ADHD

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Conflict of Interest

The presenter indicates that there is no conflict of interest in this presentation,

Objectives

- 1. Recognize signs/symptoms of different types of ADD/ADHD.
- 2. Differentiate ADHD from other disorders.
- 3. Identify the medications used for treating ADD/ADHD, and when to initiate therapy, and how to titrate or change medications.
- 4. Apply diet, behavioral, and medication management to select case study.

ADHD by the Numbers

- **11%** of children 4-17 years old
- **6.4 million** (2011)
- **7.8%** in 2003 to **9.5%** in 2007 and to **11.0%** in 2011.
- Boys (13.2%) were more likely than girls (5.6%)
- **Prevalence rates**: 5.6% in Nevada to18.7% in Kentucky
- **Indiana 15.7%** (2011)
- http://www.cdc.gov/ncbddd/adhd/prevalence.html 2011

ADD/ADHD

- **What is my ADD is not your ADD**
- **Chemical imbalance of one or more of three neurotransmitters in the brain**
  - GABA
  - Dopamine
  - Serotonin

The Overlap


Behavior Disorders
Attention Disorders
Learning Disorders

Primary Symptoms

- Inattentiveness
- Distractibility
- Hyperactivity
- Disorganization
- Impulsivity

DMS-5 Criteria

- **Inattention:**
  - Six or more symptoms of inattention for children up to age 16
  - Five or more for adolescents 17 and older and adults
  - Symptoms of inattention have been present for at least 6 months, and they are inappropriate for developmental level:

- **Hyperactivity and Impulsivity:**
  - Six or more symptoms of hyperactivity-impulsivity for children up to age 16
  - Five or more for adolescents 17 and older and adults
  - Symptoms of hyperactivity-impulsivity have been present for **at least 6 months** to an extent that is disruptive and inappropriate for the person's developmental level.

In Addition

- **The following conditions must be met:**
  - Inattentive or hyperactive-impulsive symptoms were present before age 12 years.
  - Several symptoms are present in two or more setting,
  - There is clear evidence that the symptoms interfere with, or reduce the quality of, social, school, or work functioning.
  - The symptoms do not happen only during the course of schizophrenia or another psychotic disorder.

ADD/ADHD Work-UP

- **History**
  - Behavior noted in more than 1 environment
  - Behavior before noted before 12 years old
  - Last Eye/Hearing Exam and by whom
  - Diet
  - Sleep Pattern
- **Physical Exam**
  - Attention to the Heart, B/P
  - Behavior during visit
- **Connor Scale**
- **Vanderbilt Scale (AAP toolkit)**

Tests

- **Lab:** CBC, T4, Lead level, Magnesium
- **Screenings**: Vision, Hearing
- **Scans** (Becoming Standard of Care: AAP)
  - Normal brain activity at rest
  - Decreased activity, especially in the prefrontal cortex, during a concentration task

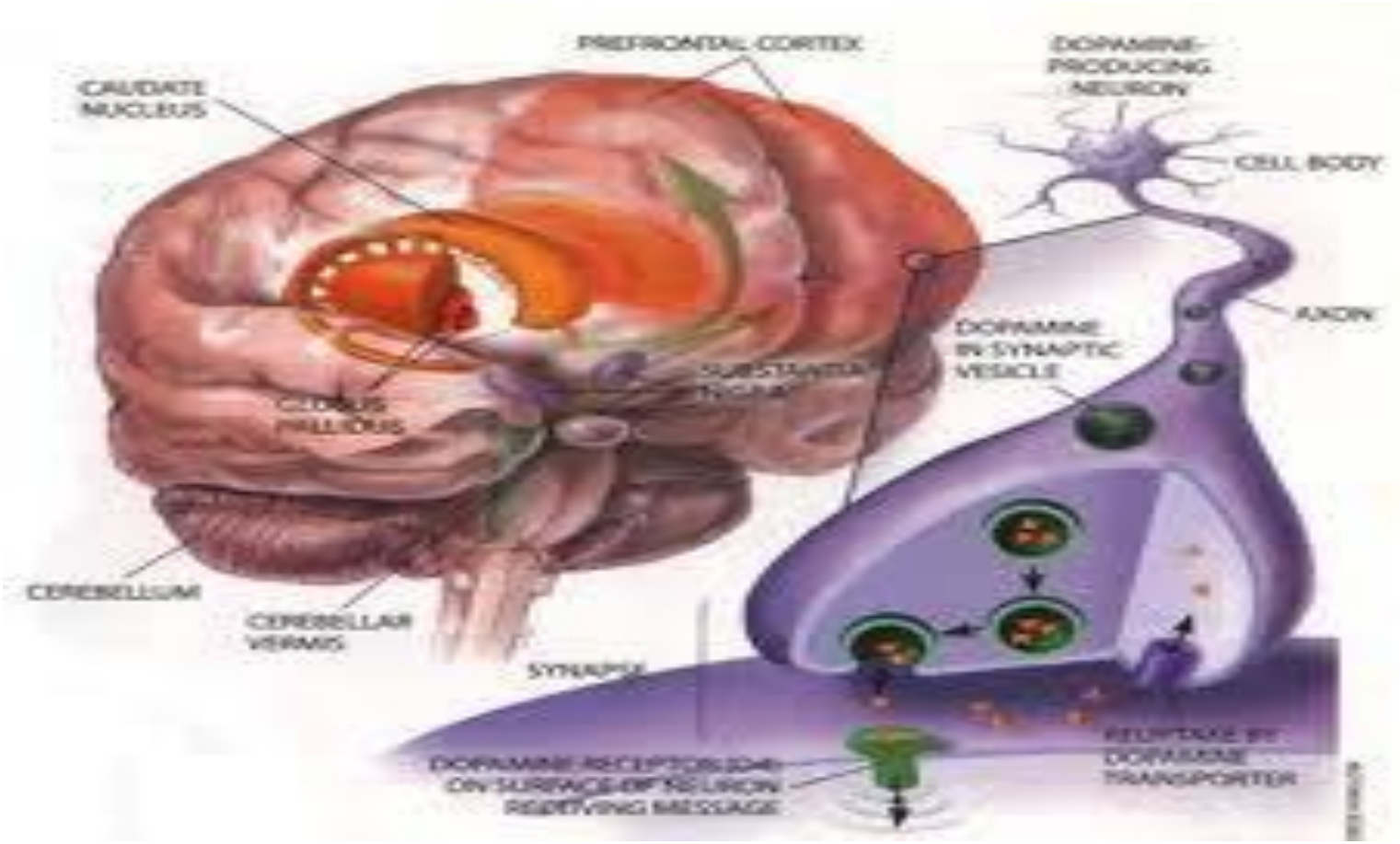
Differential Diagnoses

- Autism
- Elevated Lead Level
- Hyperthyroidism
- Anemia
- Visual/Hearing Disorders
- Oppositional Defiant Disorder

If Behavior Change is New

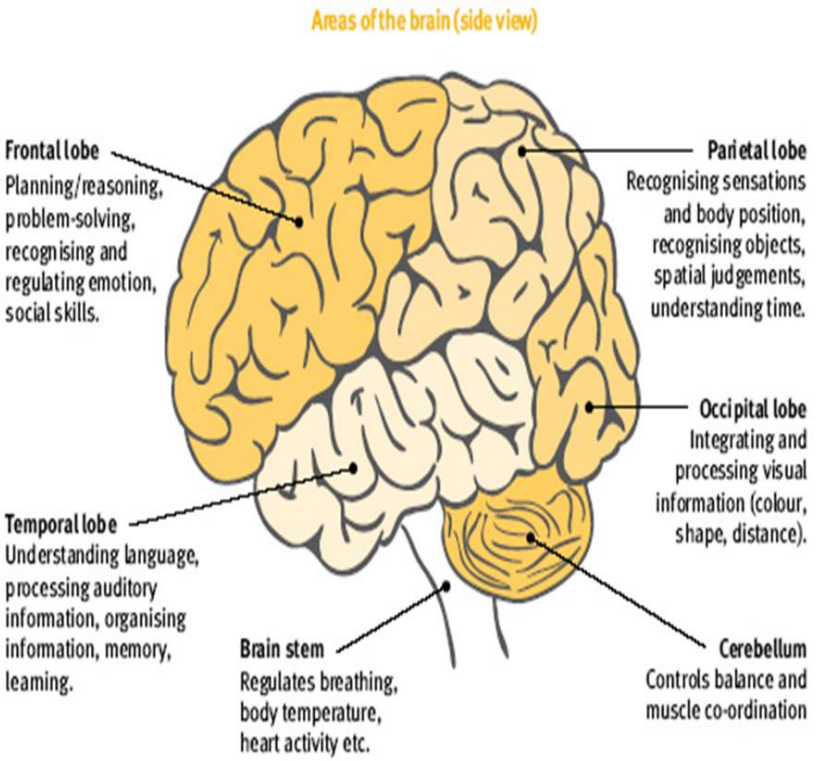
- Consider head injury
- Substance Abuse
- Physical, Sexual, or Psychological Abuse

Affects of ADD on Brain



The Chemicals & the Brain

- Prefrontal cortex
- Cerebellum
- Anterior cingulate
- Basal ganglia
  - Produces Dopamine
- Temporal lobes
- Limbic System

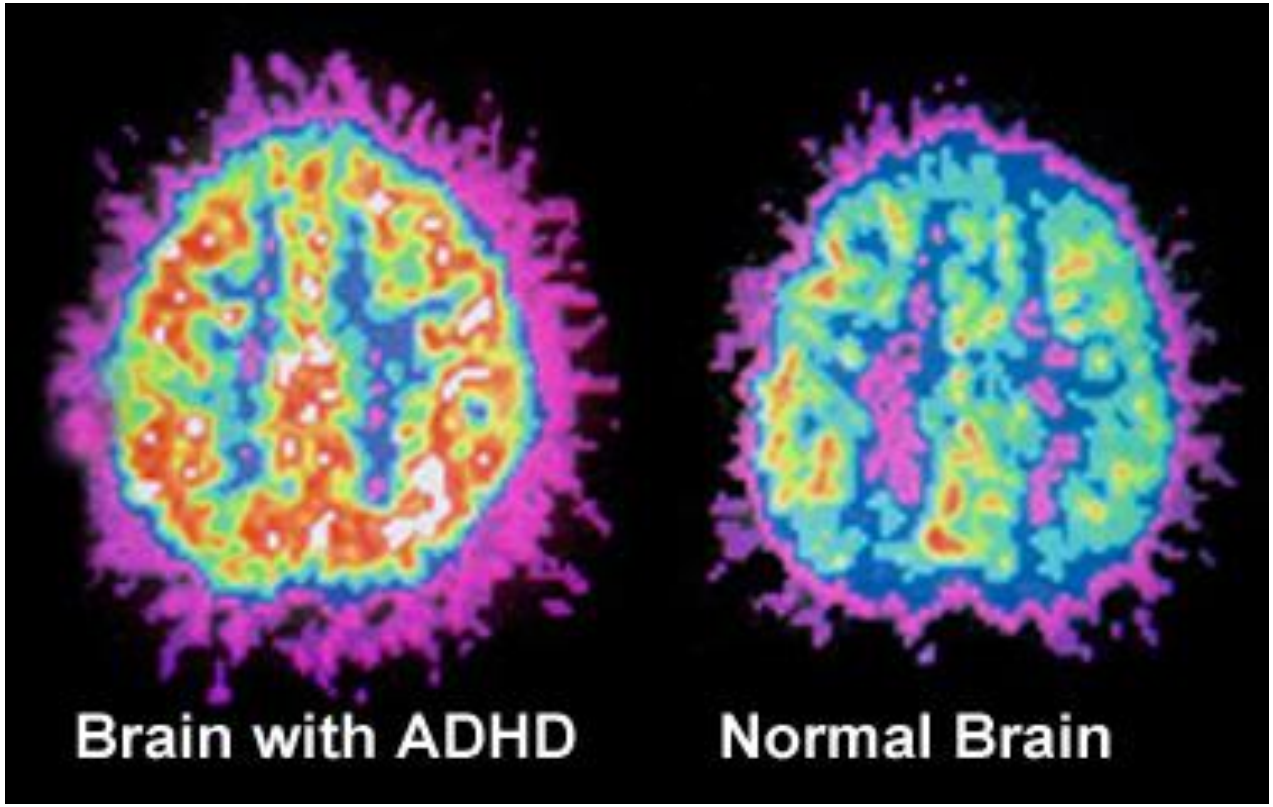


Types of ADHD

- Classic ADD
- Inattentive ADD
- Over-focused ADD
- Temporal Lobe ADD
- Limbic ADD
- Ring of Fire ADD
- Anxious ADD
- Dr. Amens

Classic ADD/ADHD

Zametkin, et al., 1990

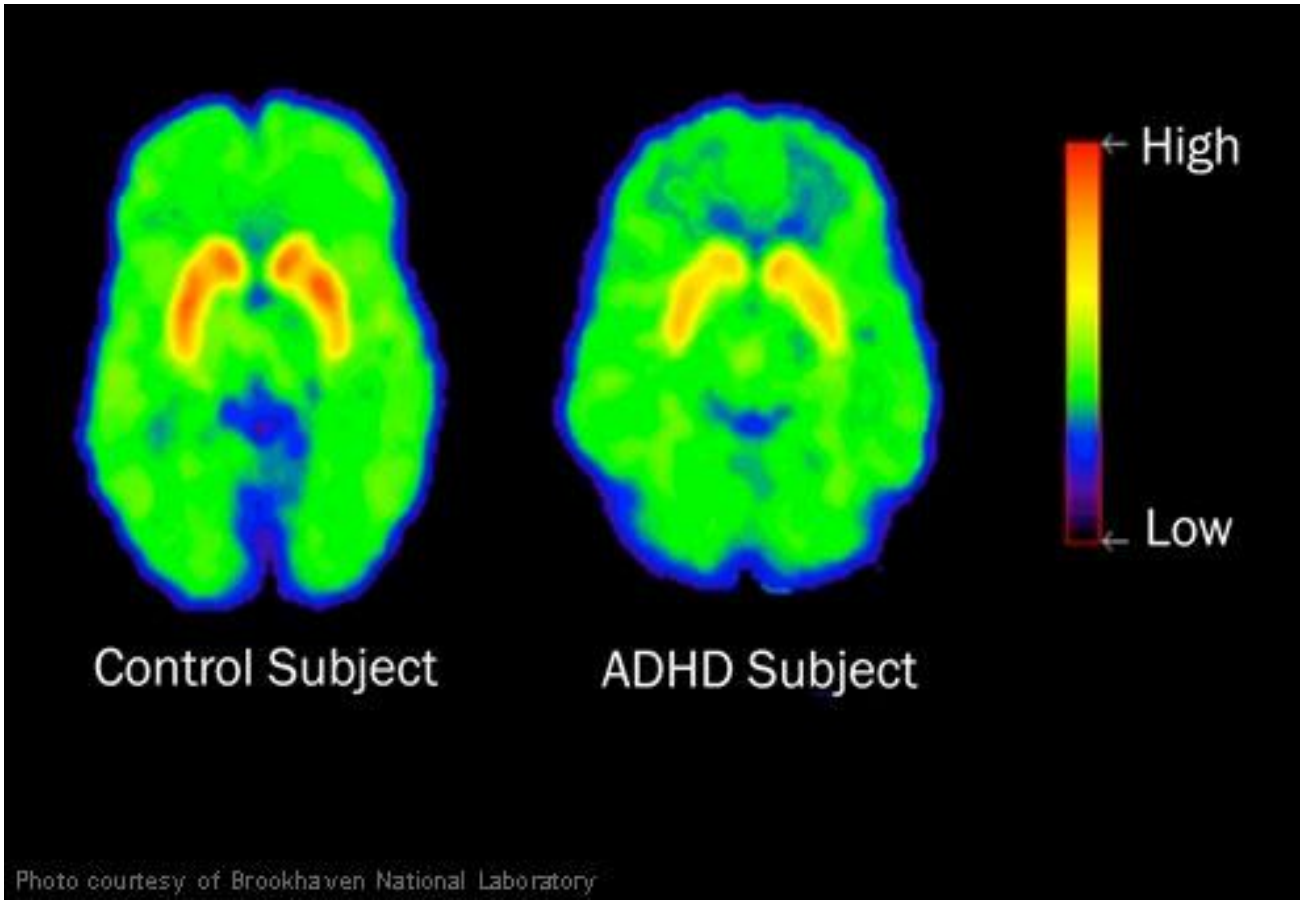


Treating Classic ADD

- Stimulants and Supplements
  - Medications:

    Ritalin, Adderall, Vyvanse, Concerta
  - Supplements: rhodiola, green tea, ginseng, and the amino acid L-tyrosine
- Fish oil that is higher in EPA than DHA.

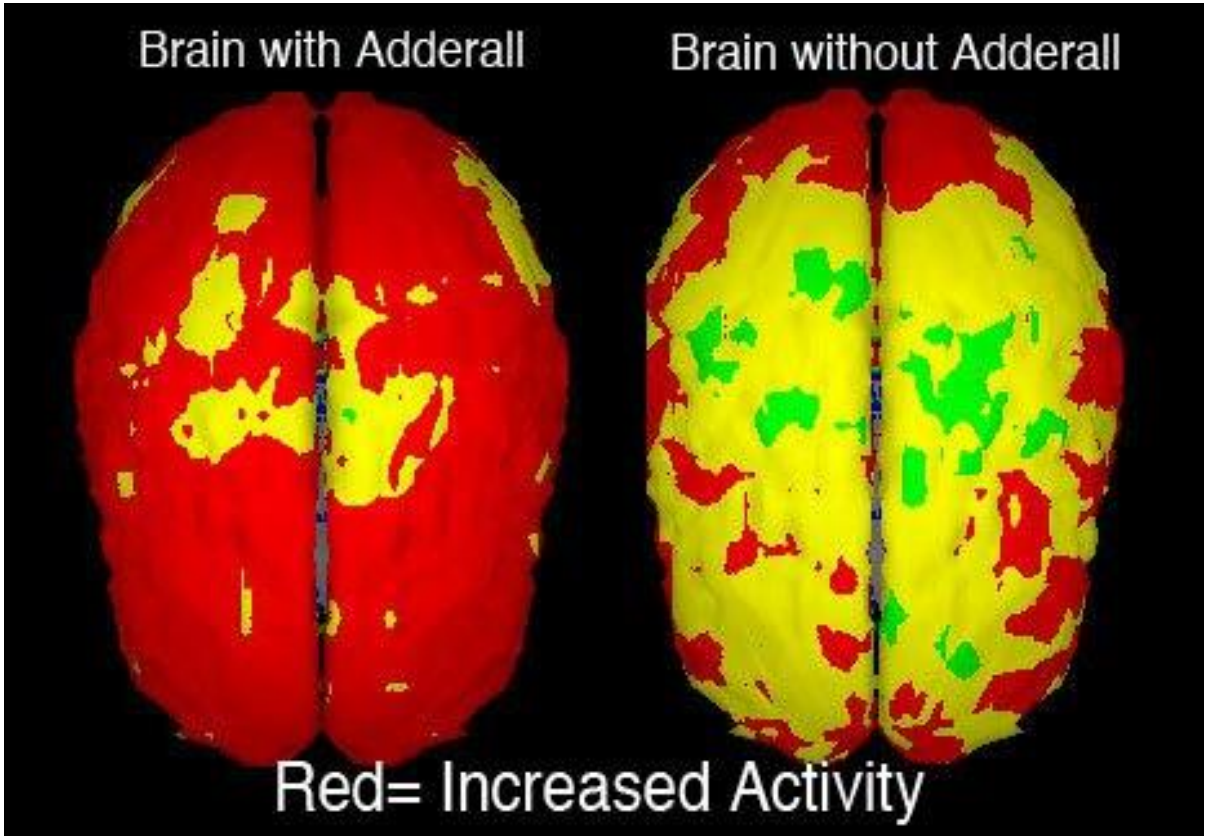
Inattentive ADHD



Treating Inattentive ADD

- **The goal-**--boost dopamine levels.
- **Supplements:** amino acid L-tyrosine,
- **Stimulant:**
  - Adderall, Vyvanse or Concerta.
- **Diet**:
  - High-protein, lower-carbohydrate diet
- **Exercise** daily.

Over-focused ADHD

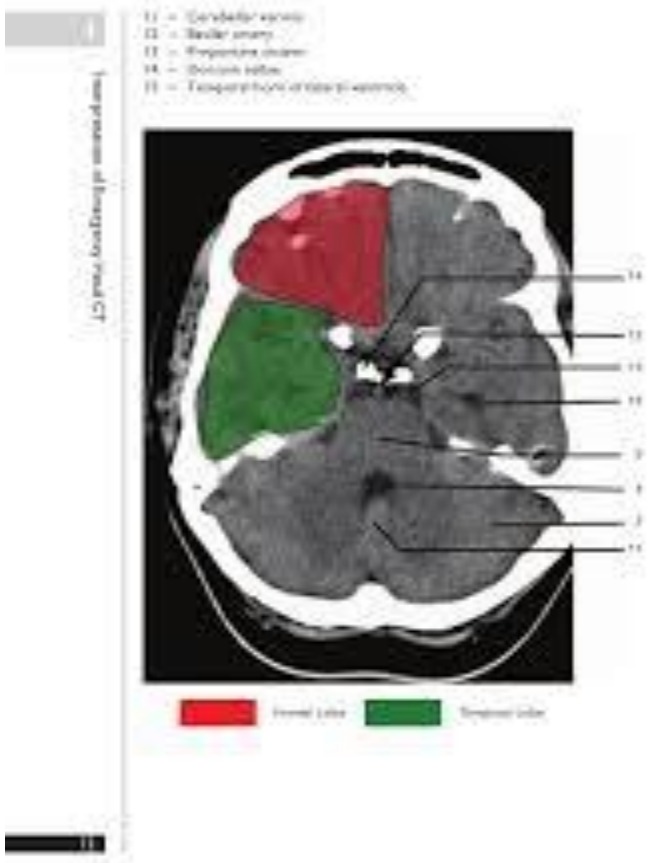


Treatment Over-Focused ADD

- **The goal--** boost serotonin and dopamine
- **Supplements first—**L-tryptophan, 5-HTP, saffron, and inositol.
- If supplements don't help,
  - Effexor, Pristique, or Cymbalta.
- **Diet:** Avoid higher-protein diet with this type, which can make patients mean.
- **Neurofeedback training**

Temporal Lobe ADD

- Low activity in the Frontal Lobe
- Increased activity in the temporal lobe
- More often seen in patients with head injuries
- Classic ADD symptoms with a short fuse

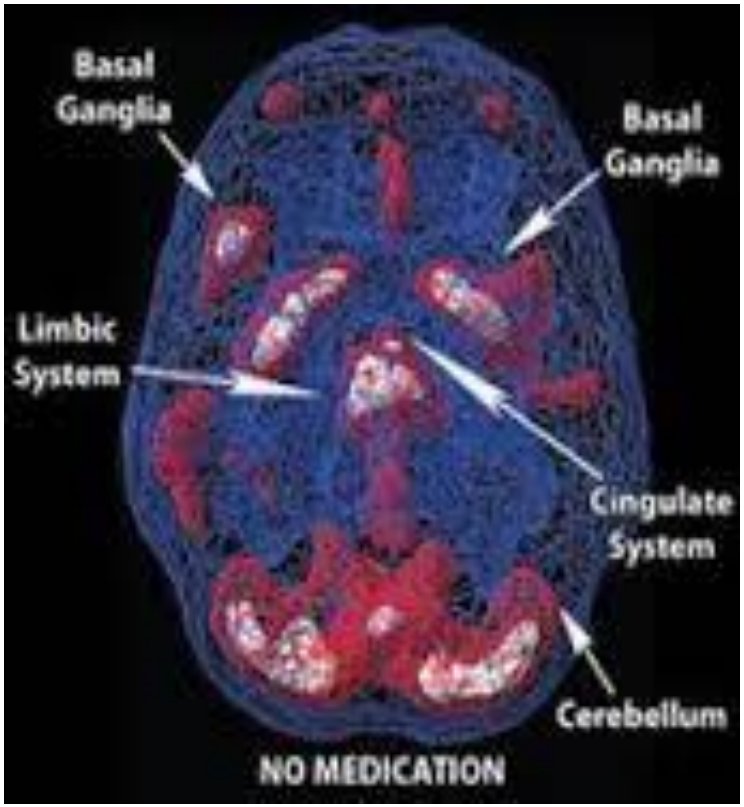


Treatment of Temporal Lobe ADHD

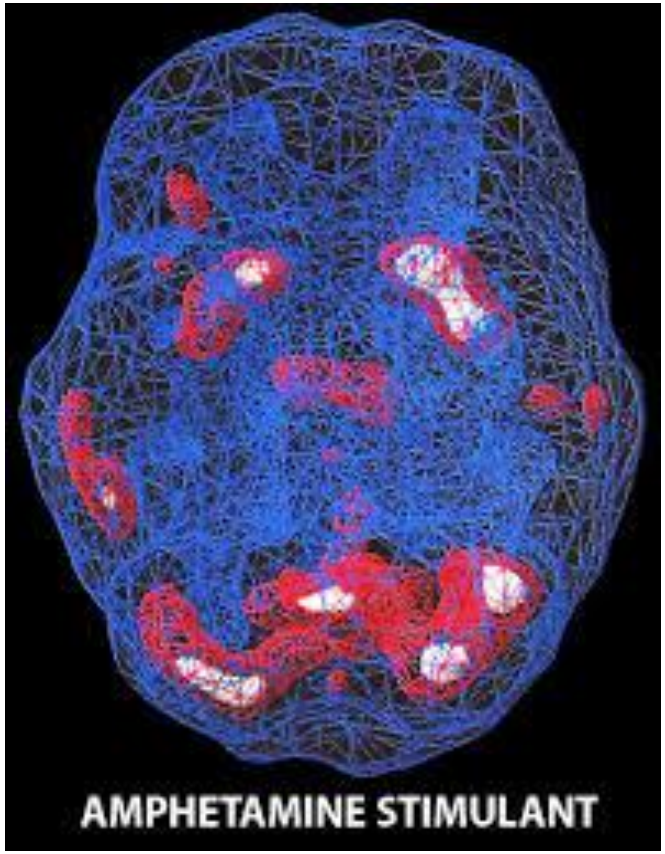
- **Supplements**:
  - GABA (gamma-aminobutryic acid)
  - Magnesium
  - Gingko
  - Vinpocetine
- **Anticonvulsant medications**

Limbic ADD

No medication



Amphetamine

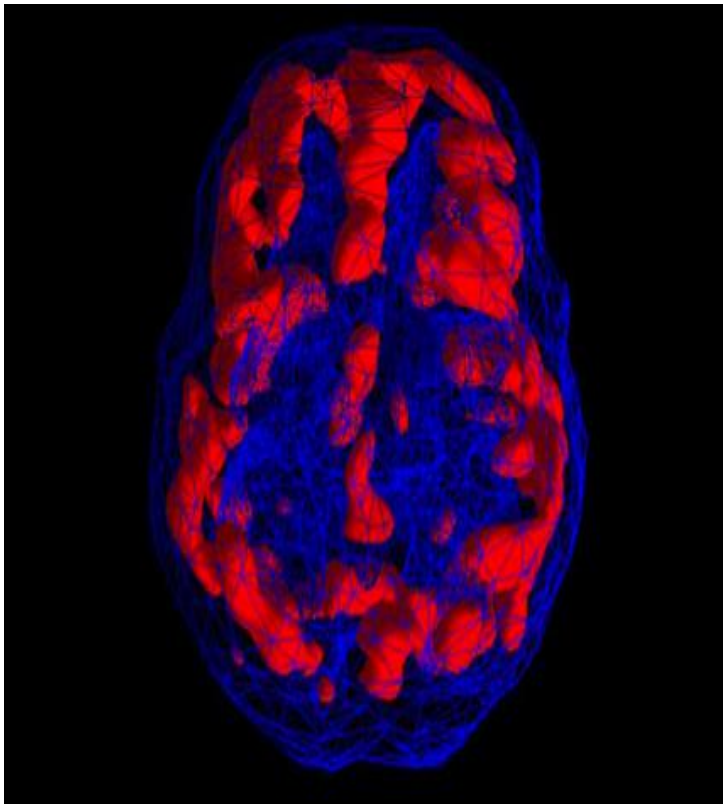


Treatment of Limbic ADD

- **Supplements**
  - DL-phenylalanine (DLPA),
  - L-tryosine
  - SAMe (s-adenosyl-methionine)
  - Fish oil (Omega 3 EPA)
- **Medications**
  - Wellbutrin Researchers think it works by increasing dopamine
  - Imipramine is another option for this type.
- **Exercise**: Regularly
- **Diet**:

Ring of Fire ADD

- Noticeable overall increased activity across the cortex
- Low prefrontal cortex activity (less common)



Treatment of R-of-F ADD

- **Stimulants**
- Elimination **Diet**
- **Supplements:** GABA, 5-HTP, and L-tyrosine supplements.
- **Anticonvulsants**
- **Blood pressure medicines:** guanfacine and clonidine may be helpful, calming overall hyperactivity.

Anxious ADD

- **Classic ADD symptoms**
- **Tense, anxious**
- **Physical symptoms**
- **Predict the worst**
- **Freeze in anxiety-provoking situations**
- **High Activity in the Basal ganglia and deep structure in brain that produce dopamine.**
- **In most types of ADD, there is low activity in these areas**

Treating Anxious ADD

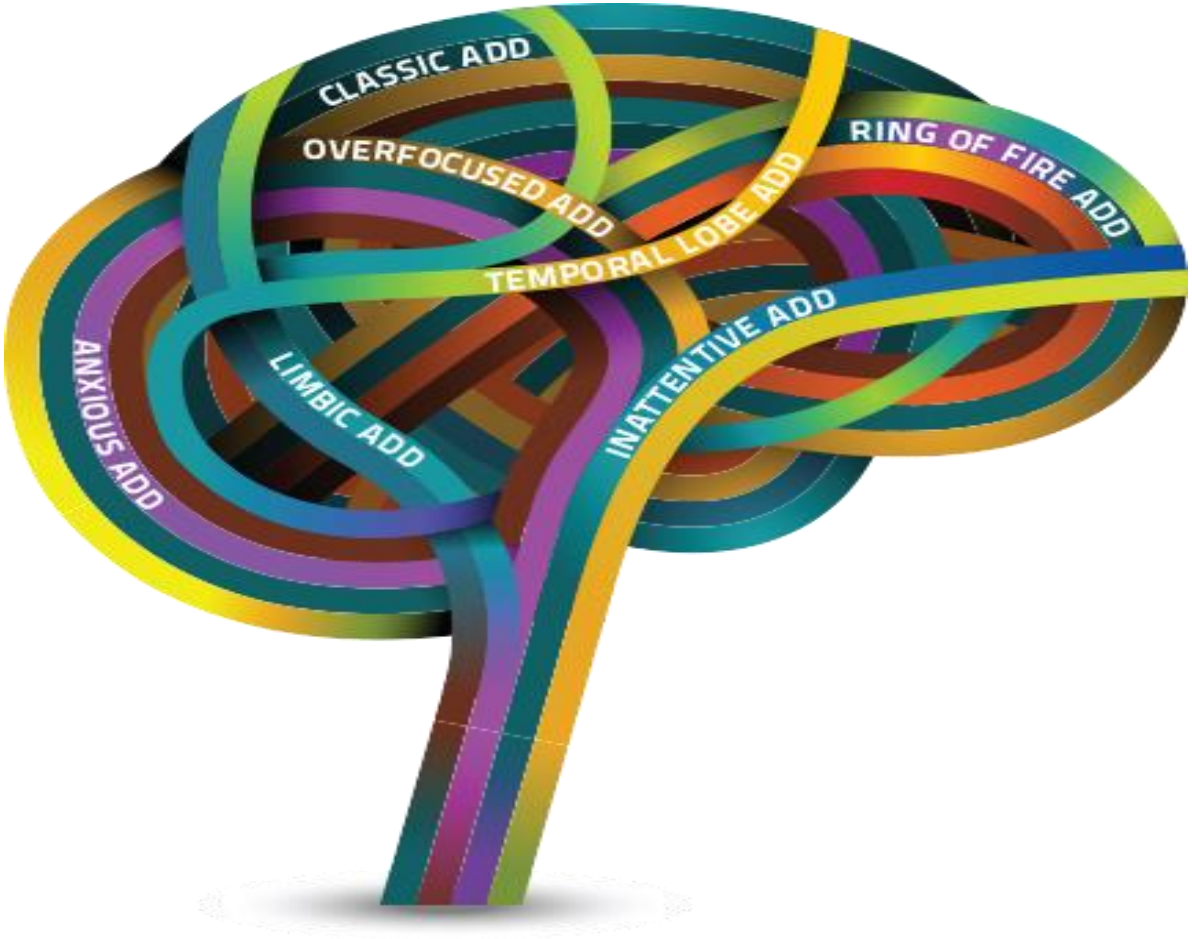
- **Goal**—increase relaxation and boost GABA and dopamine levels.
- **Stimulants**
- **Supplements**—L-theanine, relora, magnesium, and holy basil.
- **Tricyclic antidepressants--** imipramine or desipramine to lower anxiety.
- **Neurofeedbac**k

Treatment Plans Include

- **Parent/Child education**
  - ADHD as a chronic disease
  - Involves a team approach
- **Behavioral intervention strategies**
- **School accommodations and interventions**
- **Medications**
- **Requires regular follow-up and monitoring**

Pharmacology Treatment

- **Medications**
  - Should be started as soon as diagnosis is made
  - First Line—Stimulants
  - Second Line—Antidepressants, Anticonvulsants, Antihypertensives
- **Supplements**
  - Omega 3
  - Magnesium


CLASSIC ADD
OVERFOCUSED ADD
RING OF FIRE ADD
TEMPORAL LOBE ADD
INATTENTIVE ADD
LIMBIC ADD
ANXIOUS ADD

Stimulant Medication

- Immediate Release
- Mentylphenidate (10-60mg)
  - Ritalin, Metadate, Methylin, Concerta (18-54mg)
- Dexmethylphenidate
  - Focalin (5-20mg)
- Dextroamphetamine
  - Dexedrine (5-40mg)
- Lisdexamphetamine
  - Vyvanse (30-70mg)
- Amphetamines
  - Mixed amphetamine salts (Addrall 5-40mg))
  - Methamphetamine (Desoxyn-5-25mg)

Sustained Release

- Methylphenidate (10-60mg)
  - Ritalin SR, Ritalin LA,
  - Metadate ER, Metadate CD,
  - Metylin ER, Concerta, Daytrana (patch 15-30mg)
- Dextroamphetamine
  - Dexadrine spansules (5-40mg)
- Amphetamine
  - Adderall XR (5-40mg)

How they work

- Inhibition of dopamine reuptake
- Most have a rapid onset of action
- Symptom reduction in 30 to 60 minutes
- Duration of action 4 to 12 hours

Side Effects & Solutions

Side Effects	Solutions
Initial Insomnia	Earlier dosing or with clonidine or trazodone at bedtime
Reduced Appetite	Switch to Focalin which may have less affect on appetite
Stomach ache	Give medication with Food
Mild Dysphoria	Switch classes of stimulants, or add an antidepressant such as bupropion
Lethargy	Reduce dose
Headache	Reduce dose or Change stimulants
Preston, et al (2010)	

Special Cases

- Preschool to School-aged Children
  - 4-5 years of age—start with Behavior therapy; assess for developmental problems
  - When therapy is not achieving symptom control, may try mediation
  - Currently, only dextroamphetamine is approved by the FDA for this age group.
  - Methylphenidate (Ritalin, Concerta, and Daytrana patch)

AAP recommendations

Adolescents & Adults

- Check for Substance Abuse
- Monitor for refills
- Medication coverage for evening.
- Use motivational interviewing techniques

Alpha-2 Adrenergic Agonists

Reduce irritability, aggression, impulsivity, and insomnia, tics

Generic	Brand	Typical Dose (for children & Adolescents)
Clonidine	Catapres	0.15-0.4mg (3 to 4 times a day)
Guanfacine	Tenex	0.25-1.0 mg (2 to 3 times a day)
Preston et al (2010)		

Antidepressants

Generic	Brand	Dose
Bupropion	Wellburin DR/LA	Child: 100-150 mg Adult: 150-300mg
Atomoxetine (Black Box Warning)	Strattera (Monitor Liver function)	1.2-1.8mg/kg (same for children and adolescents)
Preston et al (2010)	AAP recommendation	

Benefits of Antidepressants

- Once a day dosing
- No need for special prescription pads
- No addition potential
- Most effective 5 to 40 days after starting
- Typically cover 24hours
- Can be used to treat comorbid depression

Deciding on Medication

- Does the person have a tic disorder
- Efficacy of medication
- Preferred length of time coverage
- Can swallow pills or capsules
- Cost
- Ease of administration
- Minimum side-effects
- Time of day for maximum symptom control (Concerta)
- Will medication alter sleep pattern
- Risk status for drug abuse

Titrating Stimulants

- Start with low dose
- Titrate on a 3 or 7 day bases
- May evaluate symptom control with phone meetings with parents or adult
- Increasing doses can be done by prescriptions that allow for dose adjustments upward
- Or by 1 prescription of tablets/capsules with instructions to administer progressively higher amounts by doubling or tripling the dose weekly.
- Week 4: face-to-face meeting with child/parent or adult

AAP recommendations

When to Change Medications

- Stomach ache
- Mild Dysphoria
- Headaches
- If no symptom control after 1 month
- Target goals are not being meet

Supplements

- Omega 3 (higher in EPA than DHA)
- Those reduce inflammation

When the Medication Does Not Work

- Consider the Differential Diagnoses
- Consider the other types of ADD
- Consider need for poly-pharm therapy, refer to a specialist.

Follow-up Visits and Recommendations

- Teach patient/family how to monitor HR and B/P
- Ask School Nurse to monitor HR and B/P after increase in medications
- Increase medications at weekly intervals
- Use long-acting medications
- Follow-up face-to-face at 4 weeks
- Every three months if on stimulants and symptoms are controlled

Barriers to Treatment

- The family need to be informed
- Myths
  - ADHD does not affect behavior
  - One outgrows ADHD
- Cost of medication and supplements
- Need for Lifestyle changes
  - increasing activity
  - changing diet
  - Being consistent with plan of care

Behavioral Interventions

- **Create a routine.**
- **Get organized.**
- **Avoid distractions.**
- **Limit choices.**
- **Change your interactions with your child.**
- **Use goals and rewards.**
- **Discipline effectively.**
- **Help your child discover a talent.**

- http://www.cdc.gov/ncbddd/adhd/treatment.html

Case Study

- Susie, a 7 year old, is referred to your practice, because her teacher says that she daydreams a lot in class and does not get her work done. Mom feels frustrated and asks if the teacher is making too much out of this as Susie does not cause any problems in the class.
- What is your response?
- Should this child be worked up for ADHD?

- What tests will you run?
- Who will you have do the Connor or Vanderbilt scale?
- When will you start Susie on medication or supplements?
- What about diet?
- What about exercise?

Resources

- American Academy of Pediatrics (2013). Implementing the Key Action Statements: Algorithm and Explanation for Process of Care for the Evaluation, Diagnosis, Treatment, and Monitoring of ADHD in Children and Adolescents, Pediatrics—Supplemental Information.
- http://www.additudemag.com/adhd/article/621.html
- http://www.webmd.com/add-adhd/guide/adhd-tests-making-assessment
- http://www.cdc.gov/ncbddd/adhd/diagnosis.html
- http://www.adhdandyou.com/hcp/about-adhd.aspx
- http://www.amenclinics.com/
- Preston, J.D., O'Neal, J. H., & Talaga, M. C. (2010). Child and Adolescent Clinical Psychopharmacology Made Simple (2nd Ed.) New Harbinger Publications, Inc.: Oakland,CA

Thank You

Questions?

Visit the AAP site for the ADHD toolkit