Sport Related Concussion Update 2017

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Consensus Statement: 5th Annual Meeting, Berlin (October 2016)

- Build on principles in previous statements
- Further development of conceptual understanding of Sport Related Concussion
  - Science of SRC is evolving-individual management decisions remain in the realm of clinical provider's judgement
  - Not meant to be a clinical practice guideline or legal standard of care

- Link to document: http://bjsm.bmj.com/content/51/11/838
11 ‘R’s of SRC Management

- Recognize
- Remove
- Re-evaluate
- Rest
- Rehabilitation
- Refer

- Recover
- Return to sport
- Reconsider
- Residual effects and sequelae
- Risk reduction
Definition of Sport Related Concussion (SRC)

- Traumatic brain injury induced by biomechanical forces
  - direct blow
  - impulsive force transmitted to the head
- Rapid onset of short lived impairment of neurological function that resolves spontaneously.
  - In some cases may evolve over minutes to hours
- Functional disturbance rather than structural injury.
  - No abnormality of standard structural neuroimaging
- Wide range of clinical symptoms. May or may not have loss of consciousness.
- Resolution of clinical and cognitive features typically follows a sequential course.
- Prolonged symptoms in some cases.
Concussion Subtypes

- Cognitive
- Sleep
- Psychologic
- Somatic

- Cognitive
- Anxiety/mood/emotional
- Migraine varient
- Vestibular
- Ocular-motor
- Cervicogenic
- Sleep/wake cycle
Recovery

- Large majority recover, from a clinical perspective, within the first month (80%)
- “High Risk” athletes are at risk for having symptoms > 1 month
- Teenage = most vulnerable for persistent symptoms
  - girls >> boys
- High Risk
  - ADHD/LD
  - Headache disorder/Migraine/FHx
  - Previous protracted recovery
  - Incompletely treated injury
  - H/o psychologic/mental health issues
Recovery Rates

- Athletes: nearly 80% resolution of symptoms and back to neurocognitive baseline by 4 weeks*
- Nonathletic adults: prevalence of symptoms 6%-80% at 3 months post injury**
- Ages 6-18: 14% symptomatic 3 months post and 2.3% symptomatic at 1 year***

* Collins et al Neurosurgery 2006
** Kraus et al J Head Trauma Rehab 2005
Spinos et al J Trauma 2010
Sigurdardottir et al Brain Injury 2009
*** Barlow et al Pediatrics 2010
Computerized Neuropsychologic Assessment

- “Doc, I need my concussion BASELINE test…”

- Assists in clinical decision making
  - THIS IS JUST A TOOL!!!

- All athletes should have a clinical neurological assessment as part of overall management

- Adds opportunity for athlete/parent education
Treatment: REST?

- Moving away from complete rest
- Brief rest 24-48 hours
- Then encourage them to become gradually and progressively more active
- Stay below threshold that incites symptoms
- Avoid vigorous exertion during recovery
- Optimal time is not well defined
Why trend towards activity?

- May facilitate recovery—increasing BDNF
- Improves focus
- Reduce negative psychosocial impact of activity restriction
- Better visual memory and reaction times compared to no activity or full activity
- Subthreshold aerobic exercise restores normal brain fMRI activation patterns

- Gagnon et al Brain Inj 2009
- Majerske et al J Athl Train 2008
- Leddy et al Sports Health 2012
- Leddy et al J Head Trauma Rehabil 2013
Vestibular issues with concussion

- Of most commonly reported symptoms…
  - Dizziness = 55%
  - Visual disturbances = 49%
  - Balance problems = 43% (Lovell et al. AJSM, 2004)

- Dizziness is #1 predictor of protracted recovery

- Significant improvements in s&s after referral to vestibular rehab

- ? Utility of VNG testing
  - Central vs Peripheral abnormality
Acute Phases
- If (+) oculomotor or “central positional” findings, more conservative approach and ensure CNS pathology has been ruled out

Classic peripheral vestibular
- vestibular rehabilitation
- repositioning maneuvers
- generally tolerate light aerobic exertion

Cervicogenic: manual therapy with introduction of progressive cervical stabilization program

Chronic Phases
- visual retraining and/or vestibular rehab; cervical; exertional; dual tasking
Visual issues with concussion

- **Convergence Insufficiency**
  - Inability to crossed or converge eyes.
- **Accommodative Dysfunctions**
  - Trouble focusing at near or shifting focus (factor in age)
- **Eye Movement Disorders**
  - Poor saccadic and tracking eye movements
- **Photophobia (light sensitivity)**
- **Visual Processing Speed**
  - How quickly and accurately you understand what you see
Visual Treatment

- 1:1 visual therapy
- Computerized visual therapy
- At home modalities
- Correction
  - Prism glasses
  - Reading glasses
  - Progressive glasses
  - Magnification
Formal Neuropsychologic Evaluation

- Often needed with protracted recovery
- Helps distinguish injury from premorbid issues
- Helps with 504/IEP planning
- Progress over time
Risk Reduction

- Preparticipation decisions
  - Previous symptoms, length of recovery and number of concussions
  - Ask about previous spine, cervical and facial injuries
  - Disproportionate impact versus symptom severity may indicate increased vulnerability to concussion
- Modification of playing behavior
- Appropriate head gear
  - NEVER CONCUSSION PROOF
- Neck training
- Limit checking sports (age of checking)
- Limit tackling in practices
- Vision training
- Balance training
Neck Training

- trapezius and neck strengthening exercises
  - to dissipate force during head collisions and rapid head rotations
- Isometric training
- Dumbbell shrugs
Vitamin Supplementation

Goal: increase BDNF-- helps neurons grow, restores communication among them and reduces the risk of neurodegeneration

- Omega 3 supplementation 2-3 gram/day
  - fish-derived omega-3 fatty acids have been shown to improve cognition, plasticity, and recovery of neurons after traumatic brain injury

- Magnesium oxide 500mg/day

- Vitamin B2 400mg/day

- Vitamin E 1000mg/day
  - an antioxidant, reducing free radicals in the brain which would otherwise impede optimal function of neurons

- Curcumin 8 gram/day
  - improves neuronal by reducing oxidative stress and amyloid pathology

- Zinc

- CBD oil (non psychiactive cannabinoid)
  - neuroprotective, anti-inflammatory, and anti-anxiety properties
Medications

- Amantadine
- Methylphenidate
- SSRIs, SNRIs, NNRIs
- Headache medications
  - Amitriptyline
  - Propranolol
  - Topamax
  - Triptans
Acupuncture/Acupressure

- traditional Chinese acupuncture (TCA)
- auricular acupuncture (AA)
- Acupressure

The general theory of acupuncture is based on the premise that there are patterns of energy flow (Qi) through the body that are essential for health. Disruptions of this flow are believed to be responsible for disease. Acupuncture may correct imbalances of flow at identifiable points close to the skin.
Questions?!