



# OMT for the Patient with Concussion

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Motion is Medicine Sports Medicine – Founder & Medical Director



**MOTION IS  
MEDICINE**  
SPORTS MEDICINE



*"I like chocolate cake." --- QB Troy Aikman,  
when asked if the Dallas Cowboys released  
him because of the effects of his ten  
concussions.*

# Objectives

1. Review the most recent concussion symptom sub-domains and how this applies toward a treatment approach.
2. Understand the evolving research supporting OMT in the treatment/management of concussion injury.
3. Discuss a pediatric and adult case of concussive head injury and how OMT may apply to their treatment plan.
4. Identify structural dysfunction that could manifest after a concussion.
5. Formulate an osteopathic treatment plan to address post-concussive symptoms and somatic dysfunction.



# What is a Sports Related Concussion (SRC)?

- ◆ A traumatic brain injury induced by biomechanical forces:
  - Results in a range of clinical si/sx that may or may not involve LOC. Resolution of the clinical and cognitive features typically follows a sequential course In some cases symptoms may be prolonged.
  - The clinical si/sx cannot be explained by drug, EtOH, or Rx use, other injuries (ie: c-spine, peripheral vestibular dysfunction, etc) or other co-morbidities (eg: psychological factors or coexisitng medical conditions)

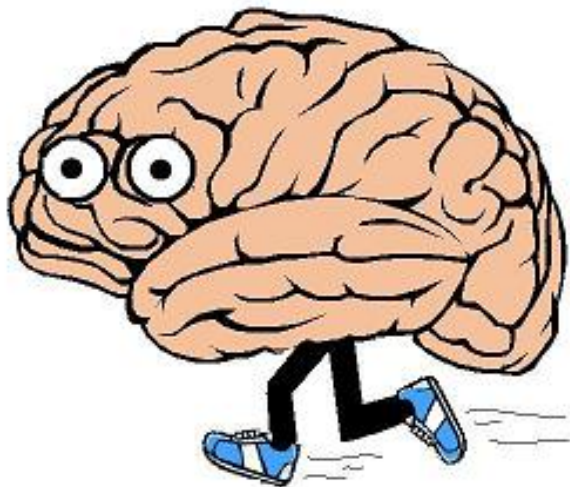


# What is PCS?

- ◆ World Health Organization definition of PCS
  - 3 or more of: HA; dizziness; fatigue; irritability; difficulty with concentrating and performing mental tasks; impairment of memory; insomnia; and reduced tolerance to stress, emotional excitement, or alcohol
- ◆ Diag. & Stat. Manual of Mental Disorders 4<sup>th</sup> Ed.
  - 3 months of 3 or more of above symptoms
- ◆ Recent definition
  - Presence of cognitive, physical and emotional symptoms that last “longer than expected” but at least 1-6weeks



“If you could see a brain limp then a coach would say, ‘get that brain off the field!’”



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"Have you tried walking with a limp?"

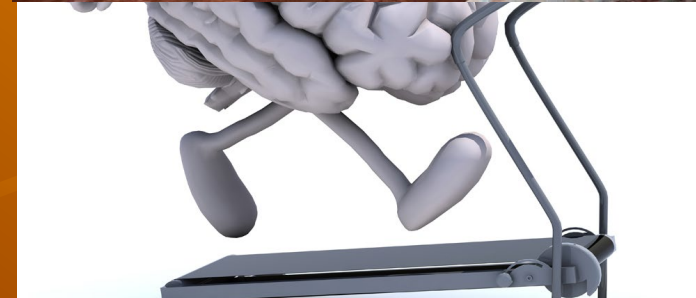


Round 1  
2:16

4GIFs.com

# How do we explain this to patients?

- ◆ “Brain sprain” analogy to explain mechanism
- ◆ “Roads under construction” metaphor to explain healing process
  - How modifiers can affect the road repair
- ◆ “Brain marathoner” to explain treatment plan
- ◆ OMT introduced as adjunct treatment that can expedite recovery





# Modifiers

- ◆ Age
- ◆ Headache/migraine Hx
- ◆ Gender
  - Female > male
- ◆ Learning disability
  - ADD/ADHD
- ◆ Mood disorders
  - Depression, anxiety, panic d/o, PTSD
- ◆ Motion disorders
  - BPPV, motion sickness
- ◆ Hx of/repetitive concussions



# Why are we Concerned?

- ◆ Traumatic brain injury is a common and potentially life-threatening injury
- ◆ Possible long-term sequelae and disability
- ◆ Important interventions prior to injury
- ◆ Return-to-play decisions are often left to the primary care provider



# “Real” Statements

- ◆ “The ED staff told me that I couldn’t play for 3 weeks because I had a concussion. Why 3 weeks?”
- ◆ The ED physician told my son he could return to the ice in 72 hours.”
- ◆ “My pediatrician asked me if my child had lost consciousness. I replied ‘No.’ He told me they didn’t have a concussion.”
- ◆ “The main concern or worry with TBI is loss of consciousness, right?”
- ◆ “My teacher must not believe that I have had a concussion because I am not getting any of the help that my doctors have recommended.”

# Post-Concussive Syndrome

- ◆ Wide variety of Sx:
  - Chronic headache (migraine variant)
  - Photo-/phonosensitivity
  - Chronic fatigue
  - Vestibular deficits
  - Mood issues
  - Sleep deficits
  - Cognitive deficits
  - Academic difficulties
- ◆ Those who sustain a concussion are 4-6 times more likely to sustain another
- ◆ Neuropsychological effects of repeated concussions are cumulative



# Symptoms of Concussion

Cognitive

Somatic

Affective

Sleep



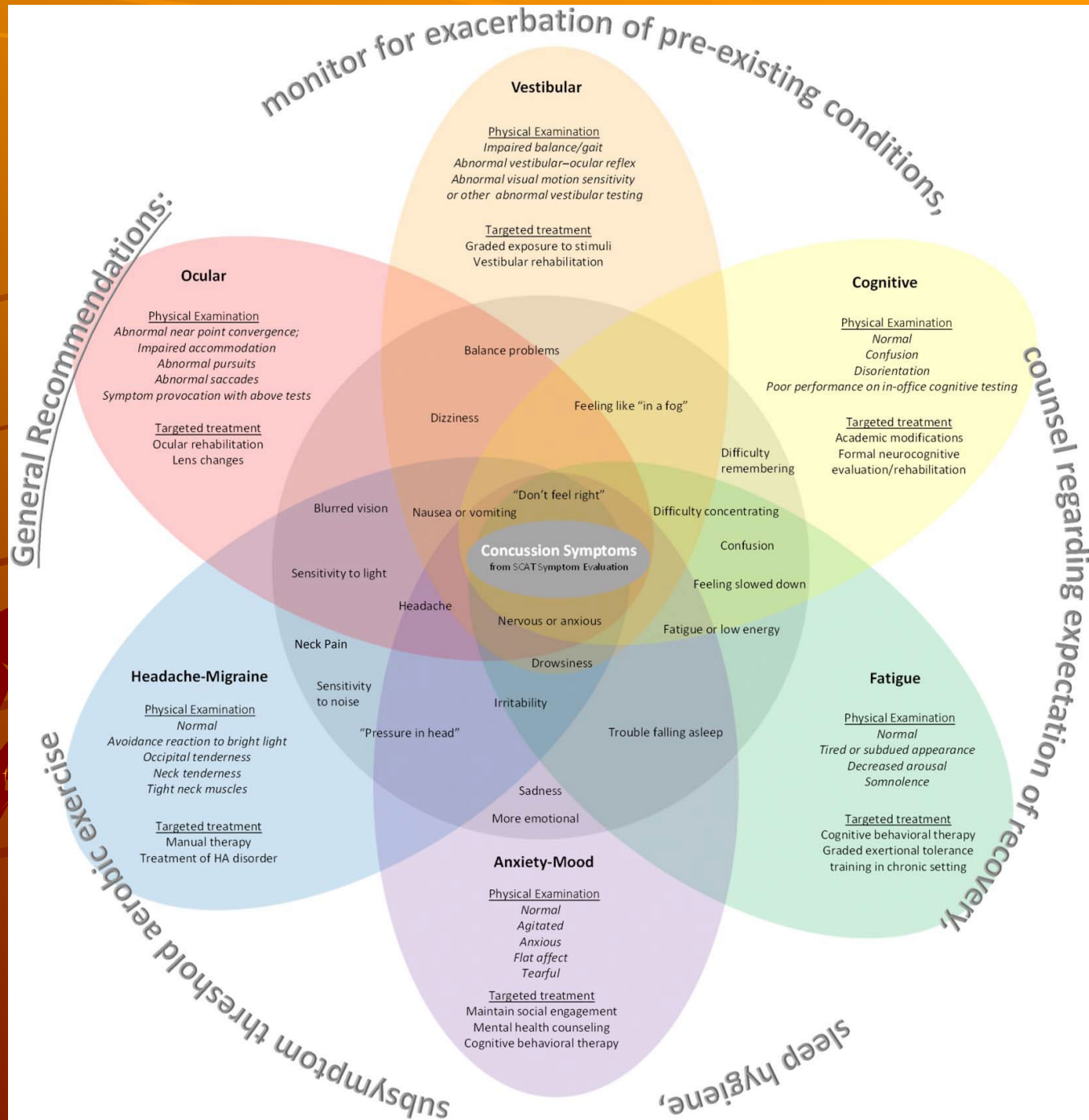
# Concussion Signs & Symptoms

Table 2: Selected acute & delayed signs & symptoms suggestive of concussion

<b>Cognitive</b>	<b>Somatic</b>	<b>Affective</b>	<b>Sleep Disturbances</b>
<p><b>Confusion</b></p> <p>Anterograde amnesia</p> <p>Retrograde amnesia</p> <p>Loss of consciousness</p> <p>Disorientation</p> <p>Feeling "in a fog", "zoned out"</p> <p>Vacant stare</p> <p>Inability to focus</p> <p>Delayed verbal &amp; motor responses</p> <p>Slurred/incoherent speech</p> <p>Excessive drowsiness</p>	<p><b>Headache</b></p> <p>Dizziness</p> <p>Balance disruption</p> <p>Nausea/vomiting</p> <p>Visual disturbances (photophobia, blurry/double vision)</p> <p>Phonophobia</p>	<p>Emotional lability</p> <p>Irritability</p> <p>Fatigue</p> <p>Anxiety</p> <p>Sadness</p>	<p>Trouble falling asleep</p> <p>Sleeping more than usual</p> <p>Sleeping less than usual</p>

Team Physician Consensus Conference,  
Herring et al, in press, 2011

# Concussion Spectrum



# Concussion Spectrum

Cognitive	HA/ Migraine	Vestibular	Ocular	Anxiety-Mood	Fatigue
<i>Feeling slowed down</i>	<i>Headache</i>	<i>Dizziness</i>	<i>Headache</i>	<i>Fatigue</i>	<i>Fatigue</i>
<i>Feeling like "in a fog"</i>	<b>Pressure in head</b>	<i>Feeling like "in a fog"</i>	<i>Dizziness</i>	<b>Sadness</b>	<i>Feeling slowed down</i>
<i>"Don't feel right"</i>	<b>Neck pain</b>	<i>"Don't feel right"</i>	<i>Blurry/ double vision</i>	<i>"Don't feel right"</i>	<i>"Don't feel right"</i>
<i>Difficulty concentrating</i>	<i>Nausea/ Vomiting</i>	<i>Nausea/ Vomiting</i>		<b>More emotional</b>	<i>Difficulty concentrating</i>
<b>Difficulty remembering</b>	<i>Blurry/ double vision</i>	<b>Balance problems</b>		<i>Drowsiness</i>	<i>Drowsiness</i>
<i>Confusion</i>	<i>Sensitivity to light</i>		<i>Sensitivity to light</i>	<b>Emotional lability</b>	<i>Confusion</i>
	<b>Sensitivity to noise</b>			<i>Nervous or Anxious</i>	<i>Nervous or Anxious</i>
				<i>Trouble falling asleep</i>	<i>Trouble falling asleep</i>
				<b>Irritable</b>	<b>Hyposomnia</b>
					<b>Hypersomnia</b>

*Italicized symptoms are found in more than one domain*  
**Bold symptoms are found only in single domain**



# The Osteopathic Sports Medicine Physician

The body is a unit; the person is a unit of body, mind, and spirit

The body is capable of self-regulation, self-healing, and health maintenance

## 4 Principles of Osteopathy

Structure and function are reciprocally interrelated

Rational treatment is based upon an understanding of the basic principles of body unity, self-regulation, and the interrelationship of structure and function



# Typical Office Evaluation

- ◆ Detailed history
- ◆ Symptom assessment
- ◆ Neurological examination
- ◆ Vestibular screening
- ◆ Cognitive testing
- ◆ Same day patient feedback:
  - Severity of injury
  - Prognosis for recovery
  - Indication for neuroimaging?
  - Level of physical exertion allowed?
  - Level of cognitive exertion allowed?
  - Academic Accommodations?
  - Return to play?
- ◆ Communication to ATC, referring physician, etc.



# SCAT-5

- ◆ The Sport Concussion Assessment Tool Version 5 (SCAT-5) can be used for both baseline and post-injury assessment
- ◆ Primarily a distillation of the best pieces of the previous concussion scales and systems into a standardized tool
- ◆ Provides diagnostic & return to play recommendations
- ◆ One part of concussion management, not the only part!

**SCAT5** SPORT CONCUSSION ASSESSMENT TOOL – 5TH EDITION  
DEVELOPED BY THE CONCUSSION IN SPORT GROUP  
FOR USE BY MEDICAL PROFESSIONALS ONLY

supported by

**Patient details**

Name: \_\_\_\_\_

DOB: \_\_\_\_\_

Address: \_\_\_\_\_

ID number: \_\_\_\_\_

Examiner: \_\_\_\_\_

Date of Injury: \_\_\_\_\_ Time: \_\_\_\_\_

**WHAT IS THE SCAT5?**

The SCAT5 is a standardized tool for evaluating concussions designed for use by physicians and licensed healthcare professionals<sup>1</sup>. The SCAT5 cannot be performed correctly in less than 10 minutes.

If you are not a physician or licensed healthcare professional, please use the Concussion Recognition Tool 5 (CRT5). The SCAT5 is to be used for evaluating athletes aged 13 years and older. For children aged 12 years or younger, please use the Child SCAT5.

Preseason SCAT5 baseline testing can be useful for interpreting post-injury test scores, but is not required for that purpose. Detailed instructions for use of the SCAT5 are provided on page 7. Please read through these instructions carefully before testing the athlete. Brief verbal instructions for each test are given in italics. The only equipment required for the tester is a watch or timer.

**This tool may be freely copied in its current form for distribution to individuals, teams, groups and organizations. It should not be altered in any way, re-branded or sold for commercial gain. Any revision, translation or reproduction in a digital form requires specific approval by the Concussion in Sport Group.**

**Recognise and Remove**

A head impact by either a direct blow or indirect transmission of force can be associated with a serious and potentially fatal brain injury. If there are significant concerns, including any of the red flags listed in Box 1, then activation of emergency procedures and urgent transport to the nearest hospital should be arranged.

**Key points**

- Any athlete with suspected concussion should be REMOVED FROM PLAY, medically assessed and monitored for deterioration. No athlete diagnosed with concussion should be returned to play on the day of injury.
- If an athlete is suspected of having a concussion and medical personnel are not immediately available, the athlete should be referred to a medical facility for urgent assessment.
- Athletes with suspected concussion should not drink alcohol, use recreational drugs and should not drive a motor vehicle until cleared to do so by a medical professional.
- Concussion signs and symptoms evolve over time and it is important to consider repeat evaluation in the assessment of concussion.
- The diagnosis of a concussion is a clinical judgment, made by a medical professional. The SCAT5 should NOT be used by itself to make, or exclude, the diagnosis of concussion. An athlete may have a concussion even if their SCAT5 is "normal".

**Remember:**

- The basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the athlete (other than that required for airway management) unless trained to do so.
- Assessment for a spinal cord injury is a critical part of the initial on-field assessment.
- Do not remove a helmet or any other equipment unless trained to do so safely.



# Physical Exam

## ◆ General

## ◆ Eyes

## ◆ Neck

## ◆ Neuro

## ◆ CNS

- CN II-XII
- DTRs

## ◆ Cerebellar deficits

- Dysmetria (fingertip to nose testing)
- Dysdiadokinesia

## ◆ Gait & Balance

- Romberg/ Modified Romberg
- Heel to toe walking
  - ◆ Eyes open fwd & bkwd, then eyes closed fwd & bkwd)
- BESS, modified BESS

## ◆ Oculo-motor

- Smooth pursuits (H-test)
- Saccades (vertical and horizontal)

## ◆ Vestibulo-Ocular

- Gaze stability (vertical and horizontal)
  - ◆ Head still, move eyes left/right then up/down between two fingers examiner holds up
  - ◆ Check for nystagmus, provocative dizziness/blurriness?
- Reverse gaze
  - ◆ Eyes still, move head up/down and left/right while focusing on single point
- Convergence insufficiency
  - ◆ Normal is double vision within 6cm from nose
- Divergence insufficiency
- Ocular alignment
  - ◆ Cover-uncover (presence of exophoria, esophoria, hyperphoria, hypophoria?)
- Pupil reaction
- Accommodation
- Dix-Hallpike maneuver
- King-Devick test - printed test

# Physical Exam



Figure 1. Smooth pursuit testing.



Figure 2. Saccade testing.



Figure 3. Convergence testing.

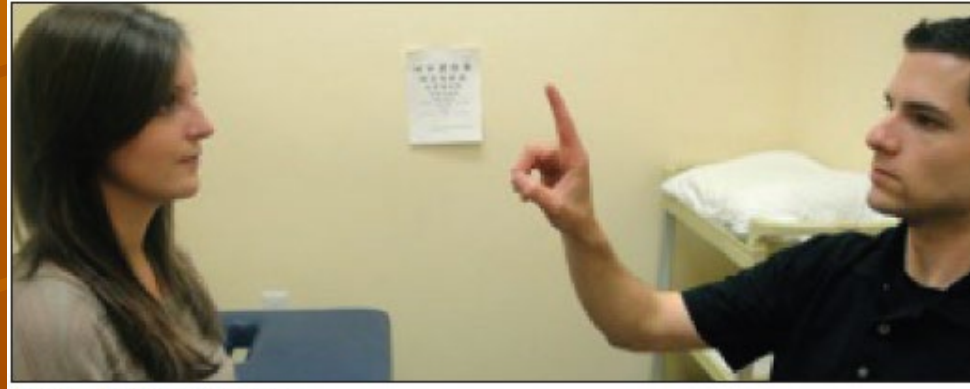
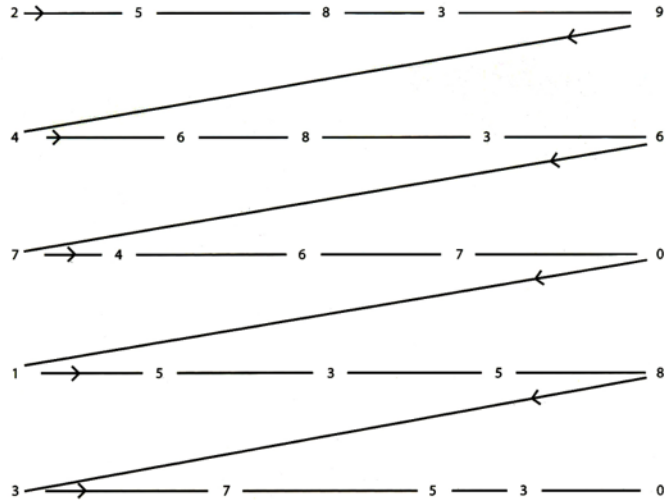
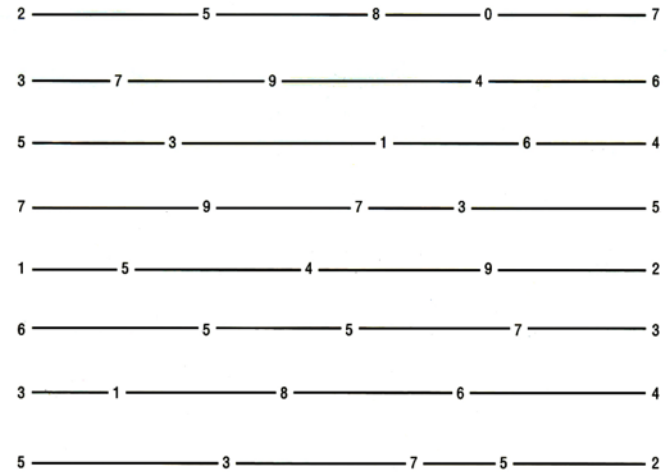


Figure 4. Divergence testing.

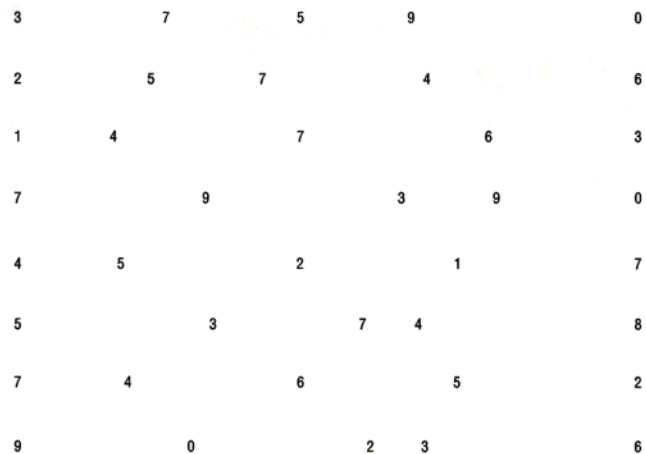
# King-Devick Test



DEMONSTRATION CARD



TEST I



TEST II



TEST III

# Neuropsychologic Testing

- ◆ Computerized programs
  - Easily accessed
  - Can be done quickly with immediate results
  - Can obtain “baseline” data on all athletes
  - Evaluate multiple aspects of cognitive functioning in brief time period
  - Measures multiple cognitive processes:
    - ◆ Verbal & Visual Memory
    - ◆ Cognitive Speed
    - ◆ Interaction of Memory & Speed
    - ◆ Self-Report of Symptoms



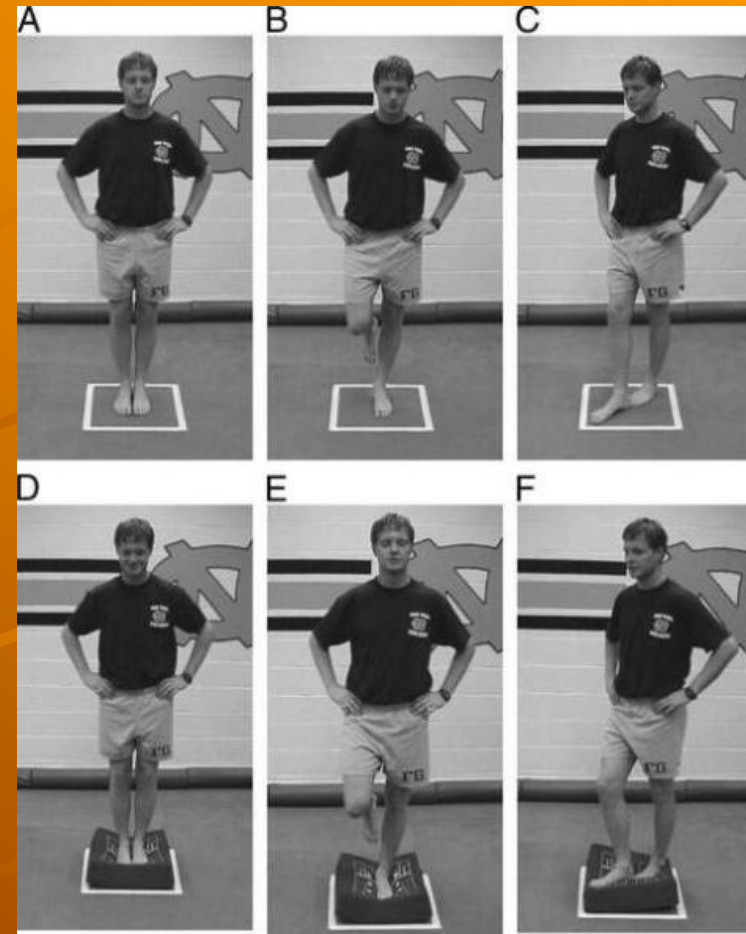
Concussion  
Vital Signs™





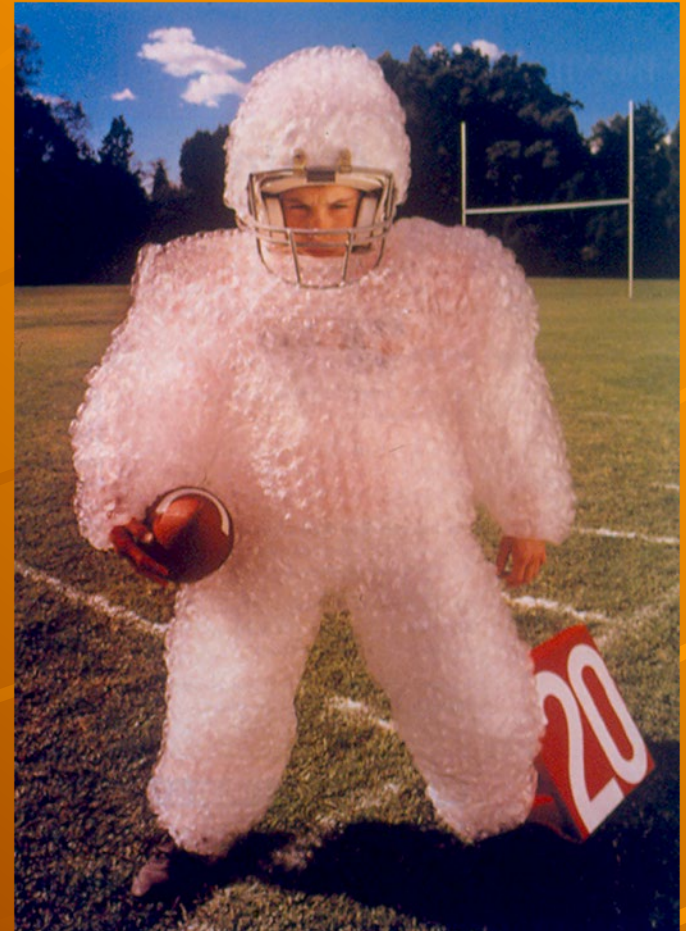
# Vestibular Screening

- ◆ On-field dizziness best-predictor of protracted recovery (>10 days) and PCS
- ◆ Etiology of dizziness:
  - Migraine variant
  - Central vestibular dysfunction
  - Peripheral vestibular dysfunction
  - Cervicogenic
  - Psychiatric
- ◆ Physical Exam
  - Ocular-Motor
  - Vestibular-Ocular
  - Balance Examination
  - Dix-Hallpike

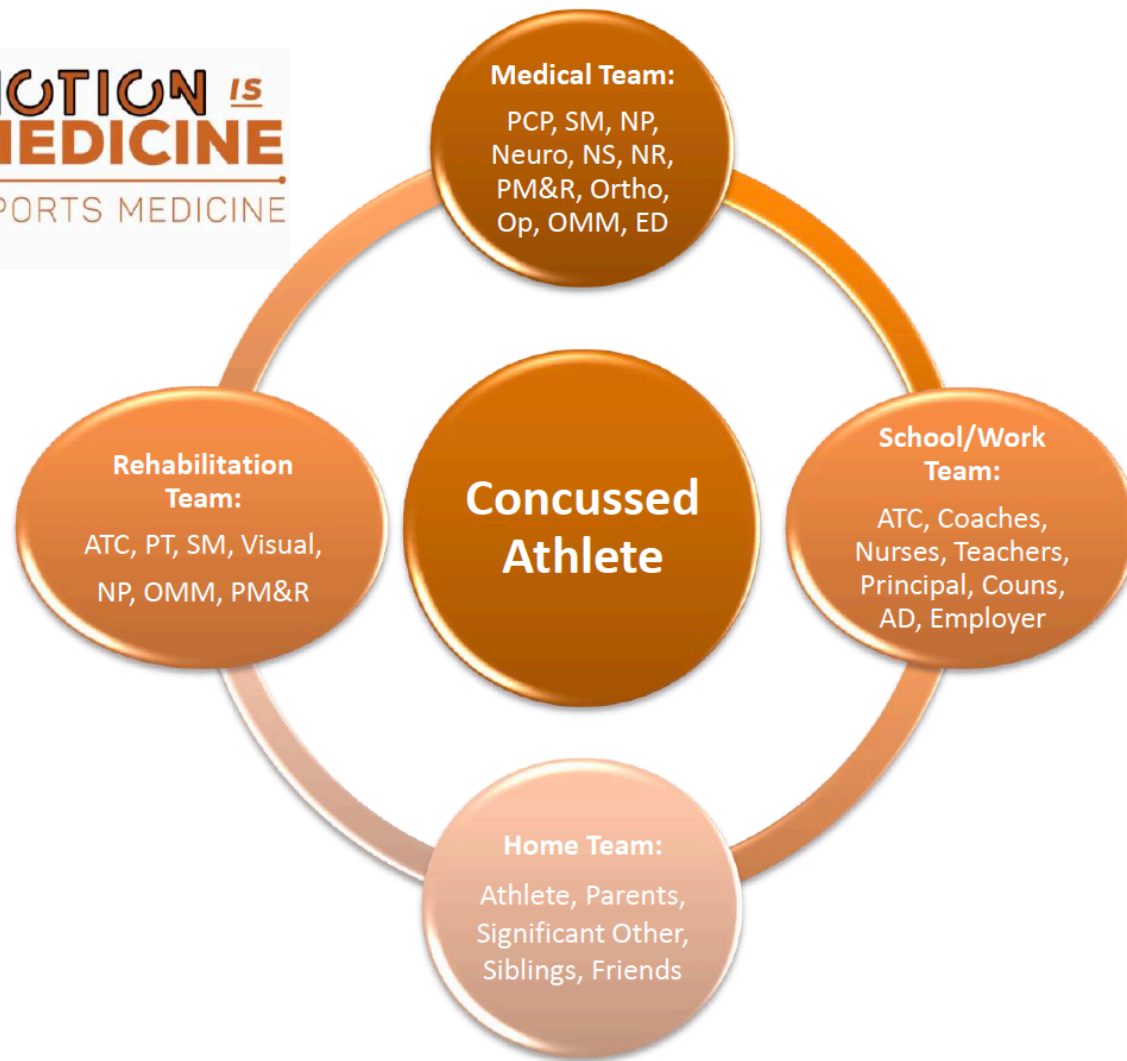


# Management

- ◆ Avoidance of activities and situations that may slow recovery
  - Eg: athletics, texting, video games, etc.
- ◆ Allowing adequate time for full physical and cognitive recovery



# The Multi-Disciplinary Team Approach for the Concussed Athlete



ATC – Certified Athletic Trainer; AD – School Athletic Director; Couns – School Counselor; ED – Emergency Department; Neuro – Neurologist;  
NP – Neuropsychologist; NR – Neuroradiology; NS – Neurosurgeon; OMM – Osteopathic Manipulative Medicine; Op – Ophthalmologist/Optomestrist;  
Ortho – Orthopedic Surgeon; PCP – Primary Care Physician; PM&R – Physical Medicine & Rehabilitation; PT – Physical/Vestibular Therapist; SM – Sports Medicine

# My treatment approach

- ◆ Explanations
- ◆ Concussion packet
  - Explanation and immediate things to watch out for
  - Neck exercises
  - Oculomotor exercises
  - Subsymptom threshold explanation
  - Vitamin Regimen
  - Can's and cant's list
- ◆ Expected time to symptom recovery
- ◆ Expected time to RTP
  - Underpromise and overdeliver!!
- ◆ Academic/work accommodations

# Concussion Take-Home Sheet



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## So you've had a CONCUSSION. Now what?

### What is a concussion?

A concussion is an injury to the brain caused by a direct or indirect blow to the head or caused by the head striking something else such as the ground. A concussion typically causes the rapid onset of short-lived impairment of brain function that resolves spontaneously with time. However, occasionally there can be a more significant problem, and it is important that the symptoms from every concussion be monitored by your athletic trainers and team physicians. Concussions usually do not cause structural damage to the brain (eg: a CT scan of the brain will be normal after a concussion). A concussion can occur whether or not a person is "knocked out." When you suffer a concussion, you may have problems with concentration and memory, notice an inability to focus, feel fatigued, have a headache, or feel nauseated. Bright lights and loud noises may bother you. You may feel irritable, be more emotional, or have other symptoms. It may be difficult to study, attend class, use the computer, or to write text messages.

### What should I watch out for?

After evaluation by your athletic trainer and/or team physician it may be determined that you are safe to go home. If your symptoms are severe or are worsening you may be sent to the Emergency Department for further evaluation. **If you are sent home, you should not be left alone. A responsible adult should accompany you.**

Symptoms from your concussion may persist when you are sent home but should not worsen, nor should new symptoms develop.

You should watch for symptoms including:

- Increasing headaches
  - Increasing nausea or vomiting
  - Increasing confusion
  - Garbled/slurred speech
- 
- Unusual sleepiness or difficulty being awakened
  - Trouble using your arms or legs
  - Convulsions or seizures

If you notice any of these problems or have any other problems that appears worse as compared to how you felt at the time you left the athletic trainer/team physician, immediately call 911 or have someone take you to the closest emergency department. Please also call your athletic trainer/ team physician if at all possible.

### Is it ok to go to sleep?

A concussion can make a player feel drowsy or tired. As long as you are not getting worse, as noted above, it is alright for you to sleep. The responsible adult who is accompanying you should wake you up every 2-3 hours to make sure you can be awoken and that your symptoms are not worsening.

### Do I need a CT scan or an MRI?

If the athletic trainer/team physician have determined that you are able to go home after the practice or game, these types of diagnostic tests are not necessary. If you are sent to the hospital with a concern for a more complicated injury (ie: skull fracture, bleeding inside the skull) a CT scan or MRI examination may be considered. If your symptoms linger for several days then these examinations may also be considered by your physician.

### May I take something for pain?

Do not take any medications unless your athletic trainer/team physician has told you to do so. Normally we do not advise anything stronger than Tylenol and ask you to avoid such things as aspirin, ibuprofen (Advil/Motrin), naproxen (Aleve), or any other anti-inflammatory medication. We also ask that you do not consume any alcohol and avoid caffeine and any other stimulants. If you are taking any supplements, we would suggest you discontinue the use of them as well. The team physician will determine when you can restart medications and supplements.

# My treatment approach

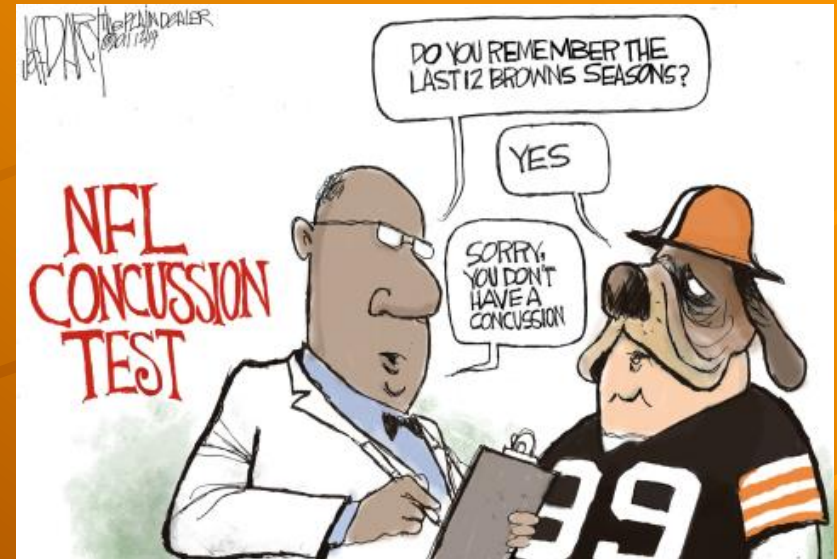
## ◆ Additional resources available

### – Therapy:

- ◆ Physical
- ◆ Vestibular
- ◆ Neurocognitive
- ◆ Visual
- ◆ Occupational
- ◆ Speech

## ◆ Anything else?!

- We'll get to that in a minute...



# Medical Treatment Approach

Physical

Pain or mood can alone cause each of the other three

Sleep

Sleep quite commonly causes mood and cognition issues

Mood

Cognitive

Each of the other factors can cause cognitive problems, much more than the other way around

# Pharmacologic Approach

Patient presents with 3 months of generalized fatigue, headaches with exertion, and cognitive complaints.

What are you going to treat first?

**pain only:** gabapentin/topiramate

**pain plus others:** nortriptyline

**sleep only:** trazodone, zolpidem

**sleep plus others:** nortriptyline

**mood only:** SSRI

**mood plus others:** nortriptyline

**cognitive only:** amantadine, donepezil





# Pharmacologic Approach cont'd

It is recommended that any medication started to control concussion symptoms be stopped prior to return to play



# Homeopathic Approach

## ◆ Cognitive:

- Fish oil/omega-3 FAs
- Zinc
- Gingko Biloba

## ◆ Headaches:

- Coenzyme Q10
- Riboflavin
- Magnesium oxide
- Butterbur

## ◆ Insomnia:

- Melatonin

## ◆ Depression/Anxiety

- St. John's Wort

## ◆ Other:

- Alpha Lipoic Acid
- N-Acetyl Cysteine
- Curcumin/Turmeric



# Management – Cognitive Rest

- ✦ May include:
  - temporary leave from school
  - shortening of the school day
  - reduction of workload
  - allowance of more time to complete work
  - Individualized Education Program (IEP)
- ✦ Avoid taking quizzes, tests, and/or standardized exams
- ✦ Adequate time to make up assignments
- ✦ Avoid computer games, video games, television, TEXTING, and possibly driving
- ✦ Avoid headphones
- ✦ May need sunglasses & earplugs



# What's Right & Wrong with this Picture?

scription.

PEDIATRIC NEUROLOGY

DEA # \_\_\_\_\_

NAME \_\_\_\_\_ AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_ DATE 10/12/09

TAMPER-RESISTANT FEATURES INCLUDE: SAFETY-BLUE ERASE-RESISTANT BACKGROUND, "ILLEGAL" PANTOGRAPH, QUANTITY CHECK-OFF BOXES AND REFILL INDICATOR

R

C M suffered  
as a concussion and  
developed a post-

concussive syndrome -  
Please, provide accommodations  
until his recovery.

Refill NR 1 2 3 4 5

(Signature)

To prohibit generic substitution, the prescriber must handwrite  
"TO BE DISPENSED ONLY AS DIRECTED".



9GNE0321950

PEDIATRIC NEUROLOGY

DEA # \_\_\_\_\_

NAME \_\_\_\_\_ AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_ DATE 10/12/09

TAMPER-RESISTANT FEATURES INCLUDE: SAFETY-BLUE ERASE-RESISTANT BACKGROUND, "ILLEGAL" PANTOGRAPH, QUANTITY CHECK-OFF BOXES AND REFILL INDICATOR

R

C M can  
return to playing football  
in a week from  
now.

in a week from  
now.

Refill NR 1 2 3 4 5

(Signature)

To prohibit generic substitution, the prescriber must handwrite  
"TO BE DISPENSED ONLY AS DIRECTED".



9GNE0321950

# Concussion Care Protocols



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Date:

To whom it may concern,

\_\_\_\_\_ was seen by me for a concussion sustained on \_\_\_\_ / \_\_\_\_ / \_\_\_\_\_. They were advised to abstain from any physical and/or cognitive activity until seen and evaluated by a physician trained to care for concussive injuries.

Please feel free to contact me with any further questions.

Regards,

*Daniel Clearfield, DO, MS*

Daniel A. Clearfield, DO, MS, FAOASM  
Primary Care Sports Medicine & Concussion Management

## CONCUSSION RETURN TO PLAY PROTOCOL

Rehabilitation Stage	Functional Exercise at Each Stage of Rehabilitation	Objective of Each Stage
1. Symptom-limited activity	Daily activities that do not provoke symptoms.	Gradual reintroduction of work/school activities
2. Light aerobic exercise	Walking or stationary cycling at slow to medium pace. No resistance training.	Increase heart rate
3. Sport-specific exercise	Running or skating drills. No head impact activities.	Add movement
4. Non-contact training drills	Harder training drills, eg: passing drills. May start progressive resistance training.	Exercise, coordination, and increased thinking
5. Full contact practice	Following medical clearance, participate in normal training activities.	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play.	

The athlete must be symptom free before beginning each stage.

Each stage must have at least a 24 hour interval in between.

If signs/symptoms of concussion return at any stage then return to previous asymptomatic stage.

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## POST-CONCUSSION CARE PROTOCOLS

Student/Athlete:

The above student/athlete has sustained a concussion. A concussion is a brain injury which should be taken seriously and be followed by a physician. In the initial period of recovery following a concussion, it is critical for the student/athlete to have both physical as well as cognitive rest to allow the brain sufficient time to rest and heal.

### Academic Relief after Concussion

Most young people will recover completely from a concussion within a couple of weeks. Typically, athletes can return to school after resting for a few days or less. If problems continue once the athlete returns to school, they should not be required to take quizzes or exams during the initial 1-2 week recovery period. If needed, classroom and homework assignments should be decreased to ensure the student can adequately manage the workload without becoming overly stressed. Scholastic work may worsen symptoms of a concussion as well as prolong recovery, so cognitive rest is important.

### Please allow for the following academic accommodations:

- \_\_\_\_\_ Return to school without academic restrictions
- \_\_\_\_\_ No return to school. Return on (date) \_\_\_\_ / \_\_\_\_ / \_\_\_\_
- \_\_\_\_\_ Return to school with the following supports. Review on (date) \_\_\_\_ / \_\_\_\_ / \_\_\_\_
  - \_\_\_\_\_ ½ day school for \_\_\_\_ days or until (date) \_\_\_\_ / \_\_\_\_ / \_\_\_\_
  - \_\_\_\_\_ Shortened classes (ie: rest breaks during classes). Maximum class length: \_\_\_\_ minutes
  - \_\_\_\_\_ Allow extra time to complete coursework/assignments and tests
  - \_\_\_\_\_ Lessen homework load by \_\_\_\_%. Maximum length of nightly homework: \_\_\_\_ minutes
  - \_\_\_\_\_ No significant classroom tests, quizzes, or standardized testing at this time
  - \_\_\_\_\_ Allow testing in a separate, distraction-free environment
  - \_\_\_\_\_ Limit the use of electronic screens or adjust screen settings, including font size, as needed
  - \_\_\_\_\_ Preprinted class notes by either the teacher or copy those of a fellow student
  - \_\_\_\_\_ Allow to participate in class only by listening with no active note taking
  - \_\_\_\_\_ Check for the return of symptoms when doing activities that require a lot of attention or concentration
  - \_\_\_\_\_ Take rest breaks during the day as needed
  - \_\_\_\_\_ Allow student to leave class early to avoid crowded hallways
  - \_\_\_\_\_ Avoid busy, crowded, or noisy environments (eg: music room, hallways, lunchroom, etc.)
  - \_\_\_\_\_ Allow to go to the nurse's office if headaches increase
  - \_\_\_\_\_ Allow to go home if headaches don't subside after resting for 15 minutes
  - \_\_\_\_\_ Allow to wear \_\_\_\_ sunglasses and/or \_\_\_\_ earplugs in class to avoid symptom provocation
  - \_\_\_\_\_ Modify due dates or requirements for major projects: \_\_\_\_\_
  - \_\_\_\_\_ Other: \_\_\_\_\_
- \_\_\_\_\_ Request meeting of Section 504 Plan or School Management Team to discuss this plan and needed supports.

### Return to Play Protocol after Concussion:

The student/athlete has the following activity restrictions: no Physical Education, no sports, no running or jumping, no weight lifting, no aggressive play, no recess.

Athletes should be free of all concussion-related symptoms or problems (e.g., headache) before returning to sports. Once the athlete is entirely free of symptoms and a doctor says it is medically safe, returning to play should occur in a gradual, step-wise fashion.

Signed: *Daniel Clearfield, DO, MS*

[ ] Daniel A. Clearfield, DO, MS, FAOASM

[ ] Other: \_\_\_\_\_

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# Management – Physical Rest

- ◆ Athletes should be withheld from physical exertion until they are asymptomatic at rest
  - Usually 1st couple of days
- ◆ Withhold from organized sporting events
  - School, club, etc.
- ◆ Start into a sub-symptom threshold program of exercise
  - Ideally supervised by ATC, parents



# Management – Rehab

- ◆ Sub-symptom threshold exercise can be beneficial for recovery and help the athlete psychologically as well
- ◆ Gradual, closely-supervised active rehabilitation program for children and adolescents is appropriate
- ◆ Return to light activity improved patients mood, anxiety, fatigue level, cognitive ability and postural stability



# RTP Criteria

◆ According to Vienna Conference and Concussion in Sport (CIS) guidelines, the athlete has to meet three criteria for return to play:

1. Symptom free at rest
2. Symptom free with exertion
3. Normal neurocognitive testing





# Management – Graded RTP

## Concussion Rehabilitation – Stepwise Return to Play

### CONCUSSION RETURN TO PLAY PROTOCOL

Rehabilitation Stage	Functional Exercise at Each Stage of Rehabilitation	Objective of Each Stage
1. Symptom-limited activity	Daily activities that do not provoke symptoms.	Gradual reintroduction of work/school activities
2. Light aerobic exercise	Walking or stationary cycling at slow to medium pace. No resistance training.	Increase heart rate
3. Sport-specific exercise	Running or skating drills. No head impact activities.	Add movement
4. Non-contact training drills	Harder training drills, eg: passing drills. May start progressive resistance training.	Exercise, coordination, and increased thinking
5. Full contact practice	Following medical clearance, participate in normal training activities.	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play.	

The athlete must be symptom free before beginning each stage.

Each stage must have at least a 24 hour interval in between.

If signs/symptoms of concussion return at any stage then return to previous asymptomatic stage.

# Vestibular Rehabilitation



	Normal vision	Eyes closed	Sway referenced vision
Fixed surface	<p>1</p>	<p>2</p>	<p>3</p>
Sway referenced surface	<p>4</p>	<p>5</p>	<p>6</p>

# Other Considerations: Somatic Dysfunction

## ◆ Cranial s/d

- OA, OM, OCS, CRI

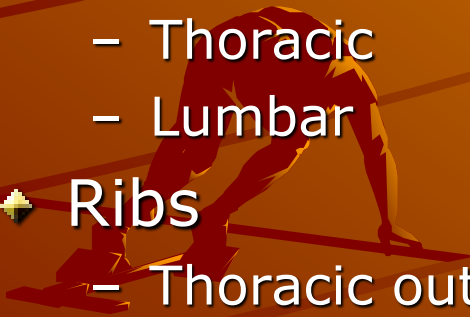
## ◆ Spine

- Cervical, Thoracic, Lumbar
- Thoracic
- Lumbar

## ◆ Ribs

- Thoracic outlet, 1<sup>st</sup> rib,  
Thoracoabdominal diaphragm

## ◆ Sacrum/pelvis



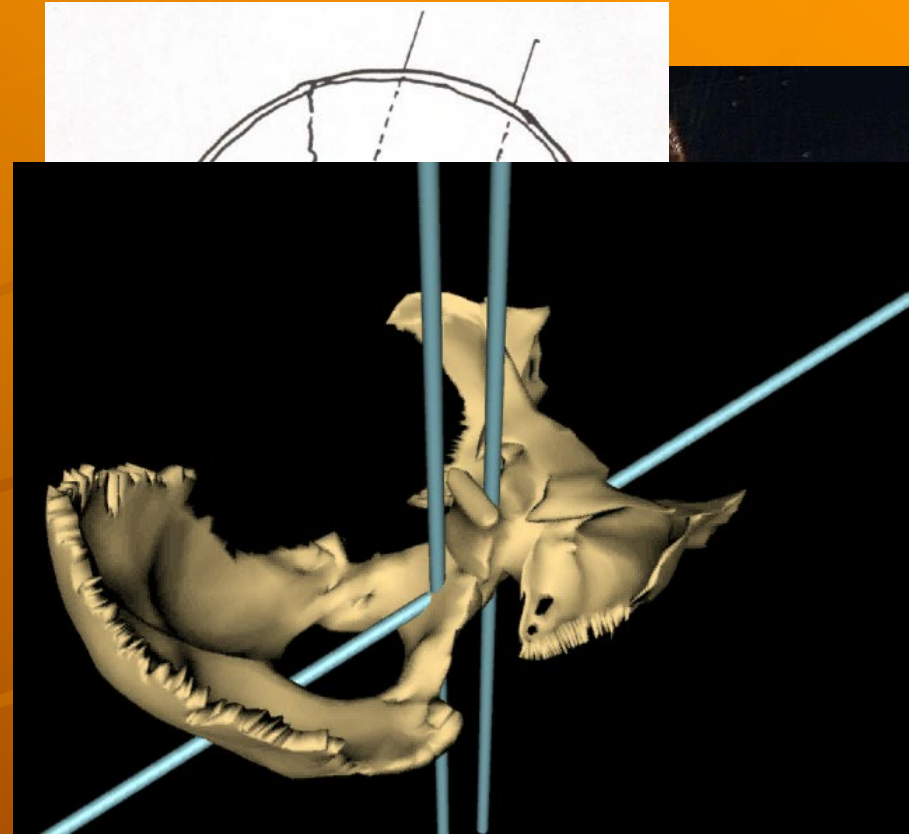
# Osteopathic Approach

- ◆ Head/cranial – OCS, OM suture,  
– Predicted strain patterns from MOI
- ◆ Neck
- ◆ UE
- ◆ R
- ◆ Thoracic
- ◆ Sacrum



# Other Considerations: Cranial Dysfunction

- ◆ Many post-concussion patients have cranial strain patterns
- ◆ Correcting these are critical to the recovery of these patients
- ◆ Treated by DO trained in cranial osteopathy



# Case 1



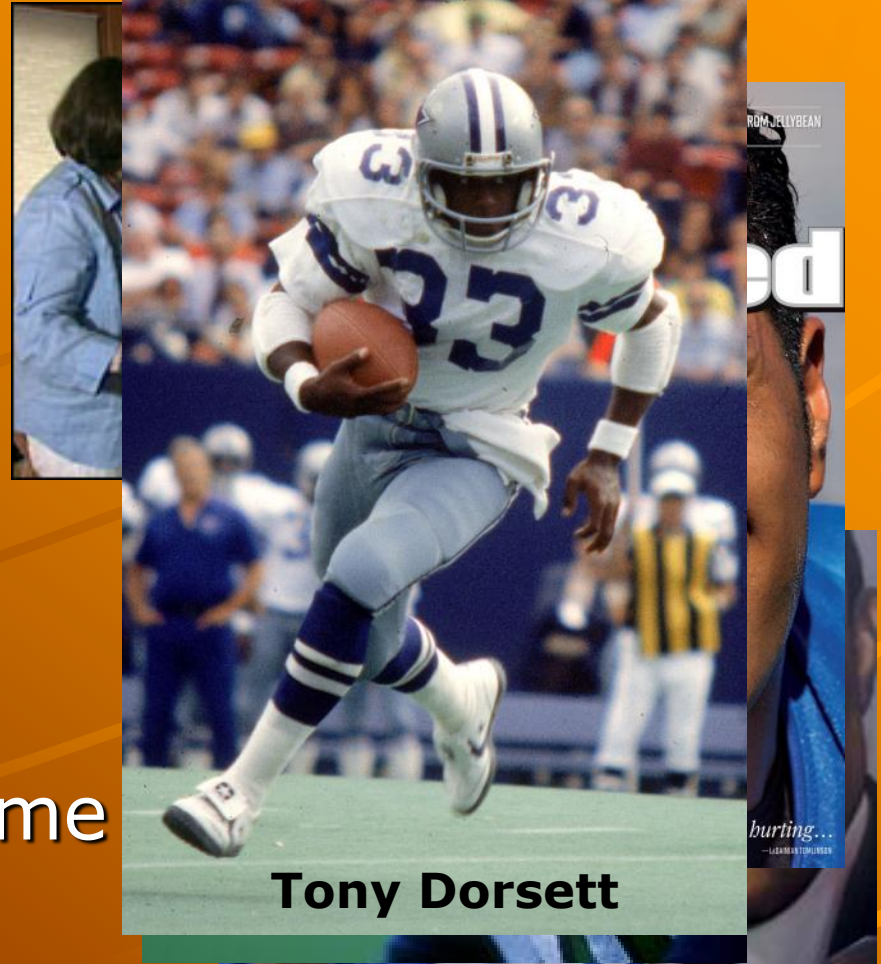
# Case 2

◆ <https://www.youtube.com/watch?v=hiPhb8RocAs>



# Potential Long-Term Sequelae

- ◆ Depression
- ◆ Anxiety
- ◆ Insomnia
- ◆ Suicidality
- ◆ Migraines
- ◆ Cognitive deficits
- ◆ Dementia
- ◆ Second impact syndrome
- ◆ Chronic traumatic encephalopathy

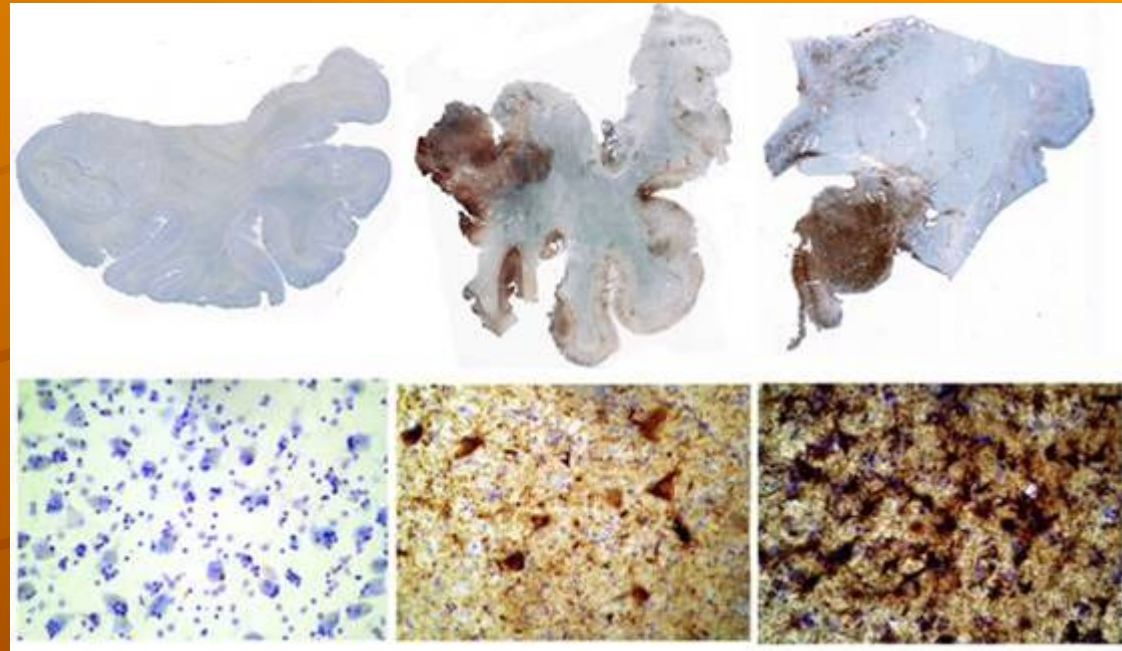


**Andre Waters**  
**Suicide 11/20/2006**



# Chronic Traumatic Encephalopathy (CTE)

- ◆ Progressive degenerative disease of the brain found in athletes (and others) with a history of repetitive brain trauma
  - Tau protein



**Normal Brain**

**45yo former  
NFL player**

**73yo boxer**

# Prevention

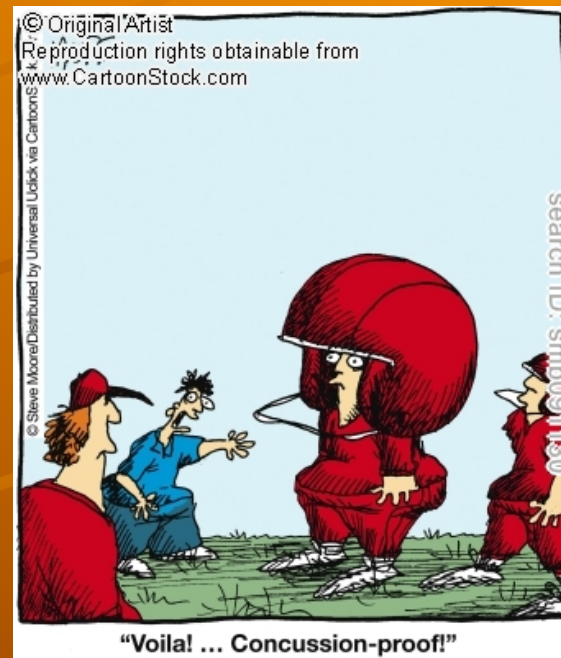
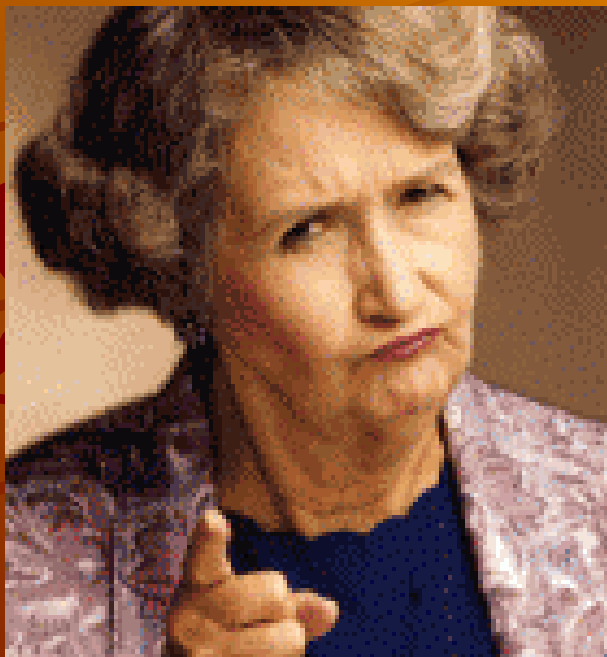
- ◆ “Concussion prevention” has become the “holy grail” for sports equipment marketers
  - Soccer head gear
  - Girl’s Lacrosse head gear/helmets
  - Pole vaulting helmet
- ◆ New football helmets, soccer head pads, mouth guards-  
**NO PROVEN PROTECTION FROM CONCUSSION!!**
- ◆ Multiple flaws in a study looking at “Riddell Revolution” helmet

◆ Neurosurgery, 2006



# Prevention

***"The best way to treat an injury is to avoid it in the first place!" --- Mom***



# The Bottom Line

- ◆ Any athlete suspected of having a concussion needs to see a HCP trained extensively to deal with brain injury and not just trained to administer a test.
- ◆ Those professionals should examine athletes' symptoms, balance and medical history along with cognitive function and should have the final say in return-to-play decisions in the interests of athletes' long-term health.
- ◆ The confluence of symptom assessment, balance assessment, physical assessment, neurocognitive assessment and clinical interview is the 'best practice' approach.

# Final Points

- ◆ Concussions are becoming more generally reported and better managed with increased awareness and national and state legislation as well as education
- ◆ There is an international consensus on the definition and standardized sideline evaluation of sport-related concussion
- ◆ Osteopathic approach involves treating the whole athlete; considering: home, school, work, social, sports; and evaluating and treating somatic dysfunction
- ◆ Appropriate management for sport-related concussion involves a customization of the presented guidelines for each patient
- ◆ *"When in doubt, sit 'em out"*



# My empathy – 9 Concussions!

- ◆ 1 baseball in Jr. High
- ◆ 3 wrestling in High School
- ◆ 1 fall out of truck doing *drive-by egging* in High School
  - Nailed my target though!
- ◆ 1 nunchuk to the head in college
- ◆ 1 stethoscope to the head in college
- ◆ 1 MVC in med school
- ◆ 1 basement beam in residency



*"There are many things you can point to as proof that the human is not smart. But my personal favorite would have to be that we needed to invent the helmet. What was happening, apparently, was that we were involved in a lot of activities that were cracking our heads. We chose not to avoid doing those activities but, instead, to come up with some sort of device to help us enjoy our head-cracking lifestyles."*



--- Jerry Seinfeld



4 years old

13 years old



7 years old





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# References

- ◆ Ayr, Lauren K. Dimensions of Postconcussive Symptoms in Children with Mild Traumatic Brain Injuries. *Journal Int Neuropsychol Soc*; 15(1); 19-30. January 2009.
- ◆ Franks, Rob, et al. Current Concepts in the Office-Based Treatment of the Concussed Athlete. *Osteopathic Family Physician*; 2018; 10(5): 32-43.
- ◆ Gagnon, Isabelle., et al. Active rehabilitation for children who are slow to recover following sport-related concussion. *Brain Injury*; 23(12); 956-964' November 2009.
- ◆ Guernsy, David, et al. Resolution of Concussion Symptoms after Osteopathic Manipulative Treatment: A Case Report. *JAOA*; 116; 13-17. March 2016.
- ◆ Hajek, Christine A., et al. Relationships among post-concussive symptoms and symptoms of PTSD in children following mild traumatic brain injury. *Brain Injury*; 24(2); 100-109. February 2010.

# References

- ◆ Harmon, Kim, et al. American Medical Society for Sports Medicine Position Statement on Concussion in Sport. *Clinical Journal of Sports Medicine*; 2019;00:1-14.
- ◆ McCrory P, Meeuwisse W, Dvorak J, et al. Consensus Statement on Concussion in Sports – the 5<sup>th</sup> International Conference on Concussion in Sport. *British Journal of Sports Medicine*; October 2016; (11): 838-847.
- ◆ Patel KG, Sabini RC. Safety of Osteopathic Cranial Manipulative Medicine as an Adjunct to Conventional Post-concussive Symptom Management: A Pilot Study. *JAOA*; 2018;118(6): 403-409.
- ◆ Zwibel, Hallie, et al. Concussion Evaluation and Management: An Osteopathic Perspective. *JAOA*; 118; 655-661. October 2018.