

Outline

- Diagnostic Criteria
- Epidemiology
- Etiology
- Adult Characteristics
- Evaluation
- Differential Diagnosis
- Treatment
- Summary
- Review Questions



Diagnosis Begins... Utah Criteria-1993

- Paul Wender developed adult ADHD criteria
- ADHD sx in childhood-hyperactivity, inattention and impulsivity
- Hot temper-quick calming down
- Emotional overreactivity-easily stressed
- Disorganization-tasks not completed
- Impulsivity/impatience
- Associated sx-marital, vocational, occupational problems

• Wender, P. ADHD in Adults, Psychiatric Times, 1996 vol 13, No. 7
• Wender PH. Attention-Deficit Hyperactivity Disorder in Adults, New York: Oxford University Press, 1995

DSM

- DSM IV-NO CRITERIA FOR ADULTS
- DSM 5-2013-included in the section on **Neurodevelopmental Disorders**, and not disruptive behavior disorders
- Criteria include adult manifestations-such as difficulty paying bills
- For individuals 17 and above only 5 symptoms are needed instead of the 6-9 for those younger
- Central feature of ADHD is disinhibition
- Deficit in capacity to monitor their own behavior
- Hyperactivity is less overt

Diagnostic Criteria and Symptoms

- Deficits in sustained attention remain
- Appointments are forgotten
- Impulsivity---socially inappropriate behavior-blurting out thoughts which are rude or insulting
- Frustration over the inability to be organized
- Inability to prioritize

Adult Characteristics

- Hyperactivity-inability to relax
- Attention deficits-forgetfulness, losing things
- ABLE to concentrate on things they like
- Affective lability-mood shifts lasts for hours, not days



Childhood Symptoms Versus Adult

Hyperactivity

- Can't sit still, always on the go
- Climbs or runs at inappropriate times

Restlessness

- Can't stay focused on one thing
- Is fidgety or impatient times

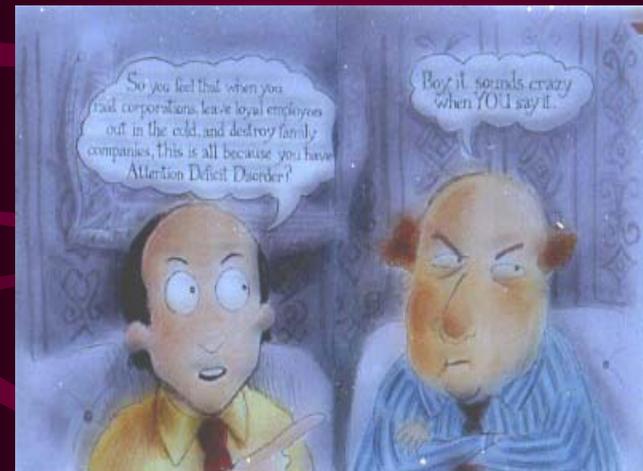
Physical Impulsivity

- Does things that result in injuries

Verbal Impulsivity

- Says the "wrong thing" or speaks out of turn

Characteristic Problems of Adults With ADHD



Epidemiology

- No studies
- 3-10% of children
- M: F-3:1 childhood, 2:1 adulthood
- Girls are more impaired cognitively and more often missed
- 1/3-2/3 persist
- 1-6% adults-9.4 million adults

Mannuzza S, Klein RG, Bessler A, et al. Adult outcome of hyperactive boys. Educational achievement, occupational rank and psychiatric status. Arch Gen Psychiatry. 1993;50(7):565-576



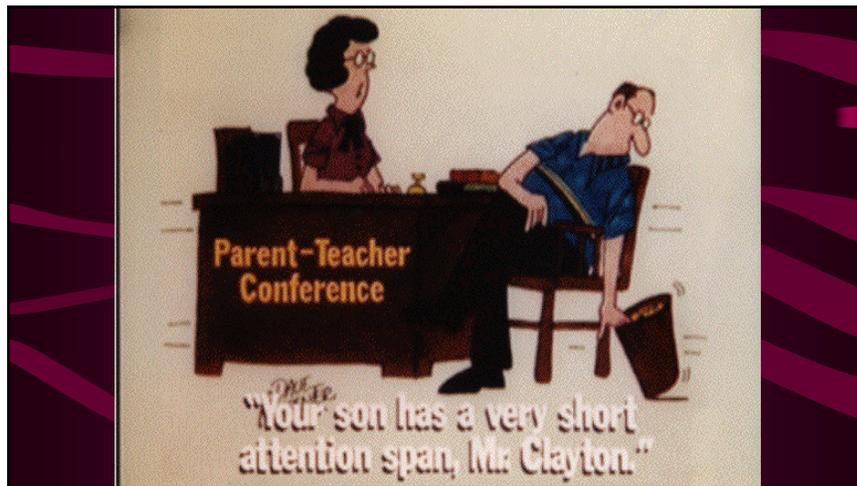
Etiology

- Not known
- Biological vulnerability
- Genetics-proven by adoption studies
- Neurochemical studies
- Frontal lobes



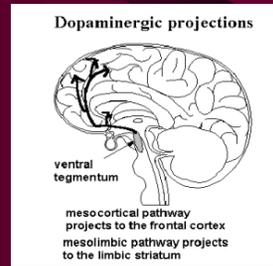
Genetic Susceptibility to adult ADHD

- Heritability is 70% (Hudziak 1998)
- Biological children of adults with ADHD are at high risk for ADHD (Biederman 1992)
- D2 receptor gene (Faraone, 2002)
- D4 receptor gene (Faraone, 2002)
- DA transporter gene (Faraone, 2002)



Neurochemical studies

- DA underactivity theory
- Shaywitz-rat pups depleted DA-ADHD
- NE and attention



The Frontal Lobes

- OFC-impulsive and aggressive behavior
- CBF and glucose utilization are different in ADHD vs. normal children
- Zametkin-1990-decreased glucose metabolism in adult frontal lobes of ADHD adults
- ?antecedents or complications of ADHD



The Frontal Lobes II

- Impairments of frontostriatal brain regions
- Poor inhibitory control
- Similarity between ADHD individuals and those with frontal lobe lesions (Mattes, 1980)
- MRI of ADHD children-reduced volumetric measures of the prefrontal cortex (Filipek et al 1997)
- Persistent ADHD represents a continuation of inhibitory control deficits from childhood (Schultz, 2005)

NO ADHD

ADHD



Why do PCPs miss the dx?

- Confusion about ADHD persisting into adulthood
- Symptoms in adult are less disruptive than they are in children
- PCP receive little training in the diagnosis of adult ADHD



Missing The Diagnosis

- Lack of guidelines for primary care providers
- Lack of objectively verifiable tests
- Diagnostic criteria structured more toward childhood diagnoses
- High rate of media attention predisposing adults toward self diagnoses
- Common comorbidities
- Concern of schedule II drug abuse

ADHD: Impact of Untreated & Under-Treated ADHD

Health Care System

50% ↑ in bike accidents¹
33% ↑ in ER visits²
2-4 x more motor vehicle crashes³⁻⁵

Patient

Family

3-5x ↑ Parental Divorce or Separation^{11,12}
2-4 x ↑ Sibling Fights¹³

Society

Substance Use Disorders:
2 X Risk⁸
Earlier Onset⁹
Less Likely to Quit in Adulthood¹⁰

Employer

↑ Parental Absenteeism¹⁴ and Productivity¹⁴

School & Occupation

46% Expelled⁶
35% Drop Out⁶
Lower Occupational Status⁷

1. DiScala et al., 1998

2. Liebson et al., 2001

3. NHTSA, 1997

4-5. Barkley et al., 1993, 1996

6. Barkley et al., 1990

7. Mannuzza et al., 1997

8. Biederman et al., 1997

9. Pomerleau et al., 1995

10. Wilens et al., 1995

11. Barkley, Fischer et al., 1991

12. Brown & Pacini, 1989

13. Mash & Johnston, 1983

14. Noe et al., 1999

ADHD evaluation

- Most patients are self-referred (Faroane, 2004)
- Mental status examination
- Developmental hx
- Past and present triad-inattention, hyperactivity, impulsivity
- Impairment-school, work, family, peers



What do adult ADHD patients say?

"As a child, I...
zoned on TV"

"As an adolescent, I...
had real social problems. I try to impress people & I've
gotten kicked out of two fraternities."

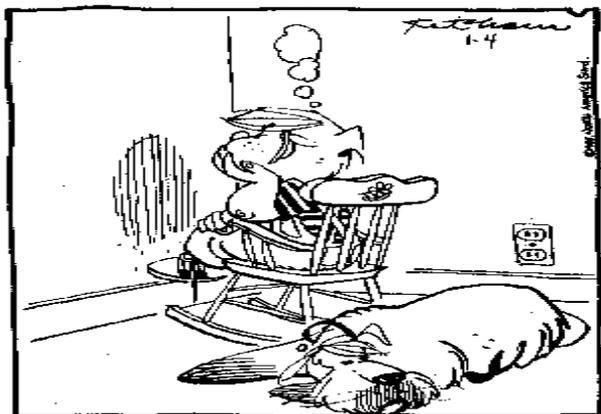
"As a graduate student, I...
never proofed a paper...I never had time to proof it!"

"As an adult, I'm...
- such a space cadet I wonder about ADD!"
- tired of reading the same page over and over & not
getting it!"

Another ADHD Adult - 22 years old - *the literal words*:

"Like I go to the store for shampoo & tooth
pastes and I come home with Hair spray &
cookies - and I'm always late even when
I've tried so hard to be on time. And I
always forget to do the most important
things. And I volunteer my self for two many
things at one time. And my mood swings
are bad, like one minute I am fine, & the
next minute I get angry, scream & holler for
know reason."

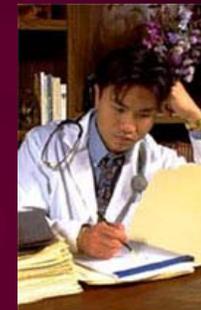
DENNIS THE MENACE



"BY THE TIME I THINK ABOUT WHAT I'M
GONNA DO... I ALREADY DID IT!"

ADHD Evaluation II

- Family hx-ADHD, LC, tic disorders, PTSD, childhood abuse
- Interview SO and/or parent
- Neuro exam
- School hx
- Lab tests-thyroid
- Consider educational testing



ADHD Evaluation III

- Psych hx-dx and rx
- Medical hx-thyroid, seizures, head trauma
- Medications-antihistamines, theophylline, steroids, sympathomimetics
- Rating scales
- PDF-procrastination,
- distractibility
- forgetfulness



DSM-5 Adult ADHD Self-Report Scale-ASRS

- How often do you have difficulty concentrating on what people say to you, even when they are speaking to you directly? (*DSM-5 A1c*, scored 0-5)
- How often do you leave your seat in meetings or other situations in which you are expected to remain seated? (*DSM-5 A2b*, scored 0-5)
- How often do you have difficulty unwinding and relaxing when you have time to yourself? (*DSM-5 A2d*, scored 0-5)
- When you're in a conversation, how often do you find yourself finishing the sentences of people you are talking to before they finish them themselves? (*DSM-5 A2g*, scored 0-2)
- How often do you put things off until the last minute? (*Non-DSM*, scored 0-4)
- How often do you depend on others to keep your life in order and attend to details? (*Non-DSM*, scored 0-3)
- May 1, 2017, JAMA Psychiatry. developed with support from Shire Pharmaceuticals

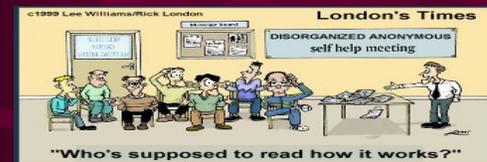
ADHD Evaluation IV

- Interpersonal problems
- Selective inattention, related to pleasure in the task
- Impulsivity-immature, helpless, remorseful, talks excessively, impatient
- Problems initiating tasks



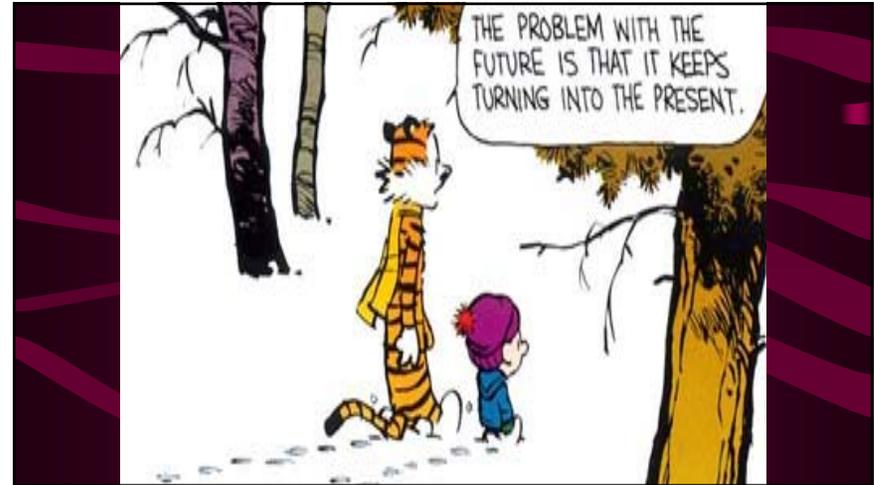
ADHD Evaluation V

- Disorganized
- Difficulties planning, organizing and executing activities
- Inability to sustain task-seen as irresponsible, unreliable and inconsiderate



Executive Function

- Disturbance in impulse control-response inhibition
- Planning problems
- Working memory
- Set shifting



ADHD Evaluation VI

- Cycle of recrimination
- H/o impairment at work and at home
- Divorce, interpersonal conflicts, lower SES, job changes
- Some feel shame
- MVA



Adults with ADHD and MVA

- Young adults with ADHD have more MVA
- 6 week pilot study, RCT using mixed amphetamine salts extended release 20-40 mg
- Driving simulator
- Situation awareness, hazard perception, risk assessment, decision making
- Driving performance was significantly improved compared to placebo



Differential Dx and Comorbidity

- Depression, anxiety, OCD
- Agitated depression
- Anxiety makes ADHD harder to rx
- Cyclothymia vs affective instability



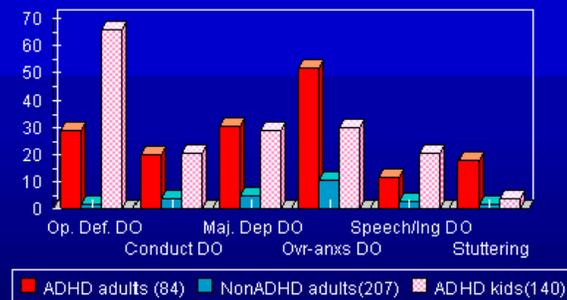
Medical Conditions that Mimic ADHD

- Hyperthyroidism
- petit mal and partial complex seizures
- hearing deficits
- hepatic disease
- lead toxicity
- sleep apnea
- drug interactions

The Developmental Sweep of ADHD

"Patterns of psychiatric comorbidity, cognition, and psychosocial functioning in adults with ADHD." Biederman, Faraone, et al. *Am J Psychiatry* 150:12, 1797-1798. December, 1993.

% ADHD vs. non-ADHD Adults & ADHD Kids



Differential Dx and Comorbidity

- Bipolar D/O-impulsivity in ADHD is thoughtless, compared to driven quality of manic episodes
- Substance abuse is often comorbid with ADHD-maybe stimulant rx in childhood decreases this????



| ADHD | BIPOLAR |
|---------------------|----------------|
| CONSTANT | COMES & GOES |
| STRUGGLE TO WAKE UP | WAKE UP EARLY |
| CONFRONTATIONAL | WITHDRAWN |
| | FAMILY HISTORY |

| ADHD | BIPOLAR |
|---------------------|----------------|
| Constant | Comes and goes |
| Struggle to wake up | Wakes up early |
| Confrontational | Withdrawn |
| | Family history |

Differential Dx and Comorbidity

- Antisocial personality disorder 18-45% childhood ADHD
- LD-62 % ADHD adults have reading problems
- Tourettes's syndrome

Treatment

- Risk/benefit ratio
- Hyperactivity-internal restlessness decreases
- Inattention-better concentration-so is happy
- Mood lability-mood is level
- Stimulants are no cure
- H/o substance abuse is not a contraindication to rx



Decision to Rx

- Impairment in functioning
- Troubled relationships, underachievement
- Need to devote time and energy to medication monitoring
- Failure to respond to nonpharmacological rx



The Decision to Rx-II

- Temper-increase threshold to anger
- Disorganization-improves strategies
- Stress sensitivity-feel less hassled
- Less impulsive-more thoughtful
- Changes may only be seen by so
- Treatment may be life-changing
- Huge human toll when ADHD is missed



Treatment

- Sparse rx data in adults
- 10 double blind placebo controlled studies
- Dramatic short term therapeutic effects
- Multimodal approach is advised
- Rx comorbid conditions, esp anxiety
- Establish target sx



Monitoring Rx

- Vocational functioning
- Daily living skills-eg forgetting keys
- Emotional adjustment
- Family interactions
- Long term supportive rx
- Assess for concurrent drug/ETOH abuse
- Discussion about safe storage of medication



Pharmacotherapy



- Behavioral plan BEFORE writing a prescriptions
- Methylphenidate and Amphetamine
- Bradley-1937-dramatic effect of amphetamine
- Numerous well-designed placebo controlled acute drug studies
- Use has doubled every 4-7 years since 1971-CONTROVERSIAL!

Treatment

- Methylphenidate-5 double blind studies in adults-55% positive responders
- Aimless restlessness becomes more goal directed
- Sustained attention improves
- Inhibitory control improves



Methylphenidate

- 0.1-1.0 mg/kg—20-80 mg/day
- Decreased appetite
- Sleep problems
- Increased HR
- Bp increased-usually minor



Methylphenidate

- Short half life-roller coaster feeling
- Medication holidays for ongoing assessment
- Potential for abuse vs. poor impulse control leading to substance abuse
- Psychotic reactions in high doses

Methylphenidate

- Drug interactions-MAOI-HTN
- Warfarin-monitor INR
- Lowers seizure threshold
- Pressor agents-increase pressor effects

Forms of Methylphenidate

- Focalin-d-isomer of ritalin, 2.5 mg, 5.0 mg, 10.0 mg
- Concerta-18 mg, 27 mg, 36 mg, 54 mg
- Metadate ER-10 mg, 20 mg (released every 4 hours) Metadate CD 20 mg-6 mg initially and 14 mg over time
- Ritalin LA-10 mg, 20 mg, 30 mg, 40 mg- 8 hours

The Patch-Methylphenidate Transdermal



Mixed Amphetamine Salt

- D-amphetamine and l-amphetamine-may have smoother effects due to different absorption rates
- mixed amphetamine salts extended release is a 12 hour pill
- Capsule allows for dosing flexibility
- 5mg, 10 mg, 15 mg, 20 mg, 25 mg, 30 mg
- Recently approved for adult ADHD

FDA Approval of the First and Only Stimulant Prodrug Lisdexamfetamine Dimesylate as a Novel Treatment for ADHD

23 Feb 2007 -

[This] prodrug is therapeutically inactive until metabolized in the body. In clinical studies designed to measure duration of effect, it provided significant efficacy compared to placebo for a full treatment day, up through and including 6:00 pm

The capsules are available in 30-, 50-, and 70-mg strengths for once-daily dosing.

Newest Treatment Options

- **Amphetamine extended-first orally disintegrating extended release product for the treatment of ADHD for people 6 or older.** It is the same as Adderall.... For adults, the maximum dosage is 12.5mg once daily. Tablets come in different forms, including 3.1 mg, 6.3 mg, 9.4 mg, 12.5 mg.
- **Mixed Amphetamine Salt-** long acting triple bead mixed amphetamine salt for 16 and up...lasts 16 hours...doses...12.5 mg, 25 mg, 37.5 mg, 50.0 mg

Atomoxetine

ADHD, for >6 years old

- Only non-stimulant approved to rx ADHD
- NOT a controlled substance
- SNRI
- Drowsiness, nausea, vomiting, ??? Liver problems
- Takes 2-4 weeks
- 10 mg-80 mg/day

Other Agents-Bupropion

Barrickman 1999 double blind crossover study bupropion and methylphenidate- both effective-but bupropion is effective after week 4

- Mean dose 360 mg/day
- 52 % vs. 11%

Modafinil

- Approved for narcolepsy and excessive daytime sleepiness
- Wake promoting agent
- Headaches, nausea, nervousness, insomnia
- 100 mg-400 mg/day
- (Turner et al, Biol Psych
- 2004)



Donepezil

- cholinesterase inhibitor-helps with executive functioning problems
- 2.5 mg/day, max dose 10 mg/day



Nicotine-ABT-418

- Adolescents w/ ADHD smoke 2x as much as their counterparts
- Transdermal patch has been studied in adolescents with ADHD
- Nicotine improved inhibition
- Mecamylamine-1950's active in the brain's nicotinic receptors
- Nicotinic activation enhances DA transmission



Other Agents

- SSRIs good for comorbid anxiety and depression
- Propranolol-promising for temper outbursts, excitability, irritability
- Clonidine-used in children for their irritability-no good studies in adults
- Guanfacine-also good for irritability



- ✦ Each day, make a list of what you need to do. Plan the best order for doing each task. Then make a schedule for doing them. Use a calendar or daily planner to keep yourself on track.
- ✦ Work in a quiet area. Do one thing at a time. Give yourself short breaks.



Child Psychiatrist Referral

- Dangerous or disturbed behavior
- Comorbidities
- Failure to respond to treatment plan
- Wanting a second opinion

CHADD®

Children and Adults With
Attention-Deficit/Hyperactivity Disorder

800-233-4050

ADD/ADHD: A Positive View Don't be a victim ("organic brain disease") - *be a victor!*

- A "warrior hunter", not a "meek farmer"
- Capable of astounding discoveries
- Imbued with boundless energy
- In understanding, there is strength
- In reconciling the ADD/ADHD syndrome with reality, there is wisdom

Summary

- DSM5 adds an Adult ADHD diagnosis-stay tuned
- 1-6% population have adult ADHD-common d/o
- Inattention, impulsivity, hyperactivity
- Decreased DA
- impaired frontostriatal brain regions-lack of inhibition
- No laboratory marker-clinical diagnosis
- Rx may be life-changing
- Huge human toll when ADHD is missed
- Stimulants are the drug of choice



Future Directions

- Etiology of ADHD
- Does early rx effect the DA system?
- Long term studies are needed-this is a chronic condition
- Over and under dx

**You
Mean I'm
Not Lazy,
Stupid Or
Crazy?!**

A Self-Help Book for Adults with
Attention Deficit Disorder

Kate Kelly and Peggy Ramundo

