Adult Neuropsychological Issues: Impact on Intellectual Functioning and Return to Work

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Disclosures

I receive compensation from the New York Jets and New York Islanders for Neuropsychological Consultation
Child vs. Adult Concussion

– Mechanism of impact usually different
  • Children: Sports most common
  • Adults: Motor vehicle accidents most common

– Neurophysiological effects similar

– Symptoms and recovery can differ
  • Children have more behavioral symptoms, longer recovery
  • Adults show more physical and cognitive symptoms

– Associated factors differ
  • Children: school, peers, family
  • Adults: work, family, responsibilities, activities, litigation
CONCUSSION

Look on the Bright side. For one brief, glorious moment, you forgot you were on the Cubs.
Reminder of Concussion Definition

1. Direct blow to the head, face, neck or elsewhere with an ‘impulsive’ force transmitted to the head.

2. Rapid onset of short-lived neurological impairment that resolves spontaneously. Sometimes, symptoms and signs may evolve over minutes to hours.

3. May result in neuropathological changes, but acute symptoms reflect a **functional** disturbance rather than **structural**—usually normal neuroimaging studies.

4. May or may not involve loss of consciousness. Resolution of the symptoms typically follows a sequential course. However, in some cases symptoms may be prolonged.
# Signs and Symptoms

<table>
<thead>
<tr>
<th>Physical</th>
<th>Cognitive</th>
<th>Emotional</th>
<th>Sleep/Arousal</th>
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</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Feels “in a fog”</td>
<td>Irritability</td>
<td>Fatigue</td>
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<tr>
<td>Nausea/Vomiting</td>
<td>Attention/Concentration</td>
<td>Sadness</td>
<td>Drowsiness</td>
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<td>Balance problems</td>
<td>Memory</td>
<td>Nervous/Anxious</td>
<td>Onset insomnia</td>
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<tr>
<td>Visual problems</td>
<td>Slow responses</td>
<td>More emotional</td>
<td>Sleeping more/less</td>
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<td>Sensitivity to light and/or sound</td>
<td>Confused about recent events</td>
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<td>Looks “dazed”</td>
<td>Repeats questions</td>
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Concussion Modifiers

Prolonged (>1 min.) LOC, amnesia

Number, severity, duration of symptoms

Convulsions (very rare)

Recent concussion(s)

Concussion from less impact than prior concussion

Co-morbidities of migraine or mental health disorders, ADHD, learning disabilities, sleep disorders

Use of psychoactive drugs or anti-coagulants

Dangerous, high-risk activity
Typical Associated Features

• Retrograde Amnesia (forgetting events prior to the injury)
• Loss of Consciousness
• Post-traumatic Amnesia (forgetting events after regaining consciousness)
• Timeline:

Leaves house 
---no recollection---
Retrograde Amnesia

Crash

Regains Consciousness but 
---not making new memories---
Post-Traumatic Amnesia

New memories

Amnesia Ends
Cognitive Changes: Typical Domains Assessed in Neuropsychological Evaluation

- Intelligence
- Attention
- Sustained concentration
- Verbal and Non-Verbal Memory
- Language, speech, reading, writing
- Cognitive speed
- Sensory & motor abilities
- Visuo-perceptual
- Visuo-motor speed and accuracy
- Personality
Cognitive Abilities Most Affected by Concussion in Adults

- Attention & sustained concentration
- Visuo-motor speed and accuracy
- Cognitive speed
- Verbal and Non-Verbal Memory
Neuropsychological Testing: Computerized Batteries

- Reliability is very poor
- Confusion over instructions
- Wrong buttons
- Accidentally moving screen to screen
- No way to monitor effort
- “Sandbagging” at baseline
- Computer glitches—screen savers, backups
- No measure of delayed recall memory
Paper-and-Pencil, Face-Face Testing: <30’

- Post-Concussion Scale (21 signs/symptoms)
- Verbal learning
- Non-verbal learning
- Visuo-motor sequencing/speed
- Visuo-motor learning
- Attention/concentration
- Frontal executive/cognitive speed
- Review of balance Errors Scoring System (BESS)
- Review of ImPACT computerized battery and SCAT-3
Verbal Learning
Read to patient who recalls; 3 trials

Fork
Rum
Pan
Pistol
Sword
Spatula
Bourbon
Vodka
Pot
Bomb
Rifle
Wine
Non-Verbal Learning
Show to patient for 10”, draws shape & position
Repeat over 3 trials
### Attention and Concentration

1. **Trial 1** 5 - 9  
   **Trial 2** 8 - 3  
   The first time the patient repeats in order.

2. **Trial 1** 4 - 1 - 5  
   **Trial 2** 6 - 9 - 4  
   The second time they are repeated backwards.

3. **Trial 1** 6 - 4 - 3 - 9  
   **Trial 2** 7 - 2 - 8 - 6

4. **Trial 1** 4 - 2 - 7 - 3 - 1  
   **Trial 2** 7 - 5 - 8 - 3 - 6

5. **Trial 1** 6 - 1 - 9 - 4 - 7 - 3  
   **Trial 1** 6 - 1 - 9 - 4 - 7 - 3

6. **Trial 1** 5 - 9 - 1 - 7 - 4 - 2 - 8  
   **Trial 2** 4 - 1 - 7 - 9 - 3 - 8 - 6

7. **Trial 1** 5 - 8 - 1 - 9 - 2 - 6 - 4 - 7  
   **Trial 2** 3 - 8 - 2 - 9 - 5 - 1 - 7 - 4

8. **Trial 1** 2 - 7 - 5 - 8 - 6 - 2 - 5 - 8 - 4  
   **Trial 1** 1 - 6 - 4 - 7 - 5 - 3 - 9 - 8 - 2
Visuo-motor speed, accuracy, shifting gears mentally
Visuo-motor perception, speed, memory
Cognitive Speed, Cognitive Flexibility: Stroop Test

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<th>Color</th>
<th>Stroop Test</th>
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<tbody>
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<td>XXXX</td>
<td>RED</td>
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Delayed Recall

– Free recall of word list
– Recognition of word list from larger list
– Free recall of non-verbal shapes and position
Recovery

• Most uncomplicated concussions resolve in 1-2 weeks, perhaps up to 6 weeks
• If more than a few symptoms, or some severe, consider evaluation at a concussion clinic
• COMPLETE cognitive and physical rest is no longer considered appropriate—no “cocoon”
• Tailor rest to symptoms— if activity produces/exacerbates symptoms, back off
• As recovery progresses, increase activity
Gradual Escalation of Exercise for Most Sports

- Stationary bicycle
- Running
- Weight lifting
- Position-specific drills (e.g., wide receiver runs routes)
- Non-contact practice
- Practice with contact
- Play

If any exercise produces symptoms, back off to prior
Same Exercise Escalation for Adults

- Exercise is good gauge of recovery
- Facilitates neuroplasticity and neurogenesis
- Promotes neurotransmitter recovery
- Improves mood
- Reduces stress
- Better sleep
- Improves self-esteem
- Only need to omit position drills and contact
Gradual Escalation at Work

Similar escalation can be done with work tasks:

- Using computer for increasing lengths of time or increasing complexity
- Attending meetings
- Writing reports
- Staying on feet if in retail sales
- Telephone work
Best Model for Work

– Interview patient about occupation
– Outline specific duties, responsibilities
– Discuss supervisors and supervisees
– Identify potential areas where concussion symptoms could interfere
– Construct plan for escalating duties within each area, and how to back off if needed
– Rest breaks, extended time for tasks
– Consider taking a FEW sick days, and then perhaps part-time days as recovering
Other Factors

– Education and reassurance

– Address stressors
  • Personal
  • Family
  • Work
  • Financial
  • Other responsibilities

– Anxiety and stress management

– Executive functions
  • Planning, organization, sequencing, prioritizing