

*ADHD:
Comprehensive Views
and
Current Challenges*

Dr. PAUL HUTCHINS

Child Development Unit

Children's Hospital Education Research Institute

The Children's Hospital at Westmead

NSW Australia

PAULH@CHW.EDU.AU

ADHD is a real disability

- ⊙ Overall ADHD is one of the best-researched disorders in medicine and the overall data on its validity are far more compelling than for many medical conditions

Goldman 1998

- ⊙ Although scientists and clinicians debate the best way to diagnose and treat ADHD there is no debate amongst competent and well-informed health-care professionals that ADHD is a valid neurobiological condition that causes significant impairment in those whom it affects

AACAP Practice Parameter for ADHD

J Am Acad Child Adolesc Psychiatry 2007; 46(7) 894-921

ESSENCE OF ADHD

- ⊙ ADHD is a neurodevelopment learning difference/ disorder described (interpreted?) as behaviour disorder
- ⊙ ADHD is commonest DBP - with combined
models mechanisms manifestations management
- ⊙ Management is complex
- ⊙ Evidence varies: robust v. partial v. anecdotal
- ⊙ Adverse effects + / - inadequate treatment
Most complex tasks and cognitive load are
- ⊙ Social interpretation
- ⊙ Higher language: interpretation inference extrapolation
- ⊙ Organization - tune to task problem solve to goal

CENTRAL CONCEPTS OF ADHD

- ⊙ ADHD is a developmental cognitive inefficiency i.e. **LEARNING disability** BUT described as behaviour disorder
- ⊙ how brain controls its thinking learning and behaviour

Executive functioning **working memory**

inhibition control **attention regulation**

Individuals vary AND are variable

- ⊙ diagnosis is descriptive & collaborative
- ⊙ spectrum and threshold of disorder are multifactorial

Castellanos FX Sonuga-Barke EJS, Milham MP Tannock R(2006) Trends in Cognitive sciences. 10(3), 117-123

CONTRIBUTIONS to ADHD

symptoms spectrum impairment threshold of disorder
demands exceed resources in biology + environment

disable problem-solving to attain future goals.

GENETIC

- ⊙ ID TWINS 70-80%
- ⊙ Chrom 4 5 6 8 11 16 17
- ⊙ Neurotransmit DA SRT
- ⊙ Syndrome phenotype FAS
CNS disorder
- ⊙ Mood disorder

NON GENETIC

- ⊙ Prenatal stress LBW
- ⊙ Acquired brain injury
- ⊙ Maternal Smoking
- ⊙ Extreme early deprivation
- ⊙ Frontal lobe size and function
also in siblings

⊙ ENVIRONMENT

- ⊙ Demand > support
Expect Task Responses
- ⊙ Mistreatment
- ⊙ Hostile aggression magnifies
Conduct Disorder
- ⊙ Parent / carer ADHD
- ⊙ professional ADHD
- ⊙ “community” ADHD
- ⊙ “political” ADHD
- ⊙ “belief / dogma” ADHD

IMPLEMENTING the “well thought out and comprehensive treatment plan; AACAP 2007”

- ⊙ Accurate information and understanding
- ⊙ Hypotheses -logical valid
- ⊙ Match learning teaching and output styles

Prepare the child for the situation and situation for the child”

Giorcelli

- ⊙ Priorities and targets from all views + reviews
- ⊙ Relevance of medication
- ⊙ ? LD = ADHD symptoms ?? ADHD = LD symptoms
- ⊙ ?“optimal Rx ADHD then test for LD ; AACAP 2007”

VIEWS and CHALLENGES

Supporting ADHD with an open mind

- ◆ Accept models of ADHD organization; genes + environment
- ◎ Learning disability seen as behaviour disorder
- ◎ spectrum of difference + threshold “disorder” Severity
- ◎ Where does ADHD begin and end? esp. LD IA > HA
- ◎ Co-occurring symptoms Overlapping disorders

LANGUAGE Specific LD Dyspraxia PSK Adolescent Adult

Gifted Global Learning Difficulty (IH) Autism Neurology

- ◎ Optimal individualized validated “package of support”
range intensity priority availability effectiveness continuity
flexibility review developmental trajectory REFINE
- ◎ Labels change eligibility for funding and support

PROFESSIONAL CONTEXTS

O'Keefe M McDowell M (2004) JPCH 40;252-257

PAEDIATRICIAN

- ⊙ Individual child & family
- ⊙ Biology + environment
- ⊙ Family genetics
- ⊙ Development patterns
- ⊙ Continuum of difference
- ⊙ Threshold of disorder
- ⊙ Community view re health
- ⊙ TRAINING MODERN
- ⊙ EVIDENCE STRONG
- ⊙ INTERDISCIPLINARY

SCHOOL

- ⊙ Child class/ school/ system
- ⊙ Environs / social / effort
- ⊙ Family input / aspiration
- ⊙ Skills stages
- ⊙ Definition of disorder
- ⊙ Category of funding
- ⊙ Pedagogical curriculum
- ⊙ TRAINING OLDER
- ⊙ EVIDENCE GROWING
- ⊙ MULTIDISCIPLINARY

HOW COMMON ARE PROBLEMS

- ⊙ AIHS MH survey 2000
20% have DBP
 - ⊙ 70% teachers desire contact from doctor
 - ⊙ 70% teachers don't contact doctor.
 - ⊙ 34 % paed visits DBP
(Hewson, JPCH 1999)
- SCHOOL of 1000
(Marraffa + RACP submit)
- ⊙ 500 chronic illness
 - ⊙ 100 admitted in any 1 year
 - ⊙ 100 disability (97% main class)
 - ⊙ 150 SL Difficulty reading
 - ⊙ 30 Sp Learning Disability
 - ⊙ 140 mental health (3% see MH)
(110 seriously disrupt learning)

Learning & Behaviour don't “work” well

- ⊙ Learning + behaviour difficulty 15 %
- ⊙ learning disability (LD) 2-5 %
- ⊙ LD language (SLI) 90 %
- ⊙ AD/HD 2-5 %
- ⊙ LD + AD/HD 50 %
- ⊙ AD/HD respond to stimulants 70 %

- ⊙ AD/HD adolesc 60 %
- ⊙ AD/HD adult 20 %
- ⊙ Close family 25 %
- ⊙ AD/HD 20 %
 - + Conduct Disorder
 - + ODD 50 %
- ⊙ AD/HD 20 %
 - + depression/ anxiety

MAIN ISSUES

- ⊙ Range of presentation spectrum
- ⊙ LD ADHD overlap
- ⊙ COMPREHENSIVE views esp language
- ⊙ Explain to school advocate support
- ⊙ Medication and medication issues
- ⊙ Investigation
- ⊙ complementary treatments
- ⊙ Follow up continuity +advice .
- ⊙ ADULT TRANSITION

CRUCIAL CONCEPTS FOR TEACHERS

- ◎ Cognitive model - INEFFICIENCY- an LD
- ◎ Multitude of individual symptoms
- ◎ ? (re) interpret reports
- ◎ Overlap with language +++ other++
- ◎ I/A >>HA boys >?= girls
- ◎ **Vulnerability depends on load** NB. HSC gifted
- ◎ Medication use relative to all other approaches
- ◎ Medication must be collaborative

Creativity or Confusion - a point of view and context of load + expectation

- ⊙ Lateral thinking/ solving
- ⊙ Imagination/innovation
- ⊙ Intuition / empathy
- ⊙ Energy / spontaneity
- ⊙ Charm / charisma
- ⊙ Focus / commitment
- ⊙ Intensity / persistence
- ⊙ Enthusiasm / passion
- ⊙ Vision / ambition
- ⊙ Distractibility/inconsistency
- ⊙ Inaccuracy /irreverence
- ⊙ Intrusion / introversion
- ⊙ Activity / impulsivity
- ⊙ Superficiality
- ⊙ Insatiable / inflexible
- ⊙ Compulsion / zeal
- ⊙ Arrogance / idiosyncrasy
- ⊙ Risk-taking / egocentricity

ADHD the wider spectrum

7.5% 7 -16 yrs NMH Survey in Australia

1/2 Inattentive 1/4 HI 1/4 Combined

Graez et al (2001) JAAACP 40,1410-1417

- ⊙ Executive function working memory
 - ⊙ Less male predominance
 - ⊙ More associated with LD , anxiety
 - ⊙ Missed presentation: adolescence girl gifted
 - ⊙ LD and ADHD 20 - 90% language disorder most
- IA** subtle complex **HI** expressive and clarity
- Cohen et al (2000) JCPP 41, 353-362***

Types of ADHD

IMPULSIVE

- ⊙ INHIBITION
- ⊙ motor
- ⊙ boys >>> girls
- ⊙ language/speech disorder
- ⊙ social rejection
- ⊙ BEHAVIOUR
- ⊙ aggression
- ⊙ Early referral
- ⊙ family discord
- ⊙ Persistence
- ⊙ MEDICATION Behaviour

INATTENTIVE

- ⊙ ORGANISING
- ⊙ memory/planning
- ⊙ boys >= girls
- ⊙ subtle language / speech
- ⊙ social reticence
- ⊙ LEARNING
- ⊙ anxiety/sadness
- ⊙ Late referral
- ⊙ family stress
- ⊙ Adjustment
- ⊙ Organisation Medication

ADHD Social difficulty

- ⊙ impulsivity immaturity
- ⊙ comprehension perception
- ⊙ sense of consequences
- ⊙ time sequences
- ⊙ inner language misinterpretation
- ⊙ insatiability over focussed
- ⊙ anxiety self esteem sensitivity

ADHD practical help - STRUCTURE

- ◎ DON'T OVERLOAD don't over-expect
 clear brief predictable regular repeated
- ◎ Small amounts of facts and sequences
- ◎ Visual demonstration
- ◎ Right level of distraction novelty
- ◎ Feedback reward avoid blame
 Immediate frequent tangible visible
- ◎ Timing of medication
- ◎ Effect of exercise routine reward

Multidisciplinary roles

- ◎ Teacher effective instruction personalisation
accommodations inclusion
 - ◎ Speech /language pathologist
language literacy study social
 - ◎ Psychologist Social Worker
cognitive behaviour family adjustment
 - ◎ Occupational and Physio therapist
specific skills writing computer
 - ◎ Doctor
answers advocacy anxiety medication
- Support groups engage individual parents and all others

Disability and Family Issues

AVOID BLAME

- ◎ Family history
strengths struggles strategies spectres
- ◎ Threshold for coping and overload
more children life events jobs illness
- ◎ Grief / relief perspective planning
information realism support groups
- ◎ Behaviour and school support
- ◎ Parent diagnosis and treatment eg LD ADHD
separation (Fa) depression (Mo) substance abuse

MEDICAL MANAGEMENT

- ⊙ Medical illness and risk stress
- ⊙ biography development/ FH / therapy
- ⊙ patterns in school reports + language
- ⊙ documentation Special Prov /Univ
- ⊙ required teaching/ learning /output styles
- ⊙ relevance of AD/HD and medication
- ⊙ investigation -audiology, EEG, genetics
- ⊙ “other” therapies CAM - auditory /vision/ motor

CONSULTATION INPUTS

- ⊙ Clear concerns, specific teacher comments
- ⊙ All school reports PATTERNS
- ⊙ All assessments SEE WORKBOOKS
- ⊙ Specific interventions and effects
- ⊙ Social success peer comparisons
- ⊙ Rating Scales e.g. DSM Strengths + Difficulty Q
- ⊙ Prior LANGUAGE ASSESSMENT / HELP
 NB functional curriculum social

CONSULTATION - EXPLAIN THE CHILD

- ◎ SUMMARY LIST OF ISSUES + ACTIONS
- ◎ list information used
- ◎ Patterns of predictability PMH FH Early problems
- ◎ Strengths + vulnerabilities & implications
- ◎ QUOTE assessments and teacher comments
- ◎ (RE)INTERPRET REPORTS COMMENTS e.g.
 - “XYZ now improving / now grasping concepts
 - “not understand what reads due to reading problem”
 - “if attended would understand; write neater ; achieve potential
 - “Quiet / join discussion/ask more for help /”
 - “more revision needed; More effort , take responsibility

REPORTS CONTENT

- ◎ LANGUAGE AGE LEVEL(S)
- ◎ QUALITY not just WNL scores
- ◎ Scatter inconsistency
- ◎ Functional language
- ◎ Inference relevance problem solving
- ◎ Executive function
- ◎ Memory attention
- ◎ Word finding
- ◎ EXAMPLES of tests +ADVICE for class
- ◎ Augmented communication ?effect ?early

HOW IS LANGUAGE POSSIBLE ?

"The speed and naturalness with which most children pick up spoken and written language can fool us into underestimating the enormity of the intellectual task which faces them, and thus the enormity of the task facing those who have to solve learning problems when they arise."

David Crystal

SUBTLE LANGUAGE /LD

- ◎ MARKED SCATTER “*LAZY*”
complex sentences
- ◎ SPATIAL/TIME CONCEPTS
sequencing narrative class script social games
- ◎ POOR ORAL / WRITTEN OUTPUT “*SHY*”
basic language slow speed of retrieval dysfluency
- ◎ PRAGMATICS “*WEIRD*”
insight literal reasoning tangential
- ◎ HIGH LEVEL “*IMMATURE*”
reasoning inference prediction
ambiguity metaphor humour

Language impairment and ADHD

- ◎ Implied meanings (*Brock Knapp 96*)
- ◎ Cause effect in narrative (*Lorch et al 2004*)
- ◎ Poor inference (*McInnes et al 2003*)
- ◎ Verbal WM (*Castellanos and Tannock 2002*)
- ◎ Visual spatial WM (*Martinussen and Tannock 2005*)
- ◎ IA subtle complex HI expressive and clarity
Cohen et al (2000) JCPP 41, 353-362
- ◎ Poorest outcome age 7 with Recep+expr+HA
Beitchman et al 1996
- ◎ Persisting Language disorder at 15 yrs has problems with attention (esp. expressive language) and social skills
Snowling, Bishop et al JCPP 47(8), 759-765, 2006

Stimulants benefits for language

e.g listening comprehension inference visp spatial WM

McInnes A, Tannock et al. J Ch Adol Psychopharm 17(1);35-49 2007

patients say

- ⊙ Listen better longer more
- ⊙ Start persist switch
- ⊙ Clearer and more thoughts
- ⊙ Conversation logical
- ⊙ Creativity =
- ⊙ Argue better !
- ⊙ Inference and relevance
- ⊙ More information (WM)
- ⊙ Speech clearer

research finds

- ⊙ Naming speed Bedard 2004
- ⊙ Verbal Working memory
- ⊙ Visual Spatial WM
- ⊙ Oral narrative Francis 2003

Patient Clinical tests

Divergent thinking

Convergent thinking

Listening comprehension (CELF)

Reading comprehension

Reading and spelling

Syllable rate

TOM 9.6.93

“Cricket is when you make a pitch and you get two sets of stumps and hit them down on the flat end at each side. then you get a cricket ball and a bat then you get the ball and throw it and the person with the bat hits the ball and that is what cricket is”

Sentence “someone tells you a bit of a word”

paragraph “something half of a sentence or a full sentence”

TOM b.1993

- ⊙ F : LD++ OCD depression rigid parents
- ⊙ M maths > English anxious
- ⊙ Anxiety age 4 yrs counselling 6 yrs
 - Bullied mother worried but “ignored”
 - now major anxiety symptoms on schooldays
- ⊙ Yr 3 poor inference written ideas listening comprehension group improved ++
- ⊙ Semantic Relationships listen paragraph 5 C
 - Harry Potter detail++ not succinct or main ideas.
 - Some therapy language + counsel not stimulants (yet?)

Impact of language difficulty in adolescence

- ◎ reasoning , analysis, narrative
- ◎ language of new subjects and countries
- ◎ amount / complexity / memory/write
- ◎ verbal and social pragmatics
inference , intuition , humour , sarcasm
jargon / fashions / music/ games
- ◎ negotiation extrapolation
- ◎ introspection values individuation

RELATIONSHIPS

MAIN ACCOMMODATIONS for ADHD / LD

specific substantiated sustained support
HIGH SCHOOL 6 YEARS TO DEFINE + REFINE

- ⊙ CONTENT Understanding research reasoning structure
- ⊙ OUTPUT essays time to write/rest computer reader writer
- ⊙ MEDIUM MCQ aural tape video then book cartoon
- ⊙ THERAPY language motor behaviour relaxation

MATCH LEARNING + TEACHING + OUTPUT STYLES
EACH TASK EACH TOPIC EACH DAY NOT ONLY EXAM

Internet resources

ldonline.org ldresources.com dotolearn.com
isrc.org/learn_db.htm isrc.org:8080/irsc/irscmain.nsf
inspiration.com mindjet.com thatsafactjack

USING MEDICATION

science success safety

- ⊙ establish understanding education collaboration

TALK TIME TEAMWORK

- ⊙ Use appropriate medication
- ⊙ are target symptoms / expectations clear ?
- ⊙ Refine teaching behaviour and therapy supports
- ⊙ Individualise drug & dose to child and curriculum
- ⊙ Do learning behaviour therapy gains improve ?
- ⊙ are the effects and the dose optimal ?
- ⊙ are the effects sustained ?

ONLY TEACHER PEERS (?) STUDENT(?!)

CAN DESCRIBE MEDICATION EFFECTS in SCHOOL

Stimulant Medication NB MULTIMODAL

Dexamphetamine 5 mg Methylphenidate 10 mg

Slow release RitalinLA Concerta Metadate atomoxetine

- ⊙ Dopamine /noradrenaline stimulate organisation
- ⊙ Effective 70 % to 92 %
- ⊙ 10 % single medication 10 % no response
- ⊙ Improve school behaviour and academic performance
- ⊙ language and learning memory and planning
- ⊙ self esteem family/ peer relations
- ⊙ Reduce child anxiety and oppositionality
- ⊙ Reduce risk substance use - smoking and others

Stimulant Medication ?harmful

Side effects 3% - 20% ??70% children not like

◎ Dexamphetamine v. Methylphenidate

◎ Appetite sleep mood ?tics

◎ Growth mild relative slowing 1st year ? Long term

◎ Transient coincidence placebo

◎ Under or over dose? “rebound “ in p.m. Stim & placebo

◎ Sudden Death General: 1.3 to 8.5 /10⁵ patient years Stim: 0.5

Concepts

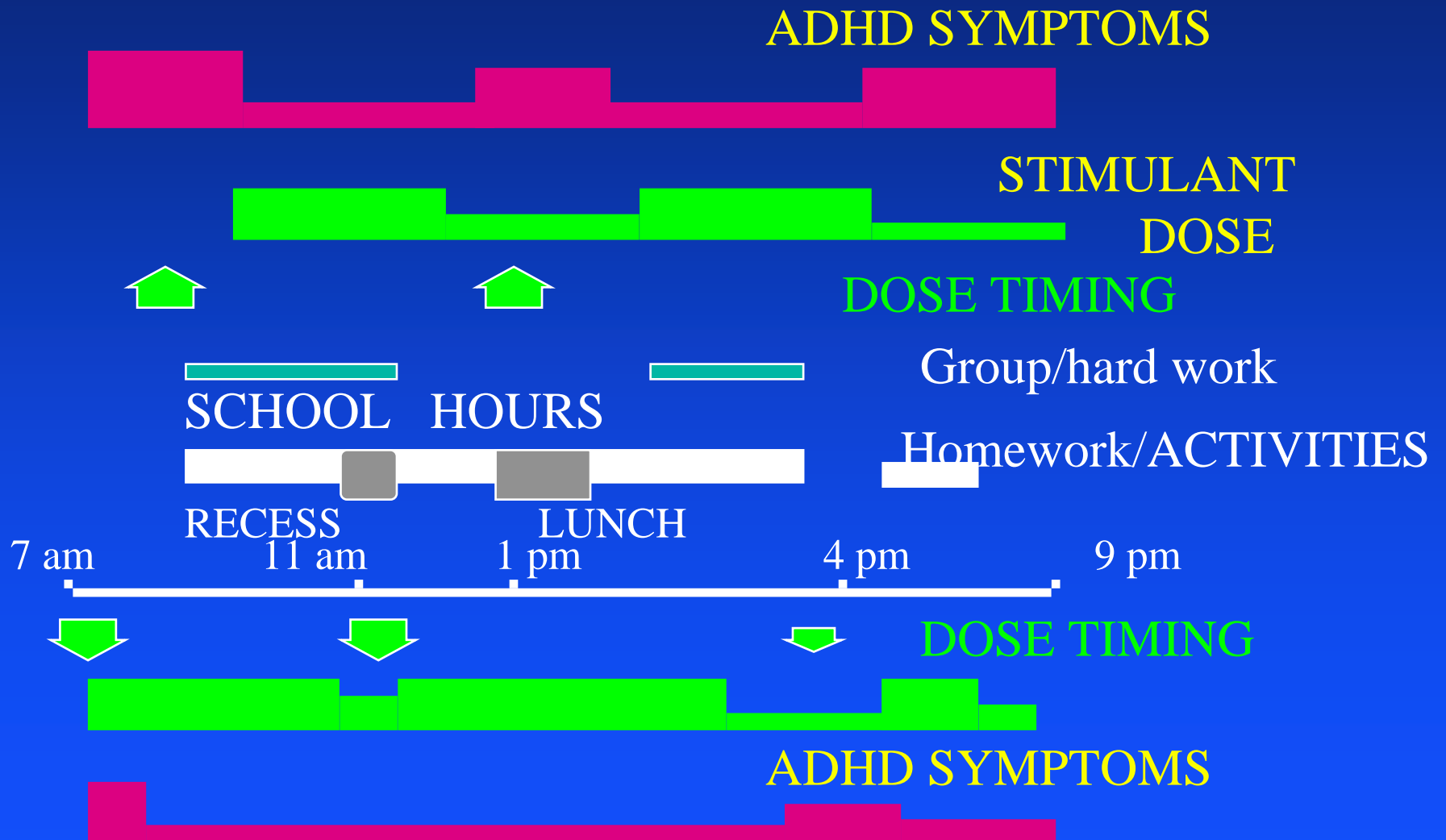
◎ “natural” better than “drugs” and “ Big Pharma”

◎ Professional attitudes knowledge models approaches

◎ Social controversy - Schedule 8

◎ Prejudiced beliefs anecdote

Tuning Medication to Activities and Teaching



EXTENDED RELEASE MEDICATIONS comparisons

	DURATION	IR / ER	DOSE	COST(min)
METHYLPHENIDATE (BIPHASIC)				
RITALIN LA	6 - 9 hrs	50%	20 30 40 mg	\$38- 47- 58
CONCERTA	9 - 12 hrs	22%	18 36 54 mg	\$87-105-135 or PBS
DEXAMPHETAMINE MPH Compounding costs PBS + approx \$30 per 100				
ATOMOXETINE				
STRATTERA NA	12 - 24 hrs	Reuptake Inhibitor	1.2 -1.5 mg/kg	not Schedule 8
		continuous	10 20 30 40 mg	\$139 or PBS 2nd line

IMPLICATIONS

More opportunity to individualise more privacy ? Less stigma
 more complex titration more sophisticated collaboration over longer time.
 Teachers tune IR responses to curriculum - now less flexibility during day
 Prescribers and pharmacists must learn new info and strategies and policies
 PBS criteria not fully flexible

How young how old how long ?

Preschool Greenhill 2006 PATS; ausinet

- ◎ Similar mechanism more variable responses
- ◎ **NSW** 4 -18 y; 3y report; , 2 y need 2 opinions

ADULTS 4 % pop ; persist: self view 10% carer 60%

- ◎ Symptoms DSM ? 6/9 ? 5/9 ? 3/9 **Impairment**
- ◎ Onset < 7y late onset respond better

Reinhardt M et al J Clin Psychiatry 2007;68:1109-1116

- ◎ Likelihood of treatment in at least 10% Rx I as child

Brinker A et al J Clin Adol Psychopharm 2007 17;328-333

- ◎ NSW DOH Criteria statistics and information
www.health.nsw.gov.au/public-health/adhd/index.html
www.medscape.com ; www.add.org.au

Cognitive Enhancers good or ill - a changing view ?

- ⊙ Consequences of not using ?
- ⊙ Not “cure” only symptoms ? Unfair advantage?
- ⊙ Foods are “natural” v CAM v “controlled drugs”
- ⊙ Society effects of poor attention and memory
GBP 250M lose keys 400M bank orders
- ⊙ Raise pop IQ by 3 reduce poverty 25% welfare 18%
parentless children 18% M in jail 25%
- ⊙ “designer enhancers may begin to be developed , like Ritalin, at moment this research only in military”. ?
Prenatal / postnatal nutrition
- ⊙ May become as ubiquitous as coffee , computers ,
cellphones all of which enhance human performance”

Savelescu Prof of Ethics Oxford University in 2007
www.abc.net.au/rn/backgroundbriefing/stories/2007/2004383

CAM = complementary and alternative medicine

- ⊙ NIH's National Center for Complementary and Alternative Medicine (NCCAM) defines CAM as a group of different medical and health care systems, practices, and products that are not part of conventional medicine. NCCAM divides complementary and alternative treatments into five categories:
- ⊙ Alternative medical systems (e.g., homeopathy or Chinese medicine)
- ⊙ Mind-body interventions (e.g., meditation, dance therapy, auditory integration)
- ⊙ Biologically based therapies (e.g., using herbs, foods, and vitamins)
- ⊙ Manipulative and body-based methods (e.g., deep pressure, craniosacral therapy)
- ⊙ Energy therapies (e.g., reiki, electromagnetic fields, etc.)

Complementary and alternative medicine (CAM)

- ⊙ “a broad domain of healing resources that encompasses all health systems, modalities and practices and their accompanying theories and beliefs , other than those intrinsic to politically dominant health systems of particular society or culture in a given historical period”
Cochrane Collaboration 2002
- ⊙ “heterogeneous collection of therapeutic substances and techniques that are not consistent with the Western clinical model of medicine”
NSW Dept Health

Paediatrician's Approach to families re CAM

American Academy of Pediatrics:

Committee on Children With Disabilities

Counseling Families Who Choose Complementary and Alternative
Medicine for Their Child With Chronic Illness or Disability

Pediatrics vol. 107 no. 3 March 2001, pp. 598-601

E. M. S. Sibinga, M. C. Ottolini, A. K. Duggan, and M. H. Wilson

Parent-Pediatrician Communication about Complementary and
Alternative Medicine Use for Children

Clinical Pediatrics, May 2004; 43(4): 367 - 373.

M. H. Cohen and K. J. Kemper

Complementary Therapies in Pediatrics: A Legal Perspective

Pediatrics, March 2005; 115(3): 774 - 780.

Teacher guide to controversial Practices

Stephenson J (2004) *Special Education Perspectives* , 13 (1) ,66-74

- ⊙ Caution re alternative anecdotal therapies
- ⊙ Criteria of fads/ frauds
- ⊙ Good **references**
- ⊙ Auditory Integration Therapies Vision – Irlen lenses
- ⊙ Sensory Integration Therapy
- ⊙ Doman-Delacato patterning Facilitated Communication
- ⊙ Conductive education Multisensory Environments
- ⊙ Select method likely to be **effective**
- ⊙ **Monitor impact to ensure learning**
- ⊙ Access info based on **sound research**

PEDIATRICS Vol. 107 No. 3 March 2001, pp. 598-601

AMERICAN ACADEMY OF PEDIATRICS:

Counseling Families Who Choose Complementary and Alternative Medicine for Their Child With Chronic Illness or Disability

Committee on Children With Disabilities

1. Seek information for yourself and be prepared to share it with families.
2. Evaluate the scientific merits of specific therapeutic approaches.
3. Identify risks or potential harmful effects.
4. Provide families with information on a range of treatment options (avoid therapeutic nihilism).
5. Educate families to evaluate information about all treatment approaches.
6. Avoid dismissal of CAM in ways that communicate a lack of sensitivity or concern for the family's perspective.
7. Recognize feeling threatened and guard against becoming defensive.
8. If the CAM approach is endorsed, offer to assist in monitoring and evaluating the response.
9. Actively listen to the family and the child with chronic illness.

CAM - Fatty Acids (?omega 3 = MPH)

- © Polyunsaturated fatty acid supplementation for ADHD? Fishy, fascinating, and far from clear.(Commentary). Betsy Busch. *J. Dev Behav Pediatr.* 2007; 28: 139-150.

Without inclusion criteria that we all can recognize, it is difficult to evaluate the collective significance of this entire body of work. So far, the data available are limited, fragmentary, contradictory, and ultimately, inconclusive.

Nonetheless, the study of Sinn and Bryan is appealing and thought provoking, and there is an attractive suggestion across this literature of slight-to-modest improvement after LC-PUFA supplementation (but typically [less than or equal to]1 SD).

- © Sinn N, Bryan J. Effect of supplementation with polyunsaturated fatty acids and micronutrients on learning and behavior problems associated with child ADHD. *J. Dev Behav Pediatr.* 2007;28:82-91.
- © www.abc.net.au/catalyst/stories/s1691896.htm

FATTY ACIDS -Durham Trial

<http://www.durhamtrial.org/index.htm>

- ⊙ 100 students at 12 schools with dyspraxia and motor
- ⊙ Placebo study 3M + 3M crossover
- ⊙ other assessments for dyslexia and ADHD

- ⊙ Primary school www.durhamtrial.org/primary%20results%20new.htm
- ⊙ Treated @ 3 m Reading + 9.5 m Spelling + 6.5 m
- ⊙ Placebo then treated @ 6 m Reading + 13.5 m Spelling + 6.5 m
- ⊙ Behaviour improved 0.7 = stimulant effect size 0.78
- ⊙ ADHD ratings 30% at start drop by 18% treated 1% control

- ⊙ “couch potato to model student “The Human Mind BBC TV and Lord Winston
- ⊙ . bbc.co.uk/science/humanbody/mind/articles/intelligenceandmemory
- ⊙ [omega_three.shtml](#)

TARGETS and CLAIMS FOR THERAPY ?

- ⊙ Central mechanism Associated mechanisms
- ⊙ “Core” symptoms Associated symptoms
- ⊙ Effect size (dis) Continuity of treatment
- ⊙ Adverse effects
- ⊙ Costs of energy time money
- ⊙ “Exclusivity ” of therapy and therapist
- ⊙ Practitioner effects

Personality empathy and professionalism

Lifestyle and complementary therapies for ADHD:How health professionals can approach patients

www.medscape.com/viewprogram/6929_pnt

ADHD

and

CAM

⊙ NEUROBIOLOGICAL

genes + environs prematurity
Catecholamine inefficiency

⊙ COGNITIVE

Cerebellum -time sense rapid speed
Auditory delay and reading
working memory and language

⊙ LIFESTYLE / ENVIRONMENT

Organise structure demand reward
Manage style of distractions
Behavioural social emotional
(antecedent not consequent-PREPARE)
Synchronise medication + cognitive

⊙ BIOCHEMICAL

Nutrition Feingold

LIFESTYLE / MIND BODY

Meditation

Biofeedback

Auditory training

⊙ BIOMECHANICAL

Cerebellum SMI

Craniosacral patterning

⊙ BIOENERGETIC

acupuncture

CAM, ADHD and NUTRITION

	PLAUSIBLE MODEL	EFFECT	TRIAL	SAFE	HARM
FATTY ACIDS	+	+ Durham Adelaide		+	-
	Omega 3 effect on membrane stability	anecdote re visual dyslexia	and motor		
ADDITIVES	?	++	+ 10 % psk	+	-/+
SUGAR	-	-	NEG	+	+
ELIMINATION DIET	-	+	?	+	+/-
MEGAVITAMIN	-	-	NEG	-	++
IRON	-	?+	-	?	?
	extrapolation from iron deficiency treatment improves concentration				
ZINC	-	-	-	?	+
Yeast Control	-	-	-	?	?
Nootropics	-	?	-	?	?
Pycnogenol	-	-	+	+	-
	61 kids Pyc > placebo 4 wk	24 adults Pyc = MPH= placebo 3 wk			

CAM, ADHD and NEUROLOGICAL

	PLAUSIBLE MODEL	EFFECT	TRIAL	SAFE	HARM	
NEUROPROFILE		+	+	? context	+	-
	BRC QEEG ERP	alpha beta delta theta	profiles as markers			
BIOFEEDBACK	EMG relaxation	reconfigure rhythms				
EEG		+	+	-	?	?
Electric Stim MET and CES		-	-	-	?	?
Acupuncture		+	+	-	?	?
AUDITORY TRAINING		++	+	-	?	?
CEREBELLAR	delay in visuomotor and phonological processing					
DORE (DDAT)		++	+	+	?	?
PSYCHOLOGICAL	? Act on anxiety					
Meditation		+	+	+	+	-
Hypnosis		-	+	?	-	?
BIOMECHANICAL	eg Sensorimotor	Kinesiology				
Craniosacral manip		NO	-	-	?	+

Cerebellar developmental delay

- ⊙ DORE Achievement Centres (DDAT Clinics)

<http://www.ddat.co.uk/go/rainbow/3361/en-GB/DesktopDefault.aspx>

- ⊙ Dyslexia Dyspraxia Attention deficit Verbal Apraxia
- ⊙ Visual spatial , motor and phonological process in LD

“1 in 6 suffer few are told why there is an answer”

“virtually everyone can improve dramatically on our DRUG FREE treatment

- ⊙ Electronystagmography Posturography
- ⊙ various reading tests Dyslexia screen
- ⊙ exercises 2 x day 6-12M
- ⊙ Most recent research
- ⊙ DST literacy measures (one minute reading, nonsense passage reading, spelling and writing) showed no evidence of improvement

A cure for dyslexia?

A company is promoting behavioural exercises as a cure for dyslexia. Scientists worry that evaluation of the program is compromised by design flaws and conflicts of interest and that responses to critics restrict academic freedom.

Nature Neuroscience vol 10 (2) Feb 2007 p 135

- ⊙ Marketed for ADHD, dyspraxia and Asperger syndrome as well as dyslexia. Dore Achievement Centres have treated over 25,000 people worldwide.
- ⊙ Reynolds paid GBP 35K by Dore for 2003 study + 3 Ph D students
- ⊙ 5 of *Dyslexia* Board resigned when 2006 Reynolds study published.
- ⊙ Coltheart and Snowling got legal letters when said no scientific proof
- ⊙ until an independent evaluation has been published in an academic journal, claims that the treatment has been scientifically proven cannot be supported. More importantly, parents must be able to rely on experts in the field to give their honest professional opinion about a treatment's efficacy, without interference from commercial interests or legal concerns.
- ⊙ ABC 4 CORNERS 06/08/07
- ⊙ <http://www.abc.net.au/4corners/content/2007/s1997916.htm>
- ⊙ Bishop DVM Curing Dyslexia and ADHD by training motor co-ordination: Miracle or Myth ? *J Paediatrics Child Health* 2007

EEG NEUROFEEDBACK

Annotation: neurofeedback - train your brain to train behaviour.

**J Child Psychol Psychiatry. 2007 Jan;48(1):3-16 Heinrich,
Gevensleben ,Strehl**

EEG biofeedback vs. placebo treatment for Attention-Deficit/Hyperactivity Disorder: A pilot study C. Heywood I Beale 7 kids SMR / theta = placebo

Journal of Attention Disorders, Vol. 7, No. 1, 43-55 (2003)

Strehl U 8-13y 30 x 1 h 5d/wk over 3 phases separated by 6 weeks

Slow Cortical Potentials 1st study with EEG data reported during and follow up

NO ADHD 2/ 23 and at 6 M 3/ 20 IQ and ATT better

Pediatrics 2006;118:e1530-e1540

Clinical utility of EEG in attention deficit hyperactivity disorder. Loo and Barkley

Applied Neuropsychol 2005;12(2):64-76

Electroencephalographic biofeedback (neurotherapy) as a treatment for attention deficit hyperactivity disorder: rationale and empirical foundation.

Monastra VJ Child Adolesc Psychiatr Clinic N Am 2005 Jan;14(1):55-82, vi.

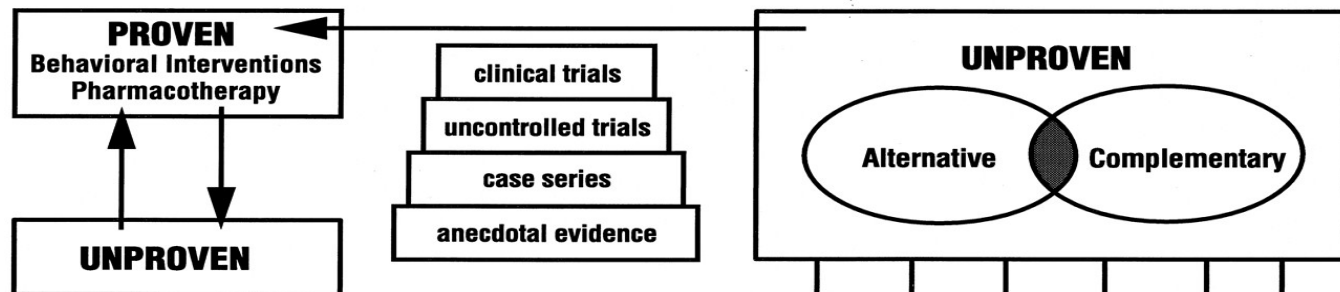
Committee on Children With Disabilities, Pediatrics 2001;107:598-601;

AAP

Systems of Health Care



Categories of Therapies



Examples of unproven biomedical, complementary, and alternative medicine (CAM) therapies used by children with autism

Nystatin
Secretin
IVIG

Manual Therapies
Chiropractic Massage

Mind/Body Therapies
Auditory integration
Prayer

Energy Medicine
Reiki

Acupuncture

Herbal Therapies
Ginko

Nutritional Supplements
DMG
Vitamin B₆

Robert 2 .5 yrs

- ⊙ Active ++ in utero
- ⊙ Mother ADHD + dyslexia
- ⊙ Active ++ from day 1
- ⊙ No sense of danger
- ⊙ 2 yrs no words 60 dB hearing loss
- ⊙ 3 yrs active +++
- ⊙ 3 yrs medication to enable preschool and therapy
- ⊙ 6 yrs LD decoding story speech
- ⊙ 10 yrs special education dex + clonidine
- ⊙ 12 yrs sports and class captain
- ⊙ 14 yrs high school entry supported now slipping

Sarah 3.5 yrs

- ◎ Global delay DQ 60 language disorder DQ 40
- ◎ Active +++ medication essential
- ◎ Special preschool + language therapy
- ◎ special class /school still illiterate
- ◎ Father dyslexia++ good draughtsman
- ◎ Brother PIQ 130 VIQ 85 presents at 11 years
language learning disability persists in job / TAFE
age 15 years reads @ 6 yr level

▪ Simon 10 years :symptoms

- ⊙ difficulty in reasoning / writing essays
- ⊙ off task , incomplete work, fidgety in year 5
- ⊙ few friends chess interest
- ⊙ earlier sagging grades year 3
- ⊙ reading 22 months behind age
- ⊙ I.Q. 120P 105V(scatter 90c -50c)
- ⊙ not unhappy

SIMON 10 years - LEARNING DISABILITY

- ⊙ Literacy LD for grade(3 yrs<) Severe LD for ability(5 yrs<)
reading spelling PIQ 125 VIQ 103 (nb scatter)
- ⊙ **Language Disorder**
essays off-topic not listen peer problems
subtle comprehension problem solving pragmatics
auditory discrim attention working memory executive
- ⊙ **Maths**
comprehension / problem / sequence / space / time
- ⊙ **Written output** narrative skills / coordination)
- ⊙ **Organisation** attention 6/7 impulsivity 3/6 DSM IV

SIMON 10 years : **Action**

© Speech Pathologist

comprehension word finding word narrative social

© Occupational Therapist

sequence space typing

© Psychologist

structure encourage individual family

© Explain to Simon give success in chess science

© Output modify quantity / method /time;computer

© Behaviour class play home

© Medication share wait targets optimise

NATURE OF DISORDERS - QUALITY IS THE KEY

LANGUAGE IMPAIRMENT

- ⊙ content context *DEFICITS/ DYSLEXIA*
- ⊙ complexity

ADHD *DISORGANISATION*

- ⊙ fine tuning fluency feedback
- ⊙ speed capacity **EXECUTIVE FUNCTION**
- ⊙ adaptability flexibility

DYSPRAXIA *PLANNING SEQUENCING*

- ⊙ restricted repertoire inflexible repetition speed

AUTISTIC SPECTRUM *DISTANCE/ DISINTEREST*

- ⊙ failure of social symbols
- ⊙ fail to generalise / organise hierarchy of knowledge

ADHD LANGUAGE and LEARNING

- ⊙ Always assess basic and higher language in ADHD
- ⊙ Teacher not assume that in ADHD without language or reading difficulty student does comprehend everything
- ⊙ Target academic cognitive language problems
AND behaviour
- ⊙ Synchronise medication to academic demands & support

SUPPORT SUCCESS - TOGETHER !!!

- ⊙ define problem
 - ⊙ basic skills : language motor
 - ⊙ assess higher level functional language
 - ⊙ modify teaching support: generic and specific
 - ⊙ modify behaviour program
 - ⊙ therapy : language motor social
 - ⊙ define medication targets
 - ⊙ monitor effectiveness and REVIEW
- academic social self esteem therapy medication