Appropriate Management of the ADHD Athlete

David Csillan, MS, ATC, LAT
Ewing High School
Ewing, New Jersey
Who Am I?

Being severely learning disabled, this youth could neither read nor write at the age of 12. He overcame his disabilities to win appointment to the US Military Academy at West Point but, even there, had to hire a “reader” to help him get through his studies. His name is...
Who Am I?

General George S. Patton

Commander of the US Third Army

World War II
Dreaminess, poor concentration, a seeming inability to learn anything that did not present immediate, vivid interest: these characteristics of a young Minnesotan made his parents doubt his ability to progress very far in school or in the world. His name was...
Who Am I?

F. Scott Fitzgerald

chronicler of the Jazz Age, one of America’s leading novelists
Even at the time he accepted a chair in Medicine at Yale University, he wrote letters containing “privaledge”, “definate” and “sacarafice”. The name of this language-disabled man of medicine was...
Who Am I?

Harvey Cushing

brain surgeon, father of neurosurgery
What is ADHD?
What is ADHD?

Attention
Deficit
Hyperactivity
Disorder
“...the current term for a specific developmental disorder seen in both children and adults that is composed of deficits in behavioral inhibition, sustained attention and resistance to distraction, and the regulation of one’s activity level to the demands of a situation (hyperactivity or restlessness).”

Russell Barkley, PhD, Dept. of Psychiatry at SUNY Upstate Medical University, Syracuse, NY
ADHD Simulation

Instructions – follow in numerical order

6. From hand to hand 5 times toss the ball
1. 3 times touch your right ear
2. Touch your left shoulder 1 set of 5
5. Get the ball in the front of the room
7. Do 4 right-handed ball squeezes
3. Bend over and touch your left foot with the left hand
4. Do 3 trunk circles counter-clockwise
8. Give me the ball
9. Return to your seat
ADHD Simulation

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1. 3 times touch your right ear
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4. Do 3 trunk circles counter-clockwise
5. Get the ball in front of the room
6. From hand to hand 5 times toss the ball
7. Do 4 right-handed ball squeezes
8. Give me the ball
9. Return to your seat
ADHD Simulation

Instructions – follow in numerical order

1. Touch your right ear 3 times
2. Touch your left shoulder 5 times
3. Bend over and touch your left foot with the left hand
4. Do 3 trunk circles counter-clockwise
5. Get the ball in front of the room
6. Toss the ball from hand to hand 5 times
7. Do 4 right-handed ball squeezes
8. Give me the ball
9. Return to your seat
Differential Diagnosis

- Psychiatrists
- Neurologists
- Behavioral Pediatricians
- Psychologists
Associated Causes

Environmental?

- Neurobiology
- Genetics
Associated Causes

**Environmental**
- Link with cigarette / alcohol use during pregnancy?
- Exposure to toxic level of lead in paint or plumbing

**Genetics**
- 25% of immediate family members with ADHD children also have ADHD

*National Institute of Mental Health 2005*
Associated Causes

Neurobiology

Frontal Lobes of the Cerebrum:
Problem solving, plan ahead, understand the behavior of others, restrain impulses

Right and left lobes communicate with each other through the nerve fibers (corpus callosum) connecting both lobes
Associated Causes

Neurobiology

Basal Ganglia

Interconnected gray masses deep in the cerebral hemisphere serve as the connection between the cerebrum and cerebellum. With the cerebellum, it is responsible for motor coordination.
Associated Causes

Neurobiology

ADHD children show a 3% - 4% smaller brain volumes in all regions: the frontal lobes, temporal gray matter, caudate nucleus and cerebellum.

Treatment involves reaching a balance in the brain either by:

- Increasing cognitive activity, thus bringing executive functioning **up** to normal levels
- Increasing inhibitory activity, thus bringing impulsivity **down** to normal levels.

*National Institute of Mental Health 2005*
Associated Causes

2 Schools of Thought

Dopamine
This neurotransmitter is involved in controlling emotions and reactions, concentrating, reasoning, and coordinating movement. An abnormally low level of dopamine can cause inattention, impulsiveness, and hyperactivity.

RX Goal: Increase levels of Dopamine

Norepinephrine
This neurotransmitter increases the inhibitory mechanisms of the cortex, helping us to "inhibit" our behaviors. Many believe that 70% of the brain is there to inhibit the other 30% of the brain.

Rx Goal: Increase levels of Norepinephrine
Law of Percentages

4 - 5% General Population
8 – 10% Professional Athletes

Law of Percentages

Virginia Survey

- 870 interscholastic athletes completed a survey with questions about ADHD symptoms, treatments and sport performance with their normal pre-participation sport physical.

- Median age was 15 years old

- 50.2% male, 49.7% female

- Student-athletes resided in a mixed urban and rural community in VA

Law of Percentages

Virginia Survey

Results:

• ADHD diagnosis was reported by 7.3% of student-athletes

• 94% ADHD student-athletes take medication

• 25% ADHD student-athletes are under the effects of medication while participating in sports
ADHD Characteristics

Inattention

Makes careless mistakes
Difficulty sustaining attention
Does not seem to listen
Does not follow through
Difficulty organizing tasks
Avoids sustaining mental effort tasks
Often loses things
Easily distracted by external stimuli
Often forgetful in daily activities

Comparison of Characteristics, YouthLight, Inc. 1998
ADHD Characteristics

Hyperactive

- Often fidgets or squirms
- Cannot remain seated for extended periods
- Restless
- Difficulty remaining quiet
- “On the go”, “Driven by a motor”
- Often talks excessively

Comparison of Characteristics, YouthLight, Inc. 1998
ADHD Characteristics

**Impulsivity**
- Blurts out answers before question ends
- Has difficulty waiting turn
- Interrupts or intrudes on others

*Comparison of Characteristics, YouthLight, Inc. 1998*
Treatment: 3 – Prong Approach

- Daily Medication
- Individual / Group Therapy
- Periodic Re-Evaluations
20 – 30% of adolescents with ADHD also have another learning disability.

National Institute of Mental Health
“2 For 1” Disorder

• Depression
  - low self esteem

• Bipolar
  - mood cycling

• Obsessive Compulsive Disorder (OCD)
  - recurrent and persistent habits
“2 For 1” Disorder

- **Oppositional Defiant Disorder (ODD)**
  - non-compliant, stubborn behavior

- **Anxiety**
  - anxious attitude, panic attacks

- **Tourette Syndrome**
  - nervous tics, vocal sounds
Famous People With Learning Disabilities

Alexander Graham Bell
Whoopi Goldberg
Albert Einstein
Winston Churchill
Thomas Edison
Erin Brockovich
Beethoven
Ann Bancroft
Louis Pasteur
Ervin "Magic" Johnson
Ernest Hemingway
Cher
John F. Kennedy
Woodrow Wilson
Walt Disney
Steven Spielberg
Evaluation Process

• Adolescent interview
• Parental Interview
• Teacher Rating Scale
• Neurological Exam

Edward Hallowell, MD, The Hallowell Center, Sudbury, MA
John Ratey, MD, Harvard Medical School, Boston, MA
Medications

**Stimulants**

- Short-Term Form
- Sustained Release
Medications

Ritalin

Adderall

Concerta

* works on neurotransmitter dopamine
Medications

Strattera®

* FDA approved, not a stimulant, works on neurotransmitter norepinephrine
Medications

Performance “Enhancer” or “Equalizer”? 

- Stimulants are considered to be performance enhancing by the NCAA and the IOC and are included in the list of banned substances.

- The key issues are optimizing an athlete’s academic and athletic performance while avoiding side medical effects AND testing positive for a banned substance.

**Problem:** The primary goal for using a stimulant medication is to boost academic performance by improving concentration and enhancing learning. However, this medication is beneficial when competing for these same reasons; therefore, may be looked at as an ergogenic drug.
Medications

Avoiding the Positive Drug Test

• The athlete should inform his/her medical doctor that he/she is a competitive athlete.

• If appropriate, the school should provide their State Athletic Association (HS) or US Anti-Doping Agency (collegiate) with information on the prescribed medication.
Athletic Trainer must be familiar with minor but common side effects

- Decreased Appetite
- Anxiety
- Irritability
- Insomnia
- Stomach Ache
- Headache
- Slight Chest Discomfort
- Palpitations
Medication: Side Effects

“2 For 1”

Athletic Trainer must be familiar with interactions of other medications
Medication: Side Effects

Abilify

- Treats mood disorders
- Disrupts body’s ability to reduce core body temperature

Concern: Strenuous exercise, exposure to extreme heat, dehydration

Direct correlation between usage and slight weight gain (consideration for wrestlers)

Physicians Desk Reference 2006
Medication: Side Effects

Research or Speculation

• To date, no formal research has been done with ADHD medications and athletes (dehydration, hyperthermia, weight gain, etc...)
Athletes With ADHD

Scott Eyre
Pitcher, Philadelphia Phillies

Cammi Granato
Gold / Silver medal
USA Woman’s Ice Hockey

Chris Kaman
Center, Los Angeles Clippers
The Concussed ADHD Athlete

“Relationship Between Concussion and Neuropsychological Performance in College Football Players”

Michael W. Collins, PhD, Scott H. Grindel, MD, Mark L. Lovell, PhD, et.al.

JAMA, September 8, 1999, Vol 282, No.10
The Concussed ADHD Athlete

Purpose: To assess the relationship between concussion history and learning disability (LD) and the association of these variables with neuropsychological performance and to evaluate post-concussion recovery in a sample of college football players.

Subjects: 393 male college football players from 4 Division 1A programs.

Baseline: Self-reported.

Age, playing position, SAT/ATC scores, hx of LD, neurological hx, hx of psychiatric illness, hx of alcohol and/or drug abuse, prior sports played, hx of concussion.
The Concussed ADHD Athlete

Pre-Concussion Baseline: A battery of neuropsychological tests performed.

- Hopkins Verbal Learning Test (verbal learning / delayed memory)
- Trail-Making Tests (visual scanning / executive functioning)
- Digit Span Test (attention and concentration)
- Symbol Digit Modalities Test (information processing speed)
- Grooved Pegboard test (bilateral fine motor speed)
- Controlled Oral Word Association Test (word fluency)
- Concussion Symptom Scale (assess baseline of self-reported symptoms)
The Concussed ADHD Athlete

Post-Concussion Evaluation: Within 24 hours and days 3, 5, & 7

Neuropsychological Tests (identical to baseline)
Both the Hopkins Verbal Learning Test & Controlled Oral Word Association Test were altered in order to minimize the learning effects associated with them.

Self-Report Inventory (identical to baseline)
The Concussed ADHD Athlete

Results:

• 24 hours following a concussion, verbal learning and memory appeared to be noticeably worse with the LD athletes.

• At days 3, 5 & 7, greater improvement was noticed in the controlled subjects compared to the LD athletes.

• LD athletes sustaining 2 or more concussions performed significantly worse on tests of executive functioning and speed of information processing.
The Concussed ADHD Athlete

Support of 3 Hypotheses:

1. LD concussed athletes may have less brain reserve capacity.

2. LD may have made the initial diagnosis of concussion more complex and confusing.

3. LD athletes have difficulty learning proper techniques and impulsivity / attention impairment may lead to increased risk of injury.
The Concussed ADHD Athlete

Study Limitations:

1. Although athletes were medically diagnosed with LD, concussion history was obtained by clinical interview; thus, representing no verifiable self-reported data.

2. Alcohol and drug use were self-reported and may be subject to underreporting.

3. Sample size of this study was relatively small.
Computerized Neuropsychological Screening

“Computerized Neuropsychological Screening of Adolescents With ADHD”

GL Iverson, PhD, CL Strangway, BA

Presented at the National Association of School Psychologists, Dallas, Tx, April 1, 2004
Computerized Neuropsychological Screening

**Purpose:** Study the sensitivity of a computerized neuropsychological screening battery (ImPACT) to the cognitive effects of ADHD.

**Subjects:** 38 healthy adolescents with a self-reported diagnosis were compared to 38 matched adolescents with no self-reported ADHD, learning or speech-related problems.

The suspected ADHD adolescents were not medically diagnosed. They were a sample of convenience. The two groups were matched on age (13 - 19), education (8 - 12), gender and number of previous concussions or head injuries. Majority were males (92%).
Computerized Neuropsychological Screening

Instrument:

- ImPACT computerized screening battery, (Immediate Post-concussion Assessment and Cognitive Testing) was utilized for data collection.

- ImPACT is specifically designed for assessing sports-related concussion.

Method:

- The test battery was self-administered and took 20 minutes to complete.

- Composite scores were determined for verbal memory, visual memory, processing speed, reaction time and impulse control.
Results:

- Significant differences
  Composite scores for Visual Memory, Processing Speed and Impulse Control.

- No significant difference
  Reaction Time Composites

** Although Verbal Memory Composite scores in the ADHD group was somewhat lower, it was not significant.
Conclusion:

• This was the first study using ImPACT in ADHD research.

• ImPACT is a rapid screening tool and not meant to be a comprehensive assessment.

• Due to its ease of use, repeatability, and sensitivity to the cognitive effects of ADHD, additional research is needed to determine the clinical usefulness of this tool for the ADHD population.
Q: Can a concussion cause ADHD?

A: Remember, ADHD is a result of a chemical imbalance in the brain. However, concussions can create symptoms which mimic ADHD.
Tips For Success

- Sensory Considerations
- Visual Equipment Cues
- Explanations
- Treatment Pastimes
- Written Cues
- Sarcasm
- Verbal / Visual Task Cues
- Rewards
Tips For Success

Sensory Considerations

- Prior to an evaluation, explain the tests to be performed
- Gradually add ice to an ice bath
Tips For Success

Explanations

• Initial one-on-one time
• Explain the rehabilitation plan
• Dry run through exercises
• Point out equipment to be used
The Car Ride
Tips For Success

Written Cues

- Write rehabilitation program in checklist format
- Keep a copy accessible to the athlete
Tips For Success

Verbal / Visual Task Cues

- Give subtle cues when the athlete gets off task
Tips For Success

Visual Equipment Cues

• Label equipment for easy identification

• Color code equipment
Tips For Success

Sarcasm

- ADHD and sarcasm do not mix
- Speak literally to avoid misunderstandings
Tips For Success

Rewards

• Establish short-term goals
• Provide small, immediate rewards to help maintain focus and motivation
Tips For Success

Treatment Pastimes

Etch-A-Sketch

Magna Doodle

Magazines
More ADHD Athletes

I am a NFL Hall of Fame quarterback who led my team to four Super Bowl victories.

Who am I?

*ADDitude Magazine, 2007*
More ADHD Athletes

Terry Bradshaw
Pittsburgh Steelers

4 Super Bowl victories in 1970’s
NFL Hall of Fame

*ADDitude Magazine, 2007*
More ADHD Athletes

I am the first American to win eight medals in a single Olympic Games.

Who am I?

ADDitude Magazine, 2007
More ADHD Athletes

Michael Phelps
USA Olympic Swimmer
First American to win 8 medals in a single Olympic Games

ADDitude Magazine, 2007
More ADHD Athletes

I was once crowned the “World’s Fastest Man”.

Who am I?

ADDitude Magazine, 2007
More ADHD Athletes

Justin Gatlin
USA Olympic 100-meter Sprinter

100 meters: 9.77 seconds

ADDitude Magazine, 2007
I was a 1975 World Series MVP and hold the MLB all-time hit record.

Who am I?

ADDitude Magazine, 2007
More ADHD Athletes

Pete Rose
Cincinnati Reds
MLB all-time hit record

ADDitude Magazine, 2007
In Summary

- Know your athletes with ADHD
- Be aware of other disorders
- Be an active member of the management team
- Know your athletes’ medications
- Understand medication side effects / other drug interactions
- Concussions and Return to Play
- ADHD-Friendly Athletic Training Room – Tips for Success
Thank You!
Questions