

AU InforMed

Volume 8 Number 1 (Issue 225)

Monday, February 15, 2010

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Special Edition

The Auburn Update The Reality of College Students with Attention Disorders

Completed as a course requirement for Auburn University Harrison School of Pharmacy, Drug Literature I. Also, it calls attention to several observances in January, including:

March 15-21, 2010, **Brain Awareness Week**

Brain Awareness Week (BAW) is the global campaign to increase public awareness about the progress and benefits of brain research.

March 14-20, 2010, **National Poison Prevention Week**

Since 1961, the third week in March has been designated as *National Poison Prevention Week*. The week is an opportunity to highlight the dangers of poisonings throughout the lifespan and to promote community involvement in poisoning prevention on a local and national level.

For more information on these observances, go to: <http://www.healthfinder.gov/nho/nho.asp>

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The Auburn Update

The Reality of College Students with Attention Disorders

ADHD - An Early History by Haley Fancher

What's in a Name?

- In the 1920s ADHD was thought to be caused by brain damage and was referred to as MBD or minimal brain damage
- In the 1960s The term (MBD) was replaced by the terminology 'hyperkinetic reaction of children' in DSM-II
- In 1980, Attention deficit disorder or ADD came into use with the publication of DSM-III
- In 1987, the DSM-III was revised. The DSM-III-R put forth the terminology currently used of ADHD
- At least the terminology has not gone the route of Nordic countries, who refer to similar symptoms as DAMP or 'Deficits in Attention, Motor control, and Perception'

Timimi S. Naughty Boys Anti-Social Behaviour, ADHD and the Role of Culture. New York: Palgrave Macmillan; 2005.

Meet the writers

Haley Fancher: Editor-In-Chief
 Kerrie Gordon
 Brian Luke
 Sara Nolan
 Carrie Williams
 Jamie Woodson

The first description of ADHD (Attention Deficit Hyperactivity Disorder) by a psychiatrist dates back to 1846. The symptoms were first described by Dr. Heinrich Hoffman, a German Psychiatrist that founded the first mental hospital in Frankfurt. Ironically, Hoffman described the symptoms not in a medical paper but rather in a collection of poems for a children's book called "Struwwelpeter." The text was later translated into English by none other than Mark Twain. Seen at right, "Struwwelpeter" or "Shock-haired Peter" contained a collection of short poems with various moral lessons. One particular poem, "The Story of Fidgety Phillip", contains a description of a young boy whose actions fit many of the ICD-10 criterion for ADHD.¹

In 1902, Dr Frederick Still, considered to be the Father of British Pediatrics, described children that had an incapacity for prolonged attention, restlessness, and other classic symptoms of ADHD in a series of lectures at the Royal College of Physicians. His lectures led to the first iteration, minimal brain damage or MBD, of the various terminology used to describe ADHD. Still, who is most associated with studying rheumatic diseases in children, claimed that the children had a "moral defect" and offered no ideas for treatment other than discipline.²

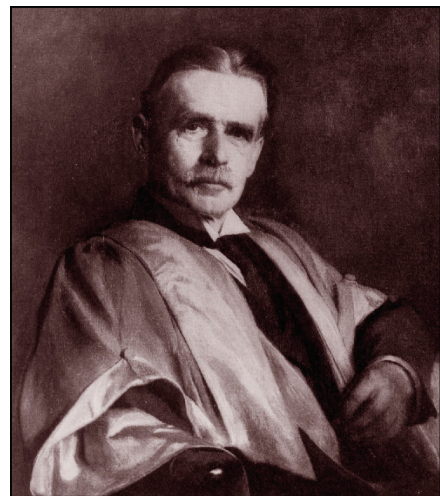
The discovery of stimulant drugs as a treatment for ADHD dates back to 1937. The study and its finding were first reported by Dr. Charles Bradley in the American Journal of Psychiatry in November of that year.² These facts, when presented together, demonstrate that ADHD is not a new disorder, but has been prevalent for over 100 years.

1. Thome J, Jacobs KA. Attention deficit hyperactivity disorder (ADHD) in a 19th century children's book. Eur Psychiatry. 2004 Aug; 19 (5): 303-37.

2. Timimi S. Naughty Boys Anti-Social Behaviour, ADHD and the Role of Culture. New York: Palgrave Macmillan; 2005. 116p.



"Struwwelpeter" cover art found at www.sagen.at/texte/maerchen/maerchen_deutschland/hoffmann/struwwelpeter.html



Sir George Frederick Still portrait www.smallandspecial.org/static/images/sir-fredericc-still-portait_lrg.jpg

CNS Stimulants as an ADHD Treatment by Kerrie Gordon

Central Nervous System (CNS) stimulants are among the most misused drugs. CNS stimulants are commonly used in the treatment of attention-deficit hyperactivity disorder (ADHD) and narcolepsy. These are used to increase alertness and also increase the amount of brain activity by enhancing the activity of the natural chemicals in the brain. Adderall (amphetamine) and Ritalin (methylphenidate) are among the most commonly used CNS stimulants today.¹ These medications have been associated with certain adverse effects, drug dependency, and can interact with certain foods.

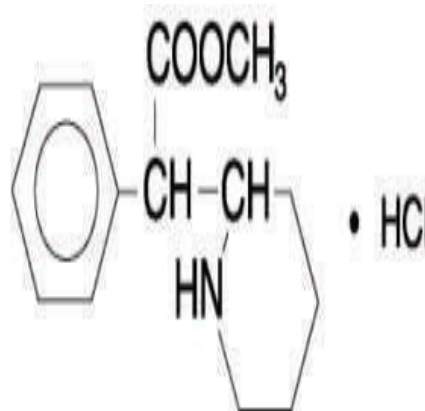
Important Facts on CNS Stimulants (1,2)

- ◆ Black box warning because of stimulatory effects on cardiovascular system
- ◆ Recommended cardiovascular examination for children diagnosed with ADHD
- ◆ Increased heart rate
- ◆ Increased blood pressure
- ◆ Increased overall body temperature
- ◆ May cause nervousness, dizziness, and insomnia
- ◆ Likely to cause addiction
- ◆ Should avoid other stimulants like caffeine and alcohol
- ◆ Acts as an appetite suppressant
- ◆ After prolonged use, taper off the medication

1. Prescription Drug Abuse and Addiction; National Institute of Drug Abuse Research Report Series. August, 2005: (5)1-11

2. Lexi-Comp® Online [AUHSOP Intranet]. Hudson, OH : Lexi-Comp Inc. [updated 2009 February 3, cited 2009 March 21, 2009]. [about 1 p.] Available from <<http://online.lexi.com/crlsql/servlet/crlonline>>

“Adderall (amphetamine) and Ritalin (methylphenidate) are among the most commonly used CNS stimulants today.”¹



Ritalin hydrochloride, methylphenidate hydrochloride Structure

<http://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?id=4249>



http://www.healthsquare.com/newrx/add1008_4.htm

A special thank you to our sponsor, Women & Children's Hospital in St. Clair, AL!

An Alternate Approach for the Management of ADHD by Sara Nolan

Stimulants are not the only treatment for Attention Deficit Hyperactivity Disorder (ADHD). Among the past few years there have been numerous studies on the usage of non-stimulants for the treatment of attention disorders. These studies have opened the doors to antidepressants and St John's Wort as possible treatment options.

Bupropion (an antidepressant) was found to improve ADHD symptoms in 76% of the patients taking the medication which was compared to only 37% improvement in the patients taking the placebo. Lithium was compared to methylphenidate in another clinical trial. Both medications produced comparable improvements in ADHD symptoms such as antisocial behavior, anxiety, and depression. Paroxetine (an antidepressant) showed improvements in 17% of the patients taking the medication which was compared to 16% improvements in the patients taking the placebo. Desipramine (an antidepressant) showed a 68% response compared to 0% response in the placebo group.¹

Hypericum perforatum (St John's Wort) was compared with placebo in a randomized, double-blind, placebo controlled trial. At the end of this eight week trial it was concluded that Hypericum perforatum did not improve the symptoms associated with ADHD. In fact, in some categories, the placebo group actually showed more improvement than the medication that was tested.²

Despite proving some of these medications inefficient in the treatment of ADHD, several clinical trials have given us a variety of alternative therapies. CNS stimulants are still the gold standard for the treatment of ADHD; however, clinical trials will continue to search and one day may discover an equally, if not superior treatment for the symptoms associated with ADHD.

1. VerBeeck W, Tuinier S, Bekkering GE. Antidepressants in the Treatment of Adult Attention-Deficit Hyperactivity Disorder: a Systematic Review. *Advanced Therapy*. 2009 23 Feb; 26(2): 170-184.

2. Weber W, Stoep AV, McCarty RL, et al. Hypericum perforatum (St John's Wort) for Attention-Deficit/Hyperactivity Disorder in Children and Adolescents: A Randomized Controlled Trial. *JAMA*. 2008 11 June; 299 (22): 2633-2641.

Not Just For Kids: ADHD in Adults by Brian Luke

ADHD in children is readily diagnosed, but often overlooked is the number of adults who suffer from the disorder. This may occur because ADHD is often less pronounced in adults, so more thorough interviewing about inattention, restlessness, impulsivity, and disorganization is necessary¹. Several studies have shown a genetic link and structural brain differences in adults with ADHD. The disorder in adults also results in poor socioeconomic status, lower educational level, and a higher probability of unemployment, failed marriages, criminal behavior, and traffic accidents².

Many studies have concluded that ADHD does decline with age. An exception is studies that include a high percentage of women. Women with ADHD often elude detection as children, since they are less likely to engage in disruptive behavior. As they age, however, comorbid psychiatric disturbances begin to emerge and when they present themselves for medical attention, these women will receive the ADHD diagnosis².

Another facet of adult ADHD is that, according to one study, only one quarter of cases are diagnosed during childhood or the teen-age years. Possibly this happens because the behaviors of ADHD patients might become more problematic in adulthood: the adult faces different challenges than the child – marriage, parenting, and career management. This might lead them to visit a primary care physician or psychiatrist, whereas their behavior during younger years might not have conflicted as much with the expectations of society¹.

Long term studies of ADHD patients have revealed that the disorder is connected with significant psychopathology and dysfunction in the adult years. Dr. Joseph Biederman, Chief of the Clinical and Research Programs in Pediatric Psychopharmacology and Adult ADHD at Massachusetts General Hospital, conducted a ten year study of ADHD youth. At the conclusion of the study, the mean age of the participants was twenty-two years. He found that the prevalence of major depression, bipolar disorder, agoraphobia, obsession-compulsion disorder, antisocial personality disorder, Tourette's disorder, nicotine de-

pendence, alcohol dependence and drug dependence was higher for ADHD patients than for controls without ADHD³.

1. Faraone SV, Spencer TJ, Montano CB, Biederman J. Attention-Deficit / Hyperactivity Disorder in Adults. *Arch Intern Med.* 2004; 164: 1221-1226.
2. Simon V, Czobor P, Balint S, Meszaros A, Bitter I. Prevalence and correlates of adult attention-deficit hyperactivity Disorder: meta analysis. *The British Journal of Psychiatry.* 2009; 194: 204-211.
3. Biederman J, Monuteaux MC, Mick E, Spencer T, Wilens TE, Silva JM, Snyder LE, Faraone SV. Young adult outcome of attention deficit hyperactivity disorder: a controlled 10-year follow-up study. *Psychological Medicine.* 2006; 36: 167-179.



College Student Suffers a Heart Attack from ADHD Drug and Alcohol Usage by Carrie Williams



The Journal of the American Board of Family Medicine recently reported a case in which a college freshman was taken to the emergency room after complaints of having chest pain for two consecutive days. The freshman was a 20 year old African American male who had no other medical conditions other than attention deficit hyperactive disorder (ADHD), which he had been diagnosed with two years prior. At the time of his diagnosis of ADHD, he was given a prescription for Adderall XR (15 mg) and was told to take it once each day. The

patient had no other medical conditions nor was he taking any other medications on a regular basis. However, he did admit that he had not been taking his Adderall XR correctly. A few weeks prior to his hospital visit, he had stopped taking his medication all together. He also confessed to smoking cigarettes occasionally and marijuana several months before and also to drinking alcohol in the preceding three nights before. The patient denied any other illicit drug usage and knowledge of having any drug allergies.

In regards to his drinking for the past three evenings, the student had been studying in the evening for exams that were approaching and afterwards, he would drink a bit of whiskey before falling asleep. In addition to drinking, on the second night be-

fore his admission, he decided to take 2 tablets of his 15mg Adderall XR to help him stay awake and later that afternoon he began to experience chest pain and a slight headache.

After 30 minutes had past since his symptoms began, he was still experiencing complications so he then took a single tablet of Tylenol. Twenty-four hours after the administration of Tylenol, his chest pain never completely ceased and his discomfort continued. The young man was then picked up from campus by a parent and was taken to the emergency room.

Upon his arrival, the student was given a dose of 325mg Aspirin, followed by 4mg of intravenous morphine two hours later. His chest pain was alleviated and a physical assessment

of his cardiovascular, respiratory and abdominal systems found no complications. After several other tests were performed, the 20 year old was finally discharged from the hospital with a diagnosis of experiencing a myocardial infarction (heart attack) most likely due to his Adderall XR usage. He was then given specific orders to avoid all drugs which contained the main ingredient of Adderall XR, amphetamine, and to take only a daily regimen of 81 mg Aspirin and 2.5 mg Norvasc.

Reference:

Xiangyang J, Velez S, Ringstad J, Eyma V, Miller D, and Bleiberg M. Myocardial infarction associated with Adderall XR and alcohol use in a young man. *J Am Board Fam Med.* 2009 Mar-Apr;22(2):197-201.

Are You More Likely to Become Addicted? by Jamie Woodson

Recently there has been a rise in public health concerns because of the increased use of prescription stimulants. Many studies have been conducted and have shown that it is a growing problem among college students, but even those numbers only show a small portion of the problem seen in colleges nationwide¹.

In a previous study by Knight et al., a comparison of non-prescribed ADHD drug use and other links were examined. This study was based on a random survey from 2001 using 119 colleges in the United States. There were a total of 10,904 respondents which gave a response rate of 52%. Demographics, institutional characteristics, and other substance abuse behaviors were also considered. Students were asked not to list any medications given under doctor's orders.

Reports found:

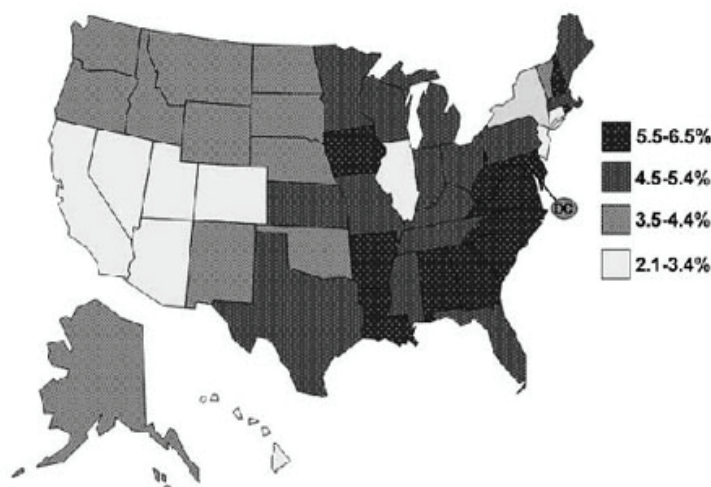
- 6.9% were life-time ADHD drug abusers
- 4.1% had used non-prescribed ADHD drugs in the past year
- 2.1% had used non-prescribed ADHD drugs in the past month

The study also stated that usage was highest among males versus females, Caucasians, members of fraternities/sororities, students with lower grade point averages, colleges in the North-eastern part of U.S. and Ivy League Colleges. Those who reported were also more likely to use alcohol, cigarettes, marijuana, ecstasy, cocaine, and other risky behaviors².

Though these results may seem low, it is an increasing concern because of the high risk side effects when these stimulants are not taken as prescribed under a physician. ADHD drugs have shown to be highly effective in treating individuals diagnosed with ADHD, but are greatly discouraged for illicit use. Researchers foresee that these numbers will continue to rise in the student population which creates the need for monitoring and further intervention efforts to curb this new form of drug abuse^{1,2}.

1. Boyd CJ, Cranford JA, LaGrange K, McCabe SE, Teter CJ. Illicit Use of Specific Prescription Stimulants Among College Students: Prevalence, Motives, and Routes of Administration. *Pharmacotherapy* [Internet]. 2006 Oct [cited 2009 Apr 20]; 26(10): 1501-1510. Available from: <http://www.atypon-link.com/PPI/doi/pdf/10.1592/phco.26.10.1501>
2. Knight JR, McCabe SE, Teter CJ, Wechsler H. Non-medical use of prescription stimulants among US college students: prevalence and correlates from a national survey. *Addiction* [Internet]. 2005 Jan [cited 2009 Apr 2]; 100(1): 96-106. Available from: <http://www3.interscience.wiley.com.libproxy2.usouthal.edu/cgi-bin/fulltext/118739143/PDFSTART>

State-based Prevalence Data of ADHD Medication Treatment
Percent of Youth 4-17 ever diagnosed with Attention-Deficit/Hyperactivity Disorder: National Survey of Children's Health, 2003



CDC: Your Online Source for Credible Health Information [Internet]. Atlanta, GA: Center for Disease Control and Prevention [updated 2009 March 13, cited 2009 April 16, 2009]. [about 5 screens] Available from <http://www.cdc.gov/ncbddd/adhd/data.html>

ADHD by the numbers- CDC Facts and Stats

- Boys (9.5%) are more likely than girls (5.9%) to have been diagnosed with ADHD.
- Prevalence varies substantially by state, from a low of 5% in Colorado to a high of 11.1% in Alabama.
- As of 2003, 2.5 million youth ages 4-17 years (56% of those with a diagnosis) were receiving medication treatment for the disorder.
- Children with ADHD, compared to children without ADHD, were more likely to have major injuries (59% vs. 49%), hospital inpatient (26% vs. 18%), hospital outpatient (41% vs. 33%), or emergency department admission (81% vs. 74%).
- The total excess cost of ADHD in the US in 2000 was \$31.6 billion. Of this total, \$1.6 billion was for the treatment of patients, \$12.1 billion was for all other healthcare costs of persons with ADHD, \$14.2 billion was for all other healthcare costs of family members with ADHD, and \$3.7 billion was for the work loss cost of adults with ADHD and adult family members of persons with ADHD.
- Across 10 countries, it was projected that ADHD was associated with 143.8 million lost days of productivity each year. Most of this loss can be attributed to ADHD and not co-occurring conditions.

CDC: Your Online Source for Credible Health Information [Internet]. Atlanta, GA: Center for Disease Control and Prevention [updated 2009 March 13, cited 2009 April 16, 2009]. [about 5 screens] Available from <http://www.cdc.gov/ncbddd/adhd/data.html>

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