2018 CONCUSSION UPDATE

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WHAT’S NEW?

• Look for treatable symptoms
• Earlier re-engagement
  – Physical activity
  – Academics
  – Social interaction
• Evolving concern for long-term consequences for concussion sustained in youth sport

• Concussion-related articles:
  – Past 12 months
    • >1100
  – Past 1 month
    • 148
WHAT’S NOT NEW?

• Criteria for return to
  – Contact/collision sport
  – Activities at high risk for head injury
• Prevention remains elusive
• No definitive diagnostic test
  – Clinical diagnosis

Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016

DIAGNOSIS

• NFL sideline tent, perceived by many parents/athletes as gold standard
  – Only thing that separates “them from us” is routine video analysis of injury
    • But many parents now provide this as well
RISK FOR PROLONGED SYMPTOMS

- Conflicting data, but best guess at present:
  - ADHD
  - Female
  - “High somaticizers”
  - Early pubertal stage

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RISK FOR PROLONGED SYMPTOMS

- Conflicting data, but best guess at present:
  - Loss of consciousness
    - Conflicting thought
  - Continued play after injury
  - Multiple head injuries within 24 hrs
  - High symptom load
    - “In a fog”
    - Dizziness
      - Vestibular/oculomotor
OFFICE ASSESSMENT

• Potentially treatable findings
  – Oculomotor
  – Vestibular
  – Cervical strain
  – Sleep disorder
  – Attention
  – Depression/somatic

OCULOMOTOR

• Symptoms
  – Difficulty reading
  – “Eyes jumping”
• Findings
  – Tracking difficulties
    • Smooth pursuit
    • Saccades
  – Convergence insufficiency

OCULOMOTOR

• Treatment
  – Physical therapy/vision therapy
  – May benefit from:
    • Magnifier/“reader” glasses
    • Change font size/color on screens
  – Neuro-optometry evaluation

VESTIBULAR

• Symptoms
  – Dizziness/nausea/balance issues
• Findings
  – Reproduction of symptoms with head movement
  – Dix-Hallpike
VESTIBULAR

- Treatment
  - Physical therapy
    - Often feel worse before better
  - Avoid medication rx

CERVICALGIA

- Symptoms
  - Neck pain
  - Cervical headaches
- Findings
  - Pain
    - Palpation
    - Neck movement

CERVICALGIA

- Treatment
  - Manual treatment
  - Physical therapy
  - OMT/chiropractic

SLEEP DISORDER

- Symptoms
  - Difficulty falling/staying asleep
  - Altered circadian rhythm
  - Daytime somnolence

Photo by MC Quinn  https://creativecommons.org/licenses/by/2.0/legalcode
SLEEP DISORDER

• **Treatment**
  – Melatonin
  – Sleep hygiene
  – Physical activity
    • Details coming up

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ATTENTION ISSUES

• **Symptoms/findings**
  – Decreased concentration
    • By history and on SCATS
  – Distractibility
  – Academic difficulty

Photo courtesy of: www.amenclinics.com

ATTENTION ISSUES

• **Treatment**
  – Academic accommodations
    • As for ADHD
  – Physical activity
  – Amantadine
    • <40 kg: 5 mg/kg/day orally in 2 divided doses
    • >40 kg: 100 mg bid

DEPRESSION/SOMATIC

• Variety mood/somatic complaints
  – Headaches
  – Depression/anxiety
• “It would be unusual for you not to have some degree of depression at this point”
DEPRESSION/SOMATIC

- Treatment
  - Physical activity
  - Social engagement
  - Counseling
  - SSRI/TCAs
    - Avoid consistent use of OTC analgesics

ACADEMICS

- “Relative” cognitive rest for several days
  - Strict rest increased recovery times
  - No rest increased recovery times
- Difficulties can be
  - Cognitive
  - Environmental
- Accommodations

RECOMMENDATIONS: RETURN TO “LIFE” AND ACTIVITY

Academics
Social
Physical activity/sport
ACADEMICS
• Symptom “aggravation” is expected and does not appear to prolong recovery
• Minimize multi-tasking
  – School and home

SOCIAL INTERACTION
• Screen-time is essential component
  – “As tolerated”
• Socialization
  – “As tolerated”
  • Or as allowed by school
  • Potential “exit strategy” if symptoms should substantially increase

PHYSICAL ACTIVITY
• Earlier engagement physical activity
  – Progressive
  – Appropriate
• Okay for light physical activity as tolerated at any point

PHYSICAL ACTIVITY
• Physical therapy optimal but not always possible
  – “Buffalo” protocol
  • Gradual progression of activity at subsymptomatic level
  • Heart rate monitoring ideal and accessible for many
    – Exercise to point of symptom onset
    – “Ceiling” heart rate at ~90% of that
      » Re-engagement in team activity
    – Re-assess every 5-7 days
RETURN TO CONTACT SPORT

- Asymptomatic
  - At rest
  - With high intensity exertion
- Restoration baseline academic achievement
- For some, computerized testing (e.g., ImPACT)
  - Most helpful if pre-injury comparison

DOWNSTREAM CONSEQUENCES

POST CONCUSSION SYNDROME

- Multiple symptoms after concussion
  - No consensus on definition
  - No consensus on timeframe
  - Eliminated from DSM-5
- “Code” able diagnosis
  - However, use of the term has fallen out of favor

PERSISTENT SYMPTOMS

- Secondary
  - Headaches
    - Esp. migraines
  - ADHD
  - Depression/anxiety
- Prevalence after concussion not known
CHRONIC TRAUMATIC ENCEPHALOPATHY (CTE)

• Worry of many parents
• What we think we know now:
  – No apparent increased risk in former high school football players for
    • Dementia
    • ALS
    • Parkinson’s
    • Depression

CHRONIC TRAUMATIC ENCEPHALOPATHY (CTE)

• Post-mortem studies (low numbers) demonstration CTE:
  – Most professional football players
    • Severe CTE
  – 20% HS football players
    • Mild pathology
  – No pre-HS football players

CHRONIC TRAUMATIC ENCEPHALOPATHY (CTE)

• Cumulative head trauma emerging as dominant risk
  – Risk of subconcussive impacts back in limelight
• Stay tuned...

“... repetitive trauma to the head is of no clear benefit ...”

G. Landry and W. Meehan
AAP Clinical Report
“Tackling in Youth Football”


White Matter Changes Related to Subconcussive Impact Frequency during a Single Season of High School Football
Am J of Neurorad December 2017, DOI: https://doi.org/10.3174/ajnr.A5489

S J Kuzniarski, M D Clark, M A Fraser, C C, et al.
PREVENTION

• Helmets and headgear
  – Not yet
    • In spite of marketing claims
  – But still important
    • Well-fit
    • Good condition
    • Sports-appropriate


PREVENTION

• Mouthguards
  – Probably not
    • But still important

• Supplements
  – Not of benefit


PREVENTION

• Helmet attachments
  – Not effective
    • Bumpers
    • Pads
    • Sensors
  – May void warranty

**PREVENTION**

- Apparently effective
  - Education
  - Rule changes
    - Best established in youth hockey

**PREVENTION**

- Apparently effective
  - Neck strengthening
    - 1 lb ↑ strength = 5% risk reduction


**ON HORIZON**

- Functional diagnostic imaging
  - PET scans
  - fMRI
- Biomarkers for diagnosis
- Individual susceptibility to injury/sequela

**TAKE HOME**

- Appropriate re-engagement in “life” is key to concussion recovery
- Identification of treatable symptoms can speed recovery
- Symptom magnification with activity progression is to be expected
- Structured return to non-contact physical activity can help multiple symptom domains
THANK YOU