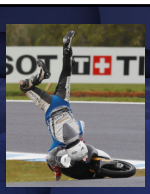

Concussion is Treatable!

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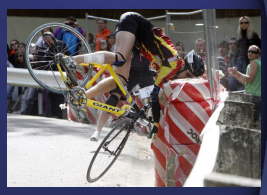
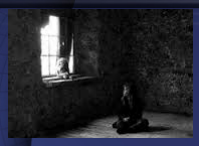
Disclosures

- Neither I nor any members of my immediate family receive any form of research funding from commercial products or organizations discussed in this presentation.
- I do receive compensation from the NFL for serving as sideline concussion consultant

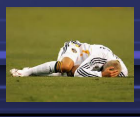
What is the current standard of care for treating concussed athletes?





Current treatment

- Current expert consensus for treatment of concussion includes: a) no return to play (RTP) on same day, b) prescribed physical and cognitive rest until asymptomatic, c) graded aerobic exertion-based RTP based on symptoms, and d) accommodations at school/work as needed.



Current treatment

- PROBLEM:
  - Previous consensus statements have provided limited guidance with regard to actively treating concussion.
- PROBLEM:
  - There is limited empirical evidence for the effectiveness of prescribed physical and cognitive rest - with no multi-site randomized clinical trials (RCT) for prescribed rest following concussion.
  - Mostly based on expert consensus

Does complete rest make sense?

- Almost no other medical conditions are currently treated with rest alone
- Animal and human TBI studies have shown improved outcome from cognitive, physical and social activity in patients with brain injury
- Prescribed rest may also set the stage for a pattern of behavior (i.e., "sick role")
- Athletes often suffer anxiety from complete cessation of all physical activity, even for a short time
  - Social isolation from friends and teammates

Should all concussions be managed the same way?

- Concussions involve varying lengths of recovery.
- Recovery is influenced by primary and secondary risk factors, and the severity and type of injury.
  - Age
  - Gender
  - Previous concussion history
  - premorbid and co-morbidities (e.g., migraine, depression, anxiety, learning disability, hyperactivity disorders, sleep disorders)

Recovery - what does it mean?

- We typically define "recovery" as resolution of symptoms
- PROBLEMS:
  - Many pts have baseline symptoms (high score)
  - Concussion symptoms overlap with many common medical and emotional symptoms and are thus somewhat non-specific
  - Studies show brain abnormalities that persist after symptoms resolve
    - considerable variability in the length of recovery across studies depending on which domain was used to determine recovery
    - Up to 28 days – even if sx better in 7 days!

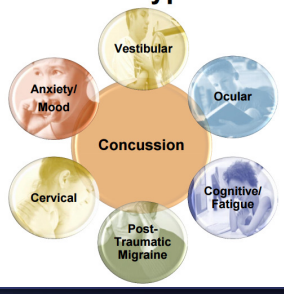
"The times, they are a changing..."

- Based on previous, many clinicians are changing their approach to concussion management
  - Recognition of concussion as a more heterogeneous disorder
    - Concussion "subtypes"
  - Multi-modality assessment of recovery (not just self reported symptoms)
  - Early targeted treatment of specific symptoms
  - Earlier reintroduction of cognitive and physical activity

Concussion as a heterogeneous condition

- Concussion is an individualized injury characterized by an inconsistent presentation of cognitive, emotional, somatic, and sleep-related symptoms and impairments that affect each athlete differently
- Post-concussion impairments can include cognitive, balance, vestibular, and/or oculomotor decrements that may interact with primary and secondary risk factors to create an individualized concussion presentation that requires a unique management and treatment strategy

SRC Clinical Trajectories or Subtypes



Courtesy Dr. Micky Collins, UPMC

Subtype symptoms and specific assessments

- Vestibular – dizziness, vertigo
  - BESS, saccades/nystagmus, sway balance
- Oculo-motor – vision problems
  - Reading fatigue, comprehension
  - Often misdiagnosed as LD, ADHD
  - VOMS – pursuits, saccades, NPC, VOR
- Cognitive/fatigue – attention, focus, energy
  - Focused neuropsych eval
  - "sluggishness" of inactivity

Subtype symptoms and specific assessments

- Post-traumatic migraine
  - May be no previous HA history
  - More common if + family history
  - Interferes with sleep, school return
- Anxiety/mood – baseline/previous history is important!
  - Worsened by isolation, restriction from team
- Cervical – may be involved due to force transmission
  - May contribute to headache issues

So, what changes should I make tomorrow in my practice?




Post concussion assessment

- Comprehensive approach to assessment that includes symptoms, cognitive, balance, vestibular, and oculomotor measures accompanied by a thorough physical exam and clinical interview
  - Not all symptoms will be apparent in the first 24 – 48 hours
  - Always consider baseline (pre-injury) symptoms
  - Previous history and family history are important
    - Time to resolution of previous injuries
    - Family h/o headache

Management

- 24 – 48 hours of physical and cognitive rest is reasonable
  - Totally empiric
  - Modify based on symptoms
- Can begin some academic work when symptoms begin to decrease
  - Start with individual work and then progress to class participation
  - Not an "all or none" event – stepwise
- Don't worry about the phone/texting, computer, TV, etc.
  - With the caveat of…

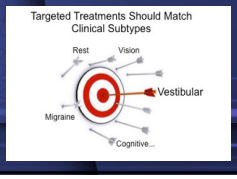
"If something makes you feel substantially worse – don't do it!"

Management

- "Probably" OK to begin some light physical exertion once symptoms are decreasing
  - NOT A TEAM PRACTICE!
  - NOT squatting 350 lbs in the weight room!
  - Examples – walking, stationary bike, stretching, stationary bike
  - Key is to avoid significant symptom exacerbation
  - Keep HR down below workout levels
  - Set time/intensity parameters to avoid achieving any "PRs!"

Management

- Consider targeted treatment of specific symptoms if they are static/disabling after 10 – 14 days
  - Unclear if this speeds up recovery
- Evaluate multiple domains and target therapy to the subtype(s)



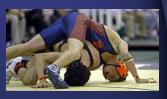
Courtesy Dr. Micky Collins, UPMC

Specific treatments

- Vestibular
  - Vestibular rehab - head coordination, balance, and gait-related exercises
- Ocular
  - eye exercises involving lenses, prisms, penlights, and cover-ups designed to improve ocular function
  - vision therapy in treating convergence and accommodative insufficiency
  - Behavioral ophthalmologist or optometrist
  - Vizual Edge program

Specific treatments

- Cognitive/fatigue
  - Sleep aids – melatonin first
  - Possible stimulants – short term
- Migraine
  - Abortive and preventive
  - TCAs, SSRIs, triptans, riboflavin
- Cervical
  - PT, traction
- Anxiety/Mood
  - TCA, SSRI, sleep treatment as above
  - Behavioral therapy



Statement from the
Targeted Evaluation and Active Management (TEAM)
Approaches to Treating Concussion Meeting
held in Pittsburgh, October 2015

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Take Home Points

- Emerging concept of concussion as a heterogeneous condition with different clinical presentations and "trajectories"
- Still no same day RTP
- Consider expanded evaluation of concussed patient and not just symptoms alone
- No evidence based reason to restrict electronics after concussion

Take Home Points

- May reintroduce academic work gradually once symptoms are decreasing and tolerable
- Light physical activity may also begin as symptoms decrease
- If symptoms are static after 10 – 14 days consider targeted therapies
- "An interdisciplinary treatment team involving multiple healthcare professionals offers the most comprehensive approach to treating patients with concussion."

Disclaimers

- Every concussed patient does NOT need to be on medication
- Light physical activity needs to be carefully monitored and parametered
- Academic accommodations may still be beneficial
- No entry into the formal RTP stepwise protocol until symptoms are back to baseline

Thanks!