Concussion; Beyond the Injury

Jennifer King DO, FAAP, CAQSM
Kapi‘olani Orthopedic Associates
Assistant Clinical Professor in Pediatrics
JABSOM
Treatment of concussions

• Concussion recovery is highly individualized.
• No grading of concussions in sports
• Rest initially and careful management of physical and cognitive exertion are the keys to recovery
• Middle school vs. high school vs. college
• Return to learn
• Return to play
Every Brain is different

• No set protocol for management
• Pieces of the puzzle
  – Symptomatology
    • Initial symptoms
    • Symptoms first 72 hours
  – Predisposing factors
  – Physical Exam
    • Neuro
    • VOMS
  – Neurocognitive testing
  – Balance testing
Tips

• Relative rest for 48-72 hours is crucial
• School notification
  – Middle school (PE)
  – Club sports/non school sports
  – Open communication
• School accommodations
• Dizziness at time of injury or being in a “fog” the first 72 after injury are not good
• Testing with ImPACT in the first 72 hours may be helpful
• Should be turning the corner after 3-4 weeks
• Medications may be beneficial for prolonged recovery
What about prevention

- Protective gear; must fit properly and be maintained and worn the right way at all times.
- Helmets are NOT designed to prevent concussions.
- Rules must be enforced for helmet contact in football.
- Proper technique in sports is important in concussion prevention.
- Playing smart with discipline and control goes a long way.
More on prevention

- Helmet (VT helmet rating)
- Helmet covers
- Mouthguards
- Soccer headgear (goalie)
- Rule changes (kick off rule)
- Behavior modification
- Visual performance
- Cervical strengthening
Beyond concussions
Additional injuries

- Seizures
- Head bleeds
- Skull fractures
Worsening of Symptoms

• Majority have symptoms on impact/at the time of injury.
• Small percentage are delayed
  – especially if they continue play.
• After rest, symptoms usually improve.
• Worsening of symptoms after improvement (minutes to hours) should be a red flag
  – epidural hematoma.
• More likely if there is skull fracture
Skull fracture

- May be subtle or obvious
- Otorrhea
- Rhinorrhea
- Battle sign
- Raccoon eyes
- Mechanism of injury; severity of the impact

Any change to level of consciousness should have emergent hospital evaluation
Worsening of Symptoms

• Close observation especially 1-2 hours of injury.

• If going home,
  – Athletic trainer or coach is to counsel caregiver
  – Ensure someone will be with the athlete.

• If worrisome for hemorrhage
  – Immediate referral to emergency room.

• RTP for worsening symptoms without epidural hematoma/skull fracture is the same protocol.
Seizures

• Uncommon
  – in Rugby 1/70 concussion had seizure at the time of impact.

• Seizures that occur minutes to hours after the event is worrisome

• No increased risk in developing epilepsy after having seizure at the time of concussion.

• RTP
  – no change in protocol if convulsions occur at the time of the impact
  – if occurs later, neurological consult to clear.
Multiple Concussions

- No rule for # of concussions and retiring from sport.
- Longer recovery time
- Short intervals between concussions
- Less impact to cause symptoms
- Not returning to normal/baseline
It’s been 3 weeks...still not better...now what?!?!
Prolonged symptoms

- After 2-3 weeks, must determine if symptoms are from concussion or outlying factors.
  - Mood changes
  - Sleeping problems **
  - Psychological problems
  - Depression
  - Chronic fatigue and pain
  - Neck injury
  - Vestibular problems
  - Visual problems
UPMC model

CREATING A HEALTHIER HAWAIʻI

CONCUSSION
CLINICAL TRAJECTORIES

A Model for Understanding Assessment, Treatment and Rehabilitation

COGNITIVE/FATIGUE
Cognitive difficulties include decreased concentration, increased distractibility, difficulty learning/retaining new information or decreased multitasking abilities. Sometimes accompanied by increased fatigue as the day progresses.

VESTIBULAR
Impairments of the vestibular system – the balance center of the brain – affect one’s ability to interpret motion, coordinates head and eye movements, or stabilize vision upon head movement.

OCULAR
Ocular dysfunction occurs when the movement of the eyes in tandem, or binocular eye movement, is affected. This may result in difficulties bringing the eyes together, or moving one’s eyes to track motion.

POST-TRAUMATIC MIGRAINE
Post-traumatic migraine symptoms include headaches, nausea, and/or sensitivity to light or noise.

CERVICAL
Sometimes, the concussive blow affects the extra cranial region including the neck and/or spinal cord. An injury of this type may lead to ongoing headaches.

ANXIETY/MOOD
This occurs when someone has a hard time turning his or her thoughts off, being particularly rumination, of suffering from excessive worry or concern.

HAʻAWAIʻI PACIFIC HEALTH

KAPIʻOALANI PALI HOSPITAL
STRAUB WILCOX
Cognitive/fatigue

- Grandma/Toddler therapy
- Sleep hygiene +/- melatonin
- Academic adjustments
Get Schooled on Concussions
Vestibular

- Vestibular therapy
- Gradual exposure to busy environments
Ocular

- Ocular therapy - controversial
- Prism glasses
- Guided reading
- Increasing font
- Thorough eye exam
Post-traumatic migraine

- Family history puts them at higher risk
- Treat the same as migraine without history of concussion
- If daily consider prophylactic medication
Cervical

- Whiplash mechanism common
- Occipital headaches
- Neck pain/tightness
- Therapeutic exercises
Anxiety/Mood

• Support system
• May need psych
• Academic adjustments
Concussion verses life

• Symptoms worse with exertion and made better with rest, then likely to be related to the initial concussion
  – visual system
  – balance system

• If symptoms are exacerbated by minimal activity and not improved by rest, likely a secondary reason for symptoms.
Who is at risk for PCS?

- History of prior concussions
- Female sex
- Younger age
- History of cognitive dysfunction
- History of affective disorders

- There has been no association thus far with severity of injury and post concussion syndrome.
Prolonged rest

- Physical deconditioning
- Metabolic disturbance
- Fatigue
- Reactive depression

- No evidence that rest beyond several weeks is beneficial
Road to recovery

• Once each portion addressed, full recovery anticipated
• If still symptomatic at 4 weeks, time to push the envelope
• Many benefits to sports/activity participation
ACTIVE KIDS DO BETTER IN LIFE
WHAT THE RESEARCH SHOWS ON THE COMPOUNDING BENEFITS

ACTIVE PARENTS ASSOCIATED WITH ACTIVE KIDS

KIDS OF ACTIVE MOMS ARE 2X MORE LIKELY TO BE ACTIVE

INTERGENERATIONAL CYCLE

COMPRESSION OF MORBIDITY
1/3 THE RATE OF DISABILITY

REDUCED RISK OF HEART DISEASE, STROKE, CANCER, DIABETES

MORE PRODUCTIVE AT WORK

LOWER HEALTH COSTS

7-8% HIGHER ANNUAL EARNINGS

15% MORE LIKELY TO GO TO COLLEGE

LESS SMOKING, DRUG USE, PREGNANCY AND RISKY SEX

UP TO 40% HIGHER TEST SCORES

1/10 AS LIKELY TO BE OBESE

PHYSICALLY ACTIVE CHILDREN

EARLY CHILDHOOD    ADOLESCENCE    ADULTHOOD

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Our Team

Dr. Robert Durkin
Pediatric Orthopedic Surgeon

Dr. William Burkhalter
Pediatric Orthopedic Surgeon

Dr. Jennifer King
Pediatric and Adolescent Sports Medicine

Pam Chan PA-C
Pediatric Orthopedics

Dr. Christopher Lynch
Pediatric and Adolescent Sports Medicine

Dr. Susan Britt
Pediatric Physical Medicine and Rehabilitation

Jason Ishikawa ATC
Clinic Supervisor

Sheri Shido ATC, RN
Athletic Trainer

Jessica Oshiro MSATC
Athletic Trainer

Matthew Jones MSATC
Athletic Trainer

Kelly Carroll MSATC
Athletic Trainer

Nohe Octubre
Medical Assistant Extrodinaire

Michelle Ferrer
Medical Assistant Surgical Coordinator

Jennifer Mohika
Referral and Scheduling Coordinator

Kelly Meyer PT, DPT
Kimberly Aina PT, DPT
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Thank you

jennifer.king@kapiolani.org
945-3766
Resources

- Hawai‘i Concussion Awareness and Management Program: http://www.hawaiiconcussion.com/
- UPMC Rethink Concussions: http://rethinkconcussions.com/
- CDC Foundation Online Training for Clinicians: http://preventingconcussions.org/
- Centers for Disease Control and Prevention: Online Coaches Training: http://www.cdc.gov/concussion/HeadsUp/online_training.html
- Dr. Mike Evans Concussions 101 Video: http://www.myfavouritemedicine.com/concussions-101/
- Frequently Asked Questions about 504 Plans: http://www2.ed.gov/about/offices/list/ocr/504faq.html