Concussion: the basics

Luke C. Henry, PhD
Clinical Neuropsychologist
UPMC Department of Neurological Surgery
05.05.2017
Outline

• Concussions
  – Brief history
  – Definition
  – Pathophysiology
  – Signs and symptoms

• Management
  – Acute
    – Clinical evaluation
    – Behavioral Management

• Risk Factors
  – Post-traumatic and premorbid

• When to ask for help
A brief history of concussion

- **3000 BCE**
- **415 BCE**
- **1300s-1600s CE**
- **20th century**
- **1700 BCE**
- **1st century CE**
- **1700s-1800s**
- **Present**
What is a concussion?

According to the CDC:

- A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces secondary to direct or indirect forces to the head. Disturbance of brain function is related to neurometabolic dysfunction, rather than structural brain injury, and is typically associated with normal structural imaging findings (CT Scan, MRI).

- Concussion may or may not involve a loss of consciousness.

- Concussion results in a constellation of physical, cognitive, emotional, and sleep-related symptoms. Recovery is a sequential process and symptoms may last from several minutes to days, weeks, months, or even longer in some cases.”
The "Complex Pathophysiological Process"

**Take home**:  
-A concussion rarely results in a visible or structural injury  
-It is a functional injury that changes the way the brain uses and produces energy
What is a concussion?

- **Epidemiology**
  - 100-300/100,000 worldwide based on ER admissions only
  - Total estimates are 600/100,000
    - Holm et al., 2005
  - More likely in those who have already been concussed*
    - Quigley, 1945; Thorndike, 1952

[Diagram showing pie chart with categories and percentages: Fall 44.5%, Collision 17.2%, Struck by object 22.9%, Struck by person 11.1%, Assault 3.1%, Unknown 1.2%]

Kozlowski et al., 2007
• Immediate markers (signs)
  – Loss of Consciousness
  – Retrograde Amnesia
  – Anterograde Amnesia
  – Disorientation/Confusion
Symptoms

NEUROPSYCHIATRIC
• Increased lability
• Sadness
• Nervousness/Anxiety
• Irritability

COGNITIVE SYMPTOMS
• Attention Problems
• Memory dysfunction
• “Fogginess”
• Fatigue
• Cognitive slowing

MIGRAINE (PHYSICAL SX)
• Headaches
• Visual Problems
• Dizziness
• Noise/Light Sensitivity
• Nausea

SLEEP DISTURBANCE
• Difficulty falling asleep
• Sleeping less than usual

Factor Analysis, Post-Concussion Symptom Scale
(Kontos et al., 2012; Pardini et al. 2004)

N=15,000 High School and University Athletes within 24-72 hours of concussion
N=327, High School and University Athletes Within 7 Days of Concussion
## Commonly Reported Symptoms

High School and College Athletes (within 3 days of injury)

<table>
<thead>
<tr>
<th>#</th>
<th>Symptom</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Headache</td>
<td>71%</td>
</tr>
<tr>
<td>#2</td>
<td>Feeling Slowed Down</td>
<td>58%</td>
</tr>
<tr>
<td>#3</td>
<td>Difficulty concentrating</td>
<td>57%</td>
</tr>
<tr>
<td>#4</td>
<td>Dizziness</td>
<td>55%</td>
</tr>
<tr>
<td>#5</td>
<td>Fogginess</td>
<td>53%</td>
</tr>
<tr>
<td>#6</td>
<td>Fatigue</td>
<td>50%</td>
</tr>
<tr>
<td>#7</td>
<td>Visual Changes (double/blurring)</td>
<td>49%</td>
</tr>
<tr>
<td>#8</td>
<td>Light Sensitivity</td>
<td>47%</td>
</tr>
<tr>
<td>#9</td>
<td>Memory Dysfunction</td>
<td>43%</td>
</tr>
<tr>
<td>#10</td>
<td>Balance Problems</td>
<td>43%</td>
</tr>
</tbody>
</table>

Lovell, Collins et al., 2004; N = 215
Why should a mental health practitioner care?

• **Summary of Mental Health Sequelae of TBI**
  – Patients with TBI have higher rates of depression, substance abuse, aggression, and impulsivity prior to injury.
  – TBI associated with 2-4 increased risk for suicide attempts, suicide, and psychiatric disorder
  – Highest risk for suicide and attempt in those with both TBI and psychiatric disorder
  – Role of worthlessness, hopelessness, belonging, support, perception of functional impairment
  – Inter-relationship of sleep, HA, depression, PTSD, and suicidality
  – Multiple concussions increase risk for depression and suicidality
  – Associated with neurocognitive impairment in memory, executive function, inhibition
Why should a mental health practitioner care?

• mTBI + adolescence = the perfect storm?
  – **Distress**: headache, depression, reaction to school difficulties, and loss of activity
  
  – **Disinhibition**: difficulty with prefrontal cortical activity to inhibition action, negative emotion
  
  – **Development**: On top of developmentally immature brain with increase drive for reward relative to capacity to inhibit
Why should a mental health practitioner care?

• Long term...
  – CTE diagnostic criteria now include suicide and suicidality as core diagnostic features
Now What?

HOW TO HELP THE CONCUSSED ADOLESCENT
Concussion Management

• *Most* aware of negative effect of premature *physical* exertion, but fewer are aware of problems that cognitive exertion can cause

• Cognitive Exertion (Thinking) and the added stimulation of the school environment can significantly increase symptoms throughout recovery

• Research has demonstrated generalized hyperactivation with concussion that is likely related to symptom increases when returning to school

• Obvious Means: testing, group work, movies, shop class, overhead lighting

• Subtle Causes: background noise (cafeteria, movement during and between classes), taking notes (especially off of a projector), sustained attention

• Psychosocial Stressors: relationships with peers, teachers; pressure to perform
Symptom Evaluation/Clinical Interview: What is Asymptomatic?

- **NEUROPSYCHIATRIC**
  - Increased lability
  - Sadness
  - Nervousness/Anxiety
  - Irritability

- **MIGRAINE (PHYSICAL SX)**
  - Headaches
  - Visual Problems
  - Dizziness
  - Noise/Light Sensitivity
  - Nausea

- **COGNITIVE SYMPTOMS**
  - Attention Problems
  - Memory dysfunction
  - “Fogginess”
  - Fatigue
  - Cognitive slowing

- **SLEEP DISTURBANCE**
  - Difficulty falling asleep
  - Sleeping less than usual
Concussion Management

The old mentality:
• Rest is the best treatment
  – Symptom provocation is a sign of continued impairment
  – Symptoms are treated with rest:
    • Physical: complete rest
    • Cognitive: no/minimal school

Why the change?
• Rest seems to work initially (first 3-5 days) post-injury
  – The effects thereafter plateau
  – Patients with either very low or very high levels of activity have more persistent symptoms
  • Majerske et al., 2008
  – Total rest is actually harmful
  • de Kruijk et al., 2002
  • Allen et al., 1999
Concussion Management

• Symptom Management
  – Symptoms are a part of recovery
  – Managing symptoms is crucial to recovery
  – When is it okay to push and when is it time to rest?

• Using a pain scale
  - "Setback/slowing recovery"
  - "Doing too much"
  - "Time to rest"
  - "Functional Symptoms"
Concussion Management

- Over-stimulation has the most profound effect in the acute-subacute post-injury phase.
- Little/No stimulation does not bode well for neuropsychological recovery either.
- Balance between symptom provocation and rest is difficult, but necessary.

“Setback/slowing recovery”

“Doing too much”

“Time to rest”

“Functional Symptoms”
Concussion Management

Treatment Model

- What treatments work in other pathologies?
  - Graded exposure works
    - Anxiety
    - Chronic pain
    - Migraine
  - Approach-Confront strategies are effective in symptom management and treatment
    - Martin, 2010

In mTBI?

- The research is limited, but...
  - Modified CBT protocols works in chronic cases (adult samples)
    - Potter & Brown, 2012
    - Ferguson & Mittenberg, 1996
    - Miller & Mittenberg, 1998
    - Leonard & Tucker, 2004
  - Physical activity is also beneficial
    - Silverberg & Iverson, 2012
    - Iverson et al., 2012
    - Leddy et al., 2012
Concussion Management

Migraine Threshold

1. Regular sleep pattern
2. Regular Diet
3. Regular Hydration
4. Physical Exercise*
5. Stress Management

Concussion

Increased stress

Lack of exercise*

Poor diet

Dysregulated sleep

Dehydration

Personal history of headaches/migraines

Family history of headaches/migraines

No Headaches
Influencing recovery:

RISK FACTORS
Risk Factors: Incidence

• Injury History
  – The single largest factor in recovery and future incidence
  – Those with prior injuries are more likely to be injured in the future
    • Lowered threshold?
    • Personality factors?
Risk Factors: Incidence

• Gender
  – Females are more likely to sustain injuries when looking at equivalent activities
  – Males sustain more head injuries overall
    • Risk taking behaviors
    • Sports
Risk Factors: Incidence

• Age
  – More common in males, teenagers and young adults
  – Children and adolescents make up a larger portion of ER visits
    • Ultimately, the data is inconclusive
Risk Factors: Prolonged Recovery

• Signs/Symptoms
  – Post-traumatic amnesia
  – On field dizziness
  – Subacute “fogginess”
  – Initial impaired neurocognitive performance
  – More severe symptom report
  – LoC is *not* predictive of prolonged recovery
Risk Factors: Prolonged Recovery

• Premorbid Conditions
  – Migraines
    • High overlap between
      – Gordon et al., 2006
  – ADHD/Learning Disability
    – Alosco et al., 2014
    – Hutchinson et al., 2014
  – Depression/Anxiety
    – Hutchinson et al., 2014

• Demographic Factors
  – Age
    • Younger take longer
  – Gender
    • Females take longer
Involving other disciplines:

WHEN TO ASK FOR HELP
Coordinating Care

• Not every patient recovers with time and proper management alone
• Depending on the presenting symptoms, consider adjunct therapies
  – Medications
  – Physical Therapies
  – Psychotherapy
Coordinating Care

• Medication
  – Useful in addressing
    • Chronic headache
    • Fatigue
    • Insomnia
    • Mood & Anxiety
    • Cognitive issues
  – Typically mostly used for brief periods
  – Maximizing the effort
    • Medications affecting change in multiple systems
Coordinating Care

• Physical Therapy
  – Consider musculoskeletal PT where neck and back pain are presenting problems
    • can be addressed within days post injury

• Vestibular Therapy
  – Consider this where dizziness-imbalance & mental fogginess are persistent
    • Deficits may be to central or peripheral vestibular system
Coordinating Care

• Psychotherapy
  – Changes in mood/anxiety may be
    • Premorbid
    • Direct result of the injury
    • Resulting from psychosocial factors that may or may not be related to the injury
  – Discuss with patient his/her primary symptoms
    – What to expect
    – Who to involve
  – Do not ignore the psychosocial factors
    – Symptoms are rarely exclusive to a single cluster
  – Create/foster a supportive environment
Summary

• Concussions are a neurometabolic injury
  • Energy production and use is impaired

• Presentation and intensity varies
  • HUGE individual differences
  • Incidence and Recovery times are influenced by several factors

• Balance between rest and exposure
  • Over- and under-stimulation can be harmful

• In cases of protracted recovery, coordinating care across professionals is necessary
Concussion Resources:

CDC Tool Kit

- Three kits with information for physicians, parents, and coaches

- Information on High School and Youth Management of Concussion

- Link to order tool kit:
Clinical Management

ANXIETY CASE
Anxiety Case

• 15 year old male
  – Hockey player
  – Struck occipital region to ice subsequent to body check
  – Initial signs
    • disorientation/confusion
  – Initial symptoms
    • Headache
    • Dizziness
    • Mental fogginess

• Biopsychosocial History
  – 1 prior concussion
    • 2 year prior
  – No other relevant history
  – Above average academically

• No treatment for 5 months
  – Academic decline
  – Worsening sleep
  – Panic attacks
  – Diagnosed with migraines and anxiety by pediatrician
    • Maxalt
    • MRI (-)
    • Prism glasses
Anxiety Case

• Presenting Symptoms
  – Headache
  – Photo/phonosensitivity
  – Blurred vision
  – Nausea
  – Numbness & tingling
  – Mentally foggy
  – Memory & attention dysfunction
  – Anxious
  – Mood symptoms

• Treatment Recommendations
  – Homebound instruction
  – Vestibular and Vision Therapies
  – Referred for medications
  – Behavioral management
    • Sleep was much improved

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>74</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>77</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>42.22</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.5</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>12</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>52</td>
</tr>
</tbody>
</table>

• Vestibular exam was highly provocative for symptoms
• Near point convergence measured at 29 cm
Anxiety Case

Follow-up #1

• Presenting Symptoms
  – Headache
  – Photo/phonosensitivity
  – Dizziness
  – Dysregulated sleep
    • Difficulty falling and staying asleep
  – Memory & attention dysfunction
  – Anxiety
  – Poor mood

• Treatment Recommendations
  – Return to school
    • Modified schedule
  – Continue vestibular therapy
  – Placed on Klonopin & Zoloft
  – Light physical activity

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>74 22%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>77 57%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>42.22 85%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.5 92%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>12 5%</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>52 62%</td>
</tr>
</tbody>
</table>

• Vestibular exam was still provocative for symptoms

• Near point convergence measured at 12 cm
Anxiety Case

Follow-up #2

• Presenting Symptoms
  – Headache
  – Photo/phonosensitivity
  – Dizziness
  – Numbness & tingling
  – Memory & attention dysfunction
  – Anxiety
  – Mood
  **Symptoms reduced with physical activity

• Treatment Recommendations
  – Continued modified school schedule
  – Discharged from vestibular therapy
    • PT’s progress notes indicated large functional gains despite symptom report
  – Increase physical activity
  – Psychotherapy

![Composite Scores Table]

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>74  22%  78  32%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>77  57%  76  54%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>42.22  85%  42.35  85%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.5  92%  0.52  87%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>12  5  9</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>52  62  58</td>
</tr>
</tbody>
</table>

• Vestibular exam was mildly provocative for symptoms
• Near point convergence measured at 6 cm
Anxiety Case

Follow-up #3

• Presenting Symptoms
  – Headache
  – Photo/phonosensitivity
  – Dizziness
  – Numbness & tingling
  – Memory & attention dysfunction
  – Anxiety
    • Hypervigilance, ruminating
  – Mood

• Treatment Recommendations
  – Continued modified schedule
    • Extremely resistant to full return
  – Finish Vestibular Therapy
  – Increase physical activity
  – Psychotherapy

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>74 22%</td>
</tr>
<tr>
<td></td>
<td>78 32%</td>
</tr>
<tr>
<td></td>
<td>91 80%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>77 57%</td>
</tr>
<tr>
<td></td>
<td>76 54%</td>
</tr>
<tr>
<td></td>
<td>78 60%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>42.22 85%</td>
</tr>
<tr>
<td></td>
<td>42.35 85%</td>
</tr>
<tr>
<td></td>
<td>43.43 88%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.5 92%</td>
</tr>
<tr>
<td></td>
<td>0.52 87%</td>
</tr>
<tr>
<td></td>
<td>0.51 90%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>12 5</td>
</tr>
<tr>
<td></td>
<td>9 9</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>52 62</td>
</tr>
<tr>
<td></td>
<td>58 56</td>
</tr>
</tbody>
</table>
Anxiety Case

Follow-up #4

- Presenting Symptoms
  - Headache
  - Photo/phonosensitivity
  - Dizziness
  - Numbness & tingling
  - Memory & attention dysfunction
  - Anxiety
    - Hypervigilance, ruminating
  - Mood

- Treatment Recommendations
  - Full days at school
  - Discharged from vestibular therapy
  - All other therapies/evaluations successfully completed/passed
  - Psychotherapy

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>74 22% 78 32% 91 80% 74 22% 86 64%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>77 57% 76 54% 78 60% 83 75% 64 21%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>42.22 85% 42.35 85% 43.43 88% 48.8 99% 45.15 92%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.5 92% 0.52 87% 0.51 90% 0.46 98% 0.47 97%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>12 5 9 8 18</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>52 62 58 56 70</td>
</tr>
</tbody>
</table>
## Anxiety Case

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Score 1</th>
<th>Score 2</th>
<th>Score 3</th>
<th>Score 4</th>
<th>Score 5</th>
<th>Score 6</th>
<th>Score 7</th>
<th>Score 8</th>
<th>Total Symptom Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>43</td>
</tr>
<tr>
<td>Nausea</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Balance Problems</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Dizziness</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Fatigue</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Trouble falling asleep</td>
<td>5</td>
<td>N/A</td>
<td>2</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>Sleeping more than usual</td>
<td>3</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>2</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>Sleeping less than usual</td>
<td>3</td>
<td>N/A</td>
<td>1</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
<td>2</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Irritability</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Sadness</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Nervousness</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Feeling more emotional</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Numbness or tingling</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Feeling mentally foggy</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Visual problems</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total Symptom Score</strong></td>
<td><strong>52</strong></td>
<td><strong>22</strong></td>
<td><strong>62</strong></td>
<td><strong>59</strong></td>
<td><strong>58</strong></td>
<td><strong>50</strong></td>
<td><strong>56</strong></td>
<td><strong>43</strong></td>
<td><strong>70</strong></td>
</tr>
</tbody>
</table>
Anxiety Case #2

• 17 year old female
  – Soccer player
  – Fell and struck back of head to the ground
  – Initial signs
    • Anterograde amnesia
    • Disorientation/confusion
  – Initial symptoms
    • Headache
    • Nausea
    • Dizziness
    • Mental fogginess

• Biopsychosocial History
  – Psychotherapy for “adjustment disorder” after parents’ divorce
  – No other relevant history
  – Above average academically

• Seen 1 week after injury
  – Struggling academically
  – Panic attacks
  – PCP referred to concussion clinic
Anxiety Case #2

- Presenting Symptoms
  - Headache
  - Photo/phonosensitivity
  - Blurred vision
  - Nausea
  - Mentally foggy
  - Memory & attention dysfunction
  - Denied feeling anxious
  - Denied mood change

- Treatment Recommendations
  - Modified Academic Schedule
  - Vestibular Therapy
  - Behavioral management
  - Referred for medications
    - Sleep was much improved

- Vestibular exam was highly provocative for symptoms
- Near point convergence measured at 2 cm

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>82</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>67</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>28.58</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.68</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>0</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>60</td>
</tr>
</tbody>
</table>
Anxiety Case #2

Follow-up #1

• Presenting Symptoms
  – Headache
  – Dizziness
  – Dysregulated sleep
    • Difficulty falling and staying asleep
  – Memory & attention dysfunction
  – Anxiety was increasing
    • Attributed to school stress
  – Denied mood symptoms

• Treatment Recommendations
  – Continued modified schedule, but increased hours
  – Continued vestibular therapy
  – Light physical activity
  – Recommended psychotherapy

- Vestibular exam was still provocative for symptoms

- Near point convergence measured at 2 cm

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>82  35%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>67  31%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>28.58 1%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.68 8%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>0  0</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>60  74</td>
</tr>
</tbody>
</table>
Anxiety Case #2

Follow-up #2

- Presenting Symptoms
  - Headache
  - Photo/phonosensitivity
  - Dizziness
  - Memory & attention dysfunction
  - Anxiety
  - Mood

- Treatment Recommendations
  - Return to full school schedule
  - Discharged from vestibular therapy
  - Increase physical activity
  - Psychotherapy

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>82 35% 88 51%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>67 31% 75 54%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>28.58 1% 30.65 7%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.68 8% 0.57 44%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>0 0 5</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>60 74 69</td>
</tr>
</tbody>
</table>

- Vestibular exam was nonprovocative
Anxiety Case #2

Follow-up #3

- Presenting Symptoms
  - Moderate Headache
  - Mild Photo/phonosensitivity
  - Mild Dizziness
  - Memory & attention dysfunction
  - Anxiety
    - Improving
  - Mood
    - Improving

- Treatment Recommendations
  - Continued full schedule
  - Increase physical activity
  - Psychotherapy

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>82  35%  88  51%  85  44%  96  86%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>67  31%  75  54%  78  63%  81  73%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>28.58 1%  30.65 7%  36.95 36% 38.7 42%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.68 8%  0.57 44%  0.57 44% 0.54 63%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>0  0  5  0</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>60  74  69  26</td>
</tr>
</tbody>
</table>
Anxiety Case #2

Follow-up #4

- Presenting Symptoms
  - Denying all symptoms

- Treatment Recommendations
  - Full days at school
  - Psychotherapy
  - Discharged

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>82 35% 88 51% 85 44% 96 86% 95 80% 88 89%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>67 31% 75 54% 78 63% 81 73% 88 89%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>28.58 1% 30.65 7% 36.95 36% 38.7 42% 40.22 49%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.68 8% 0.57 44% 0.57 44% 0.54 63% 0.5 85%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>0 0 5 0 1</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>60 74 69 26 2</td>
</tr>
<tr>
<td>Symptom</td>
<td>5</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Headache</td>
<td>5</td>
</tr>
<tr>
<td>Nausea</td>
<td>3</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0</td>
</tr>
<tr>
<td>Balance Problems</td>
<td>2</td>
</tr>
<tr>
<td>Dizziness</td>
<td>3</td>
</tr>
<tr>
<td>Fatigue</td>
<td>5</td>
</tr>
<tr>
<td>Trouble falling asleep</td>
<td>5</td>
</tr>
<tr>
<td>Sleeping more than usual</td>
<td>2</td>
</tr>
<tr>
<td>Sleeping less than usual</td>
<td>4</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>4</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>2</td>
</tr>
<tr>
<td>Irritability</td>
<td>0</td>
</tr>
<tr>
<td>Sadness</td>
<td>2</td>
</tr>
<tr>
<td>Nervousness</td>
<td>0</td>
</tr>
<tr>
<td>Feeling more emotional</td>
<td>4</td>
</tr>
<tr>
<td>Numbness or tingling</td>
<td>0</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>4</td>
</tr>
<tr>
<td>Feeling mentally foggy</td>
<td>4</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>4</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>2</td>
</tr>
<tr>
<td>Visual problems</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Symptom Score</strong></td>
<td>60</td>
</tr>
</tbody>
</table>
Chicken-Egg Case

- 15 year old male
  - Hockey player
  - “cheap shot” hit from behind
  - Initial signs
    - disorientation/confusion
  - Initial symptoms
    - Headache
    - Fatigue
    - Attention problems

- Biopsychosocial History
  - 1 prior concussions
    - 1 year prior
  - No other relevant history
  - Above average academically

- Treatment/management within 2 days
  - Extreme headaches; debilitating
  - Held from school for 3 days; gradual return
  - No affective problems endorsed
  - No NP testing as patient was too symptomatic
Presenting Symptoms
- Headache
- Fatigue
- Dizziness
- Bradyphrenia & Attention problems

Initial Evaluation

• Treatment Recommendations
  - Continue going to school; full days as tolerated
  - Heavy academic accommodations
  - Vestibulopathy?

• Vestibular exam was provocative, but headaches also severe and unchanged
Chicken-Egg Case

Follow-up #1

• Presenting Symptoms
  – Headache
  – Fatigue
  – Dizziness
  – Bradyphrenia & attention problems
  – Denial of affective changes
  – Very emotional in clinical interview
    • “You’re useless! I don’t feel better! Do something!”

• Treatment Recommendations
  – Continue going to school; full days as tolerated
    • Attendance was poor
  – Heavy academic accommodations
  – Attempt vestibular therapy
  – Medication consult
  – Suggested STAR

• Vestibular exam was provocative, no change in headache presentation
Chicken-Egg Case

Follow-up #2

• Presenting Symptoms
  – Headache
  – Fatigue
  – Dizziness
  – Bradyphrenia and Attention dysfunction
  – Some acknowledgement of affective change
  – Mom very concerned over affect
    • Went to STAR

• Treatment Recommendations
  – Continue going to school; full days as tolerated
    • Attendance was poor
  – Heavy academic accommodations
  – Discontinue vestibular therapy
  – Medication consult
    • Referral to HA Clinic

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>77 29% 65 4%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>83 75% 61 17%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>28.42 11% 29.15 13%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.62 41% 0.63 36%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>29 27</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>44 37 46</td>
</tr>
</tbody>
</table>
# Chicken-Egg Case

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Score 1</th>
<th>Score 2</th>
<th>Score 3</th>
<th>Score 4</th>
<th>Score 5</th>
<th>Mean 1</th>
<th>Mean 2</th>
<th>Mean 3</th>
<th>Mean 4</th>
<th>Mean 5</th>
<th>Total Symptom Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4.0</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>46</td>
</tr>
<tr>
<td>Nausea</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>2.0</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>22</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Balance Problems</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2.67</td>
<td>2.67</td>
<td>2.67</td>
<td>2.67</td>
<td>26</td>
</tr>
<tr>
<td>Dizziness</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2.67</td>
<td>2.67</td>
<td>2.67</td>
<td>2.67</td>
<td>24</td>
</tr>
<tr>
<td>Fatigue</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
<td>36</td>
</tr>
<tr>
<td>Trouble falling asleep</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Sleeping more than usual</td>
<td>5</td>
<td>N/A</td>
<td>4</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
<td>27</td>
</tr>
<tr>
<td>Sleeping less than usual</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3.67</td>
<td>3.67</td>
<td>3.67</td>
<td>3.67</td>
<td>23</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>39</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
<td>2</td>
</tr>
<tr>
<td>Irritability</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>12</td>
</tr>
<tr>
<td>Sadness</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Nervousness</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Feeling more emotional</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Numbness or tingling</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
<td>23</td>
</tr>
<tr>
<td>Feeling mentally foggy</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3.67</td>
<td>3.67</td>
<td>3.67</td>
<td>3.67</td>
<td>22</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3.33</td>
<td>3.33</td>
<td>3.33</td>
<td>3.33</td>
<td>20</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>8</td>
</tr>
<tr>
<td>Visual problems</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Symptom Score</strong></td>
<td>44</td>
<td>35</td>
<td>37</td>
<td>25</td>
<td>46</td>
<td>42</td>
<td>40.0</td>
<td>38.5</td>
<td>36.25</td>
<td>40.5</td>
<td>242</td>
</tr>
</tbody>
</table>
Chicken-Egg Case

Follow-up #3

• **Presenting Symptoms**
  – Headache
  – Fatigue
  – Dizziness
  – Symptom reduction
    • Reduced demands?
    • Reduced anxiety?
  – Low mood
  – Medications not especially helpful
    • Tried Elavil, Topamax

• **Treatment Recommendations**
  – School over for the year
  – Physical activity as tolerated
  – Encouraged social engagement
  – No treatment scheduled at STAR

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>77 29% 65 4% 75 24%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>83 75% 61 17% 70 36%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>28.42 11% 29.15 13% 28.63 12%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.62 41% 0.63 36% 0.68 18%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>29 27 31</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>44 37 46</td>
</tr>
</tbody>
</table>
# Chicken-Egg Case

<table>
<thead>
<tr>
<th>Symptom</th>
<th>4</th>
<th>5</th>
<th>4</th>
<th>5</th>
<th>4</th>
<th>4</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Nausea</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Balance Problems</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Dizziness</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Fatigue</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Trouble falling asleep</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Sleeping more than usual</td>
<td>5</td>
<td>N/A</td>
<td>4</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Sleeping less than usual</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Irritability</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sadness</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nervousness</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feeling more emotional</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Numbness or tingling</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feeling mentally foggy</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Visual problems</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Symptom Score</strong></td>
<td>44</td>
<td>35</td>
<td>37</td>
<td>25</td>
<td>46</td>
<td>42</td>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>
Chicken-Egg Case

Follow-up #4

• Presenting Symptoms
  – Headache
  – Fatigue
  – Symptom increase
  – Persistently low mood
  – Low tolerance to almost all activities

• Treatment Recommendations
  – Accommodations put in place for fall semester
  – Physical activity as tolerated
  – Encouraged social engagement
  – Scheduled again at STAR
  – Initial appointment at HA clinic

<table>
<thead>
<tr>
<th>Composite Scores</th>
<th>Percentile scores if available are listed in small type.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>77 29% 65 4% 75 24% 77 24%</td>
</tr>
<tr>
<td>Memory composite (visual)</td>
<td>83 75% 61 17% 70 36% 72 38%</td>
</tr>
<tr>
<td>Visual motor speed composite</td>
<td>28.42 11% 29.15 13% 28.63 12% 30.98 10%</td>
</tr>
<tr>
<td>Reaction time composite</td>
<td>0.62 41% 0.63 36% 0.68 18% 0.64 24%</td>
</tr>
<tr>
<td>Impulse control composite</td>
<td>29 27 31 19</td>
</tr>
<tr>
<td>Total Symptom Score</td>
<td>44 37 46 15</td>
</tr>
</tbody>
</table>

- Accommodations put in place for fall semester
- Physical activity as tolerated
- Encouraged social engagement
- Scheduled again at STAR
- Initial appointment at HA clinic
# Chicken-Egg Case

<table>
<thead>
<tr>
<th>Symptom</th>
<th>4</th>
<th>5</th>
<th>4</th>
<th>5</th>
<th>4</th>
<th>4</th>
<th>4</th>
<th>5</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Nausea</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Balance Problems</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dizziness</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fatigue</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Trouble falling asleep</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Sleeping more than usual</td>
<td>5</td>
<td>N/A</td>
<td>4</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
</tr>
<tr>
<td>Sleeping less than usual</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sensitivity to light</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sensitivity to noise</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Irritability</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sadness</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nervousness</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Feeling more emotional</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Numbness or tingling</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Feeling slowed down</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Feeling mentally foggy</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty remembering</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Visual problems</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Symptom Score</strong></td>
<td>44</td>
<td>35</td>
<td>37</td>
<td>25</td>
<td>46</td>
<td>42</td>
<td>15</td>
<td>12</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>
Chicken-Egg Case

Update

• Patient continues to have chronic migraines for which he takes medication
• Back to school full time
• Cleared to return to lacrosse and hockey
Anxiety Cases

• Summary
  – Treating cases complicated with affective disorders is challenging in patients set on “medicalizing” the problem
  – Symptoms get better with treatment
  – Psychotherapy is effective in these cases too