehensive for symptom management regardless.**

Thank You!

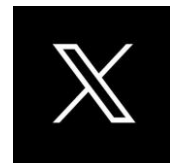
Questions? Comments?

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