The Impact of Concussion On A Student

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So, what’s a concussion?

CDC .......... (“Heads Up for School Professionals”) defines “concussion” as

1. .....a type of traumatic brain injury that results from a bump to the head or by a hit to the body
2. .....that causes the head and brain to move rapidly back and forth.
3. .....this sudden movement causes the brain to bounce around or twist in the skull
4. .....thus stretching and damaging brain cells and creating chemical changes in the brain.

Source: www.cdc.gov/concussions, Heads Up to Schools, “Returning to School After a Concussion: A Fact Sheet for School Professionals”
More About Concussions

- Most people do NOT lose consciousness
- Concussion is a rotation of the brain not an impact
- Brain is soft tissue that moves inside the bony skull
- Brain tissue bangs on skull causing bruising, blood vessel tearing and nerve/axon stretching
- Concussion causes change, often NOT SEEN in scans
- The effects of concussion are identified by noting and observing symptoms that indicate change in functions
- All activity/thinking make demands on the brain neurometabolic processes
- “Young” brains may be susceptible to chemical changes in brain which affect brain development
- “Young Kids Are At Greater Risk”

www.brainline.org/content/multimedia.php?id=9017
Symptoms can appear in first 24-72 hours (evolving injury)
Symptoms can affect functions in the areas of: cognitive, physical, emotional and sleep disturbance
Symptoms affect multiple aspects of student’s ability
Activities requiring concentration worsen symptoms
Exertion requires brain energy which is already depleted
Treated properly 80% of most single concussions recover
15% have changes that can persist for 3 months or longer
Some symptoms may linger for weeks/months (memory, headaches, concentration)
Multiple concussions tend to take longer to recover with lingering symptoms or life long problems
Fun way to review: “Concussions”

- We have covered a lot of information about the brain and possible symptoms after a concussion
- Let’s review with a clever You Tube Video! Before we learn about the......
  actual school process for “managing concussion”

- Dr. Mike Evans created a blog site using a white board to illustrate medical illnesses, including:
- CONCUSSIONS 101 A Primer for Kids and Parents
  www.youtube.com/watch?v=zCCD52Pty4A
Symptoms must be managed to ensure recovery

Effects of: headaches, noise, visual weakness, fatigue and emotional reactions must be considered

Reducing impact of symptoms reduces brain stress

“Adjustments” (short term modifications) are essential

Cognitive “rest” from intense brain activity is critical

As tolerance for activity increases, the rate of recovery varies for individual (ex: reading time)

As tolerance improves, adjust time & intensity of tasks

**GOAL:** limit cognitive activity to level that is tolerable for student without reemergence of symptoms
Successful Planning & Management Demands Collaboration

Initial Stage (time line 3-6 weeks)
1. Recognition of the concussion (on field/doctor diagnosis)
   - certified athletic trainer forms, physician forms diagnosis, complete evaluations, notify school/family
2. Identify symptoms and select case manager & re-evaluator for release to next steps on BOTH “return plans”
3. Notify appropriate school staff of information
4. Develop teams: family, medical & school
5. Create a written “adjustment” plan and “rest” plan (Oregon RTI/RMI) that includes: preventive interactions and classroom adjustments
6. Track recovery for task tolerance, improved endurance, reduced symptoms and permission to move to next steps when symptoms do not reoccur after 24 hours.

Beyond 6-8 weeks: 10-20% of population will likely need to consider a post-concussion plan using a 504 Plan

Beyond 3-4 months: 1-5% of population may need to consider special education support under category of TBI in the form of an IEP based on a neuropsychological eval
Headache

Potential implications in school

- Most common concussion symptom
- Can distract the student from concentrating
- Can vary over the course of day
- May be triggered by various stimuli, such as fluorescent lighting, loud noises, and focusing on tasks

Potential adjustments

- Frequent breaks
- Identifying aggravators and reducing exposure to them
- Rests, planned or as needed, in nurses office or quiet area

Multiple Sources for symptoms + adjustments list: include: Momsteam, CDC, ACE, CHOA, CHOP, Boston Children’s, Amer Assoc of Pediatrics

See resource list
Symptoms Requiring Adjustment

Dizziness/Lightheadedness

Potential Implications in school
• May be an indication of injury to vestibular (balance/inner ear)
• May challenge standing quickly/walking in crowded areas
• Often provoked by visual stimulus (rapid movements, computer
• Troubles with various aspects of the school building

Potential Adjustments
• Reduce amount of visual stimulus that provokes symptom
• Allow student to put head down if symptoms worsen
• Identify a place to take a rest if needed
• Give student early dismissal from class and extra time to get from class to class to avoid crowded hallways
• Permit student to have a friend help/walk with, etc
Symptoms Requiring Adjustment

Visual symptoms: sensitivity, double/blurry vision,

Potential Implications in school
- Reduced ability to attend to slide presentations, movies, smart boards, computers, etc. without increase in symptom
- Impact of artificial lighting
- Difficulty reading and copying
- Difficulty paying attention/concentrating on visual tasks

Potential Adjustments
- Reduce exposure to computers, phones, smart boards, etc.
- Reduce brightness on screens, (doctor permission)
- Allow the student to wear a hat or sunglasses in school
- Consider use of books on tape
- Turn off fluorescent lights as needed
- Seat student closer to the center of classroom activities
Symptoms Requiring Adjustments

Noise sensitivity

Potential Implications in school

- Overwhelmed with noise levels in school environment: ex: cafeteria, shop classes, music classes, hallways, gym
- Restricted Physical education classes, (doctor permission)
- Restricted Organized sports practices (no return to sports until asymptomatic)

Potential Adjustments

- Allow the student to have lunch in quiet area with a classmate
- Limit or avoid band, choir, and shop classes
- Avoid noisy gyms and organized sports practices/games
- Consider use of headphones
- Permit early dismissal from class and/or go to quiet place
- Permit extra time to get from class to class/avoid crowded hallways
Symptoms Requiring Adjustment

Difficulty Concentrating or Remembering

Potential Implications in School

- Challenges learning new tasks and comprehending new material
- Difficulty with recalling and applying previously learned material
- Lack of sustained focus and reduced reading & listening endurance
- Troubles with general test taking (overwhelm, frustration, endurance)
- Troubles with standardized testing (fatigue, print size, scan-tron sheets)

Potential Adjustments

- Build endurance with:
  (a) slowly increase tolerance level for tasks (read time 30 vs 10 min)
  (b) Adjust time & intensity of tasks (10/25 items vs all items)
- Avoid testing or completion of projects during immediate recovery
- Provide extra time to complete non-standardized tests
- Postpone standardized testing (may require that 504 plan is in place)
- Consider 1 test per day during exam periods
- Consider the use of preprinted notes, note-taker, scribe, or reader for oral test taking
- Break up tasks, homework, reading, etc into smaller chunks
Sleep Disturbances

Potential implications for school

➢ Excessive fatigue can hamper memory for new or past learning or ability to attend and focus
➢ Insufficient sleep can lead to drowsiness, tardiness or excessive absences
➢ Difficulty getting to sleep or frequent waking at night may lead to sleeping in class
➢ Excessive napping due to fatigue may lead to further disruption of the sleep cycle

Potential adjustments

➢ Allow for late start or shortened school day
➢ Allow rest breaks
Emotions and Mood

Potential Implications for School

- Irritability
- Sadness
- Nervousness, frustration, and anxiety
- Isolation/withdrawal

Potential Adjustments

- Encourage student to use the suggested “adjustments”
- Encourage student to express their feelings/needs
- Prepare them for expectations & changes in routine
- Identify adult support person they can go to
- Permit time out space
- Encourage “rest”
Caring for Emotional Symptoms

- The student must “buy into” the necessity of following medical orders and limiting activity.
- The student is the only one who can tell what is really happening in their body and brain.
- The student needs a trusted adult with whom to share their feelings.
- “what’s it like to get a concussion” teen’s talk
  www.youtube.com/watch?v=7fIrFwnns1U
Necessity of a Plan

Negative impact of NO planning:
- Without intervention, long term quality of life can be affected
- Without intervention, anxiety can lead to loss of hope, etc...
- Untreated symptoms can be exacerbated
- Sadly research of jail populations revealed that up to 60% of inmates had one or more untreated concussions/TBI’s

Positive impact of planning:
- Sets tolerable limits on brain stimulation, reduces symptoms
- As symptoms DO NOT reappear in activity, brains get better
- “Giving the brain a break” allows time for healing
- Adult support builds trust and hope as recovery improves
- “Keeping Quiet can Keep You Out of the Game”

www.youtube.com/watch?v=yIqZDbk3M40&feature=youtube_gda
What Kind of Plan

- BRAIN-SAFE plan should provide:
  - medical diagnosis/school forms
  - a progression of graded activities that don’t trigger symptoms
  - activities with increasing volume, workload & reduced restrictions
  - a 2-PRONGED plan than includes ** both cognitive & physical endurance through “cognitive/brain rest”**
  - A STEP-WISE plan that measures progress in defined steps, so when a reoccurrence of a symptom occurs, the student receives a “no pass” and must to go “back to previous step”

** Children’s Hospital of Phila. Study, 193 patients, 54% has a physical plan, but only 34 had a cognitive plan
form may be duplicated or changed to suit your needs and your patients’ needs.

### SCHOOL RECOMMENDATIONS FOLLOWING CONCUSSION

<table>
<thead>
<tr>
<th>Patient Name:</th>
<th>Date of Birth:</th>
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</thead>
<tbody>
<tr>
<td>Date of Evaluation:</td>
<td>Referred by:</td>
</tr>
<tr>
<td>Duration of Recommendations:</td>
<td>1 week 2 weeks 4 weeks Until further notice</td>
</tr>
</tbody>
</table>

**The patient will be reassessed for revision of these recommendations in ________ weeks.**

This patient has been diagnosed with a concussion (a brain injury) and is currently under our care. Please excuse the patient from school today due to the medical appointment. Flexibility and additional supports are needed during recovery. The following are suggestions for academic adjustments to be individualized for the student as deemed appropriate in the school setting. Feel free to apply/remove adjustments as needed as the student’s symptoms improve/worsen.

<table>
<thead>
<tr>
<th>Attendance Breaks</th>
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<tbody>
<tr>
<td>No school for _____ school day(s) _____</td>
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<tr>
<td>Attendance at school _____ days per week office if symptoms increase</td>
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<tr>
<td>Full school days as tolerated by the student _____</td>
</tr>
<tr>
<td>Partial days as tolerated by the student not subside</td>
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<tr>
<td>Allow other breaks during school day as deemed necessary and appropriate by school personnel</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Visual Stimulus Audible Stimulus</th>
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<tbody>
<tr>
<td>Allow student to wear sunglasses/hat in school _____ Lunch in a quiet place with a friend</td>
</tr>
<tr>
<td>Pre-printed notes for class material or note taker _____ Avoid music or shop classes</td>
</tr>
<tr>
<td>Limited computer, TV screen, bright screen use _____ Allow to wear earplugs as needed</td>
</tr>
<tr>
<td>Reduce brightness on monitors/screens _____ Allow class transitions before bell</td>
</tr>
<tr>
<td>Change classroom seating as necessary</td>
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</tbody>
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<thead>
<tr>
<th>Workload/Multi-Tasking Testing</th>
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<tbody>
<tr>
<td>Reduce overall amount of make-up work, class _____ Additional time to complete tests work and homework _____ No more than one test a day</td>
</tr>
<tr>
<td>Prorate workload when possible _____ No standardized testing until ____________</td>
</tr>
<tr>
<td>Reduce amount of homework given each night _____ Allow for scribe, oral response, and oral delivery of questions, if available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Exertion Additional Recommendations</th>
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</thead>
<tbody>
<tr>
<td>No physical exertion/athletics/gym/recess _____</td>
</tr>
<tr>
<td>Walking in gym class only _____</td>
</tr>
<tr>
<td>Begin return to play protocol as outlined by ____________ return to activity form</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current Symptoms List (the student is noting these today)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache _____ Visual problems _____ Sensitivity to noise _____ Memory issues</td>
</tr>
<tr>
<td>Nausea _____ Balance problems _____ Feeling foggy _____ Fatigue</td>
</tr>
<tr>
<td>Dizziness _____ Sensitivity to light _____ Difficulty concentrating _____ Irritability</td>
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</tbody>
</table>

**Student is reporting most difficulty with/in**

<table>
<thead>
<tr>
<th>Subject</th>
</tr>
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<tbody>
<tr>
<td>All subjects _____ Reading/Language arts _____ Foreign Language _____ Math</td>
</tr>
<tr>
<td>Science _____ Music _____ History _____ Using Computers</td>
</tr>
<tr>
<td>Focusing _____ Listening Other: ____________</td>
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I, ___________________________________________, give permission for Dr. XXXXXXXX to share the following information with my child's school and for communication to occur between the school and Dr. XXXXXXX for changes to this plan
Protocols Used in Schools

“Return to Learn” Plans:

- **STEP 1:**
  - complete rest until child is 24 hrs symptom free
  - NO school, homework, computers, texting, videos
  - limit activity that requires thinking or focusing

- **STEP 2:**
  - quiet room, activity that doesn’t trigger symptoms or resolved with rest
  - initially permit 15 minutes of “work” activity, stop with symptoms
  - permit very short intervals of tv, videos, movies, etc. Max 2 hrs a day
  - slow modified return to school with “adjustment” plan in place

Multiple states/hospitals offer variations on the “standard”: (listed in resources) from Children’s Healthcare of Atl., Children’s Hospital of Phila. and ACE Plan (Gioia)
STEP 3:
- slowly return to watching tv, video, texting
- allow more family interaction/activities short bursts of time (30 min)
- try homework with monitoring of duration as tolerated
- gradual return to classes, including make up work/one test a day

STEP 4:
- when able to do 1-2 hrs of homework, return to ½ day school
- should symptoms occur at school, take a break til resolve
- normal home activities
“Return to Play” Protocol

(heart rate calculation next slide)

(move to next stage if 100% symptom free 24 hrs)

- **STEP 1:**
  - complete physical rest, brain rest for healing
  - avoid groups, videos, reading, computers, videos, phone

- **STEP 2:**
  - light exercise, 10-15 min walk or stationary bike
  - light sweat on brow, slight increase in breathing rate,
  - increase heart rate to only 30 to 40%, or <70%

- **STEP 3:**
  - moderate aerobic activity, 20-30 min jog stationary bike add resistance
  - low risk activity, ex: dribble, catch, change directions, chase/catch
  - supervised play, increase heart rate to 40-60% max

-Mayo Clinic: Student lied about symptoms/2years

[www.youtube.com/watch?v=N9S_Hdkqf08](https://www.youtube.com/watch?v=N9S_Hdkqf08)
“Return to Play” Protocol contin...

STEP 4:
- increase aerobic activity, 40-60 min run/bike, heart rate to 60-80%
- moderate resistance activity, sports specific exercise 3 set of 10 reps
- supervised play, moderate risk, no head contact, non-contact drills

STEP 5:
- controlled contact training drills, monitor cognitive load/sequences
  - 60-90 min on field, court or mat drills
  - participate in normal practice session, return to PE class
  - recheck for symptoms

STEP 6: full contact practice, if cleared by physician

STEP 7: return to play without restriction (if cleared and 24 hr symp free)

Maximum Heart Rate calculation: max rate of 220 minus athlete age 15 yrs
(ex 220-15yr=205)
Target heart rate for STEP 2 is rate of 30 to 40% that athlete’s max rate
(1) 205x30%=62 beats a min, and (2) 205x40%=82 beats a min,
.......so, target for 15 year old STEP 2 is between 62 & 82 beats a minute
Let’s Summarize

- Primary concern.....EARLY RECOGNITION is key to recovery. Medical knowledge shared with the school and family teams can lead to complete recovery after a single concussion.
- Pediatric Concussions: Early Recognition Treatment
  www.youtube.com/watch?v=DJ2LmEYB_JQ&feature=youtube_gdat
Concussion Resources

Articles:


Resources, continued

Articles:

- “Kids’ Symptoms May Linger and Change Over Time” study May 2014, Boston Childrens, 235 kids average age 14, symptoms up to 15 days + www.medscape.com/viewarticle/824976

Web Sites:

- ACE (Acute Concussion Evaluation) forms and excellent article on its use www.childrensnational.org/files/PDF/ForDoctors/cnhn/ace-packet.pdf
- Brain Basics for understanding brain parts and functions www.brainline.org/multimedia/interactive_brain/the_human_brain.html
- Brain interactive site illustrating brain parts with descriptions www.traumaticbraininjuryatoz.org/interactive-brain.aspx
Web Sites:

- CDC Heads Up to Schools- “Returning to School After a Concussion: A Fact Sheet for School Professionals”
  www.cdc.gov/concussion

- Children’s Healthcare of Atlanta concussion services, excellent forms for “return to school & play, + chart on “Cognitive Rest for Concussion”
  www.choa.org/concussion

- Children’s Hospital of Philadelphia Brochures: “Coping After a Concussion”, downloads for protocols for Return to Learn and Return to Play
  www.chop.edu/service/concussion-care-for-kids/returntoschool.html

- Dr. Mike’s Concussion 101 Primer for Kids & Adults, clever drawing as he speaks describing all elements for concussion
  www.youtube.com/watch?v=zCCD52Pty4A
Web Sites:

- Early recognition and treatment of concussion
  www.youtube.com/watch?v=DJ2LmEYB_JQ&feature=youtube_gdat

- Keeping quiet about concussion symptoms (teen basketball)
  www.youtube.com/watch?v=ylqZDbkM40&feature=youtube_gda

- Mom’s team concussion blog, articles on management of concussion, download for charts on symptoms effects
  www.momsteam.com/print6780

- Physician’s note (sample) for official notification of impact

- Rocky Mountain Hospital, exceptional program booklet, REAP Program=Reduce, Educate, Adjust, and Pace
Web Resources:

- Soccer concussion student lies to family, not report symptoms for 2 years serious headaches
  [www.youtube.com/watch?v=N9S_Hdkqf08](http://www.youtube.com/watch?v=N9S_Hdkqf08)

- State-Wide School Training (Oregon) on line train for school & family teams, includes videos and Brain 101 handbook and post-concussion 504 planning
  [www.brian101.orcasinc.com](http://www.brian101.orcasinc.com)

- Teens talking about their concussions
  [www.youtube.com/watch?v=7flrfwnns1U](http://www.youtube.com/watch?v=7flrfwnns1U)

- Young brains at risk for injury & repeated injury
  [www.youtube.com/watch?v=0JvILU4qEw&feature=youtube_gdat](http://www.youtube.com/watch?v=0JvILU4qEw&feature=youtube_gdat)

- Youth concussion education PDF Booklet, South Carolina Brain Injury Assoc., excellent source for youth injury, after open site, search box input..sc youth concussion program