

## Bridging the Gap in Concussion Treatment

July 30, 2014

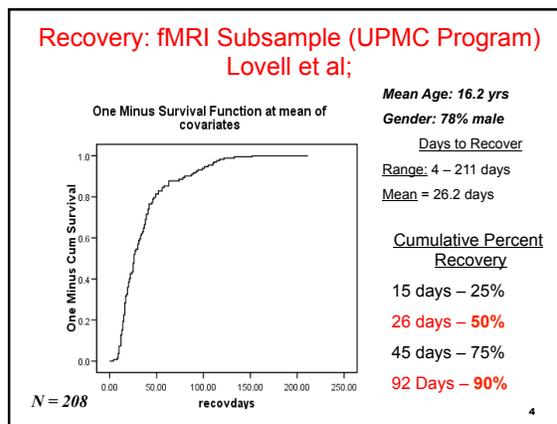
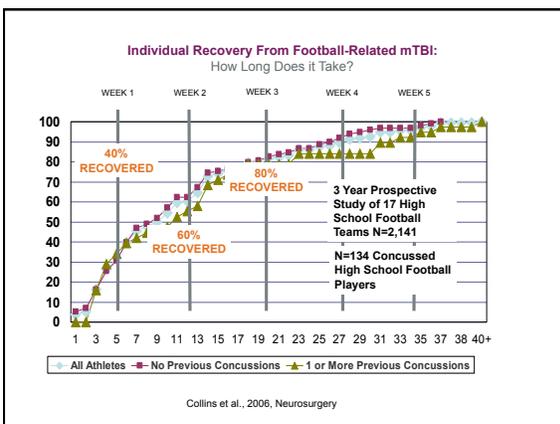
### POST CONCUSSION SYNDROME

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## How long does it take to recover from a concussion?



Non-pediatric organizations usually say less than one week.



## Definition of Post-Concussion Syndrome



**Concussion symptoms lasting more than 3 weeks**

This is the time when treatment is usually started

## Symptoms of PCS

- Foggy and slowed down
- Dizziness (spinning)
- Ocular problems
- Balance Problems
- Concentration
- Memory
- Sleep
- Psych symptoms
- Neck symptoms
- Headache



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- Previously discussed in detail the symptoms and physical findings of PCS in my previous talk.

## TOOLS USED TO ASSESS PCS

- Neurocognitive testing (ImPACT)
- MRI of head sometimes needed
- Full neuro-cognitive testing by a neuropsychologist

## Neurocognitive/psych testing

- **Zurich conference emphasized role of testing**

“In the absence of NP and other (e.g. formal balance assessment) testing, a more conservative return to play approach may be appropriate.”

“Although formal baseline NP screening may be beyond the resources of many sports or individuals, **it is recommended that in all organized high risk sports consideration be given to having this cognitive evaluation regardless of the age or level of performance**”

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## VALUE OF ImPACT CLINICALLY

Finds patients with extremely low scores (low single digits on all parameters) who are more likely to develop Post-Concussion Syndrome  
Shows when patients are not following activity restrictions because the scores decrease on serial testing

**Tells how long it takes to have cognitive fatigue and later can confirm memory loss in patients**

**Normal ImPACT + headache as main sx may indicate overdoing of activities as problem**

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## Predicting Who Will Develop PCS

- **Patients with Vestibular findings**
- **Multiple blows** at time of or around injury
- Extremely low scores on neuro-cog testing
- Previous Post-concussion Syndrome
- History of migraine headaches
- Motor Vehicle Accidents (especially females)
- Females – concussion occurring mid-cycle
- ? History of ADD
- ? Compulsive, type A excellent student

## SECOND BLOWS TO THE HEAD

- 37 athletes had a second blow to the head within 2 weeks of the first blow. No case of Second Impact Syndrome occurred.
- 25 Males and 13 developed PCS **(52%)**
- 12 Females and 8 developed PCS **(67%)**

Lee and Fine. CT Medicine 2010

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Which On-Field Markers/Symptoms Predict **3 or More Week** Recovery from MTBI In High School Football Players

| On-Field Marker       | N  | Chi <sup>2</sup> | P     | Odds Ratio | 95% Confidence Interval |
|-----------------------|----|------------------|-------|------------|-------------------------|
| Posttraumatic Amnesia | 92 | 1.29             | 0.257 | 1.721      | 0.67-4.42               |
| Retrograde Amnesia    | 97 | .120             | 0.729 | 1.179      | 0.46-3.00               |
| Confusion             | 98 | .114             | 0.736 | 1.164      | 0.48-2.82               |
| LOC                   | 95 | 2.73             | 0.100 | 0.284      | 0.06-1.37               |

| On-Field Symptom     | N  | Chi <sup>2</sup> | P     | Odds Ratio | 95% Confidence Interval |
|----------------------|----|------------------|-------|------------|-------------------------|
| Dizziness**          | 98 | 6.97             | 0.008 | 6.422      | 1.39-29.7               |
| Headache             | 98 | 0.64             | 0.43  | 2.422      | 0.26-22.4               |
| Sensitivity LT/Noise | 98 | 1.19             | 0.28  | 1.580      | 0.70-3.63               |
| Visual Problems      | 97 | 0.62             | 0.43  | 1.400      | 0.61-3.22               |
| Fatigue              | 97 | 0.04             | 0.85  | 1.080      | 0.48-2.47               |
| Balance Problems     | 98 | 0.28             | 0.59  | 0.800      | 0.35-1.83               |
| Personality Change   | 8  | 0.86             | 0.35  | 0.630      | .023-1.69               |
| Vomiting             | 97 | 0.68             | 0.41  | 0.600      | 0.18-2.04               |

The total sample was 107. Due to the normal difficulties with collecting on-field markers, there were varying degrees of missing data. The number of subjects who had each coded ranged from 92-98. The N column represents the number of subjects for whom data were available for each category. Markers of injury are not mutually exclusive. Lau, Kontos, Collins, AASM 2011

**ADHD Related to Longer Lasting Head Injury?**

**ADHD patients were compared with non-ADHD patients following a concussion.**

25% had moderate disability and 56% recovered after 6 months

VS

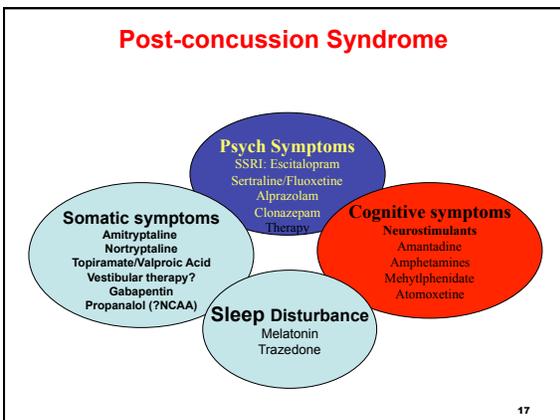
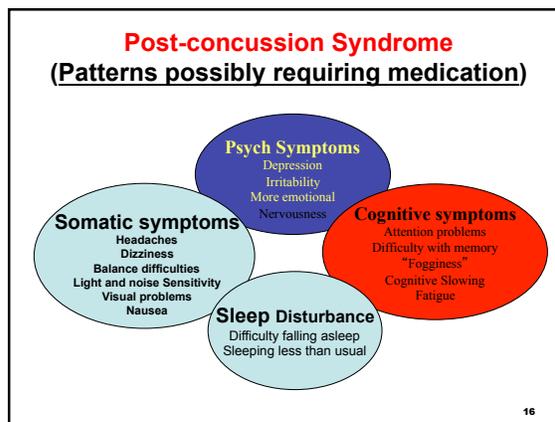
2% in normal group had moderate disability and 84% recovered after 7 weeks

**Moderate disability - defined as needing supervision for physical or behavioral problems or having residual problems with learning or functioning**

Stephanie Greene, M.D. Journal Neurosurgery:Pediatrics 6/25/13

Since most concussion symptoms usually will resolve by 3 weeks, no treatment is usually necessary prior to that time

**Every patient's treatment needs to be individualized**



**INITIAL TREATMENT - BRAIN REST "Cocon Therapy"**

Sleep a lot in dark room first day only or two days if multiple blows to head.

Minimize activities first 3-5 days

Wear sunglasses for photophobia, avoid noise

No reading, computer, video-games, I-pods,

No prolonged walking

No hot tubs

No socializing with friends or going to movies

No watching the team practice

**No Cell phones or text messaging**

## COGNITIVE FATIGUE

- On day two or three, to prevent cognitive fatigue, do activities in 15 minute intervals. Set a timer. Then take a 15 minute break.
- Initial 15 minute activities starting with:
  - Soft music
  - Books on tape
  - Television

**Parents can read school work to the student so they will not get too far behind in school.**

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## Headache Management

- **Keep the dull and achy headache from becoming pounding and throbbing.**
- Discontinue any activity that increases the headache. Identify triggers and reduce their exposure (light, noise, overdoing texting, computer or TV).
- Acetaminophen as needed (Ibuprofen after a few days)

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## SCHOOL



Students recover quickly during Christmas, Spring and Summer vacations

**Need to remember (remind parents) the first priority is to get kids back to school ASAP.**

**Sports is a secondary priority**

## Cognitive return-to-school program

When **headache free** they may start to read alternating that with the use of the computer. Start off with 2 pages or 20 minutes on the computer. Rest between each activity of 10-15 minutes. Keep doubling reading and computer time. If no symptoms after 1-2 hours they may attempt school the next day.

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**The return to school is a very critical time. If cognitive work is overdone, the concussion symptoms will return, sometimes almost as much as right after the injury.**

**SCHOOL MODIFICATIONS**  
(when they return to school)

## SCHOOL (initial return)

**Need to be driven to school initially**

(should not ride the school bus)

**Elevator passes if stairs**

(unless this makes them "dizzy")

**Avoid noisy halls and cafeteria initially**

**No gym class or exercising initially**

**(are not to be allowed in P.E. class)**

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## **Trial and error needed (balancing act)**

1 period, ½ day, full day

Go to nurse's office when HA increases

Audit classes initially

Frequent breaks with rest periods

Alternate class with rest period

Gradually increase hours

May need home schooling

**No extra-curricular activities or work**

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## SCHOOL (initial return)

No note taking (may need scribes)

Audio books helpful

Workload may need to be reduced 50-75%

Homework less than 1-2 hours a night

Frequent breaks while doing homework

Term papers postponed

**Pre-printed class notes helpful**

**(should be sent home while not in school)**

Tutoring to help catch up

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## SCHOOL (initial return) continued

It is **imperative that the student advocate for his/her needs**. If an increasing headache develops they should not stay in class but should go to the nurse's office. They can rest there (skip a period and try another class if the headache resolves). If it returns they need to go home.

## HEADACHE

- Most common symptom of concussion
- Can distract student from concentration
- Can vary throughout the day and may be triggered by various exposures, such as fluorescent lighting, loud noises, reading, focusing or tasks
- Math, Chemistry Foreign Language cause headaches to occur more than other subjects

## HEADACHE ADJUSTMENTS

- Identify triggers and reduce their exposure
- Frequent breaks
- Rests, planned or as needed in nurse's office or other quiet area
- Give student class notes
- Allow student to put head down

## NOISE SENSITIVITY

**TRIGGERS AT SCHOOL:** hallways  
lunch room  
music classes (band/choir)  
P.E. classes  
shop classes,  
organized sports practices

Should not listen to loud music (especially in cars or on I-pods)

Should avoid attending dances, parties, music concerts and sports events until symptoms are gone

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## NOISE ADJUSTMENTS

- **Allow use of ear plugs as needed**
- Leave class 5 minutes early to avoid hall
- Lunch in a quiet area with a classmate
- Limit/avoid music, shop and P.E class
- Avoid noisy gym and team/sports practice

## VISUAL PROBLEMS

LIGHT SENSITIVITY, BLURRY/DOUBLE VISION

**TRIGGERS AT SCHOOL:** Artificial lighting  
Smart boards  
Slide presentations  
Computers  
Handheld computer tablets  
Movies

**Sunglasses** may be necessary if photophobia is present (outdoors and sometimes indoors)

Avoidance of bright sunlight and exposure to flashing lights (strobe/computer games)

**No movie theaters** (loud noise and bright flashing lights)

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## VISUAL ADJUSTMENTS

- **Allow sunglasses** to be worn in school
- Reduce exposure to computers, smart boards and videos
- Reduce brightness on screens
- Turn off fluorescent lights as needed
- Consider use of audiotapes of books

## CONCENTRATION and MEMORY ISSUES

- Difficulty learning new tasks and comprehending new material
- Difficulty with recalling and applying previous learned material
- Difficulty with focusing and attention
- Problems with test taking, especially longer more standardized tests

## SCHOOL TESTS

(AFTER STUDENTS CATCH UP ON THEIR SCHOOLWORK!!!)

Quizzes, tests, PSAT/SAT tests, final exams may need to be delayed or postponed.

Initially, if test results are poor, they should be voided or retaken.

Extra time (**un-timed tests**) may be necessary when test taking is resumed. Tests may need to be taken over multiple sessions.

**No more than one test a day** when test taking resumed.

### **If concentration and memory problems:**

Oral exams may be necessary if students develop headaches taking written tests.

Consider having students do take home tests

Open book tests may be needed for some students (especially if memory issues are present)

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## EXERCISE

- May start to exercise lightly after 3 weeks even with mild headaches.
- No impact activities, limit head movement (elliptical or exercise bike initially)
- Start off very slowly (few minutes) and gradually increase. Can do multiple times a day.

**No spinning carnival rides and no boating in rough seas** until concussion is completely resolved.

(I recommend 3 months – possibly never with carnival rides if vestibular findings)

No chiropractic adjustments

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## ADHD AND CONCUSSIONS

### ADHD Prevalence is Up Among Older Children

Among youth aged 12-17 years ADHD increased by 4% annually from 1997-2006.

No increase in those aged 6-11 years.

Thought to be due to a greater awareness of clinicians in diagnosing this condition

Audrey Kubetin, Pediatric News, August 2008, Vol. 42 Issue 8

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## DILEMMA

Should an athlete who never had ADD symptoms prior to a concussion be allowed to continue to play contact sports if ADD symptoms develop and persist after the concussion?