

CUTTING EDGE ISSUES FOR ADHD and ASSOCIATED DISORDERS

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ISSUES in Managing ADHD

honing Australian expertise

- **Modern concepts** of ADHD – various models
- **Age extremes** : PSK to school adolescent to adult
- Often associated symptoms / disorders ?
“comorbidity”
- **Biological and environmental** influences and outcomes
- **Complex behaviour** disorders
- Complex **neurodevelopmental** disorders
- Appropriate use of stimulants and other

CENTRAL CONCEPTS

- how brain controls thinking and behaviour
 - Executive functioning working memory**
- ADHD in many is a developmental cognitive inefficiency i.e. **LEARNING disability** BUT described as behaviour disorder
- Difference = impairment = **disorder/ disability**
- diagnosis is **descriptive & collaborative**
- Threshold of disorder is multifactorial spectrum
biology + environment + supports
- Management
comprehensive collaborative individualised

FORMAT

INTRODUCTIONS

REALITIES OF PAEDIATRIC PRACTICE

CASES preschool and adolescent

- Issues highlighted by panel

development practice psychiatry

OPEN DISCUSSION

NEW MEDICATIONS

- Extended R methylphenidate Atomoxetine

Some useful sources

COMPLEX PSYCHIATRY (10 mins)

- Developmental disorders other medications

OPEN DISCUSSION

ADHD IN REAL LIFE PAEDIATRIC PRACTICE

- **Wide variety** of patients, families, problems in any one day with very little warning
- **Constraints** Time Cost
Very little non clinical time
- **Increasing load on limited public services** hence increasing need for private services
- Not only are we seeing **more** patients but we are seeing **more complex** patients

ADHD IN REAL LIFE PAEDIATRIC PRACTICE

- It falls on us practically and 'emotionally' to 'get it right' for these children and adolescents.
- **Expectations** of us by parents and schools for **all the answers** and we have to do our best but recognise our **limitations**.
- Our role is:
 - Correct identification,
 - Explanation of the difficulties and their implications
 - Adjustment to the difficulties
 - Education of patient, parents and teachers
 - Advocacy for goal orientated management.

ADHD AND PRESCHOOL AGE CHILDREN

Michael at 3+ years

- Mother's concerns-poor weight gain,
- **Developmental delay** noted
- Receiving **early intervention** - home and centre based
- Height, weight 10%, **head circ 75%**,
- not dysmorphic
- Anxious, tantrums,
- good eye contact, **interactive**
- Points to indicate wants
- single words, very quiet , unclear speech
- GP noted **hyperactive**, doesn't talk

Background

- **Family-**
 - Vietnamese, mother little English
 - Mo, Fa delayed language until 3-4 years
 - No contact with father, live in flat
 - Pension, Carers All
- **Birth-**
 - Term, normal pregnancy, delivery forceps
 - BW 3.16 kg, Apgars 7, 9

Issues in Preschool Children

- **Differential diagnosis**
- **Threshold of disorder** - what is normal?
- **Environment** - parenting as primary cause or effect on child at biological risk

Broader issues –

- Prevalence diagnosis
- categorical versus empirical / descriptive;
- use of medications at young age
- effect on structure / function of developing brain
- medicalisation of exuberance
- social pressures and the role of the pharmaceutical industry.

Developmental History

- Neonatal U sound- choroid plexus cysts- neurology opinion -incidental
- 18 months - **Woodside**- language + social delay
- Hearing test ›**Electrocochleography** mod R HL
- 23 mo- 2 recognisable words

ACTION from 4 yrs

- EIV class Autism Assoc (obsessive)
- infrequent language therapy Disability Service

Follow Up 5 yrs

- Some phrases emerging
- Other children to play with only at child care
- Lining up toys

- **Griffiths** @ 63 mths Dev age 33m **DQ 52**

Eye H 14 H Sp 15.5 Pers Social 29 LM ? Perf 46

- Home discipline- “placed in room or made to kneel”

Further review-Kindergarten 6 yrs

- Support class for moderate I H
- Mother increasing difficulty with hyperactivity
- Some academic progress
- School reports poor concentration
- Mother asks about stimulant therapy but knows a child worse on medication

Kindergarten

Paediatric consultation

- poor follow commands poorly,
- hyperactive, constantly playing with objects on desk, little social restraint, awareness intact

Language assessment

major receptive difficulty, dyspraxia ,

“some impulsivity, focussed on own agenda”

Reassess by Disability team 8 yrs

- **WISC-III invalid**
- poor comprehension incomplete tasks
- **Picture vocab + interpreter**
VIET > Eng Comprehension close to 4 yrs
- Play meaningful inattentive +++ mild HA
- severe express - few noises artic +++++
- **Dev Behav Checklist** (VIET +interpreter)
overall problems 33% autism risk 37%

Is it ADHD ??

DBC Marked attention symptoms

- distract active stubborn

DSM-IV 6/9 InAttent 2/ 6 HA 0 Imp

Conners Teacher RS

- Oppos 97 CognIA 95 HA 89

OBSERVED by developmental paed

- Oppositional IA verbal prompt+++
- Hard to switch task
- ? Advise trial of stimulant

PSK ISSUES - Developmental

- Symptoms ? developmentally **INAPPROPRIATE specific communication ??global situation**
- Play behave learn at **language level**
- **Comprehensive** support + behaviour
- Medication effects careful controls data
- Other medications used to avoid Stimulant control **less effective more toxic no science**
- AusEinet GUIDELINES in preschool ADHD
ausinet.flinders.edu.au/resources/auseinet/adhd.pdf

PSK ISSUES in Private Practice

- Identify need for **Interpreter**
- Collect **collateral** history
- Consider the family's **financial** situation
- Use HIC **case conferencing Item number** to coordinate
- These children need a **case coordinator** and often the paediatrician whom the family trusts and has attached to can take that role

**ADHD
PRESCHOOL
AGE
AND
PSYCHIATRY**

ADOLESCENCE

ADHD

and

ASSOCIATED DISORDERS

Zoe now age 14 years

I/A ADHD

- not listen moody
- Distract not complete

Language + learning

- Word finding Narrative
- Inference Relevance
- Slow processing
- Reading spelling
- Slow written output

Social reticence anxiety

- teased few friends

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PSK behaviour middle ear

- Family patterns known

School

- 6 yrs reading support
- 7 yrs behaviour
- 8 yrs **language assess**

Comp Word Find not visual

- 9 yrs **cognitive assess**

Auditory memory speed

language therapy

subtlety narrative type

- 9 yrs **anxiety +family counsel**

Zoe's medication 1

DEX @9 yrs 31 kg 5 mg + 5 mg 8.30 a.m. 1 p.m.

- Some effect but not last Home & study poor
- 4 p.m. language therapy poor

10 mg + 5 mg 8.30 a.m. 1 p.m.

- Listen persist complete essay content length better
- home + therapy poor weekends better

DEX @10 yrs 35 kg 10 mg 5 mg 5 mg 7 + 11 a.m. 4 p.m.

- better school late a.m. / p.m.
- better home & therapy
- Better social events

Zoe's medication 2

DEX @10 yrs 35 kg 10 mg 5 mg 5 mg 7 + 11 a.m. 4 p.m.

- better school late a.m. / p.m.
- better home & therapy
- Better social events
- BUT anxious poor appetite

MPH @11 yrs 38 kg 20 mg 10 mg 10 mg 7 + 11 a.m. 4 p.m

- Similar effect still anxious moody more appetite
- Work is harder but focussed

STOP MPH ?? SSRI

- Work harder and still anxious
- Anxiety program + family therapy

MPH @ 11.5 yrs 40 kg 10 mg + Compound 15 mg 8.00 a.m.

- Work easier less anxious

Zoe's medication 3

MPH @ 12 yrs 40 kg 10 mg + Compound 15 mg 8.00 a.m

Benefits continue but organising hard in HS

- ambivalence re ADHD media
- teased re going to office bullied "forget" 11 a.m. dose
- focus but not feel "myself"

MPH 10 mg + Compound 20 mg 8.00 a.m.

- Focus in p.m. + early homework
- **Mood effects** at lunch not chatty / fun with friends
- Appetite poor at lunch

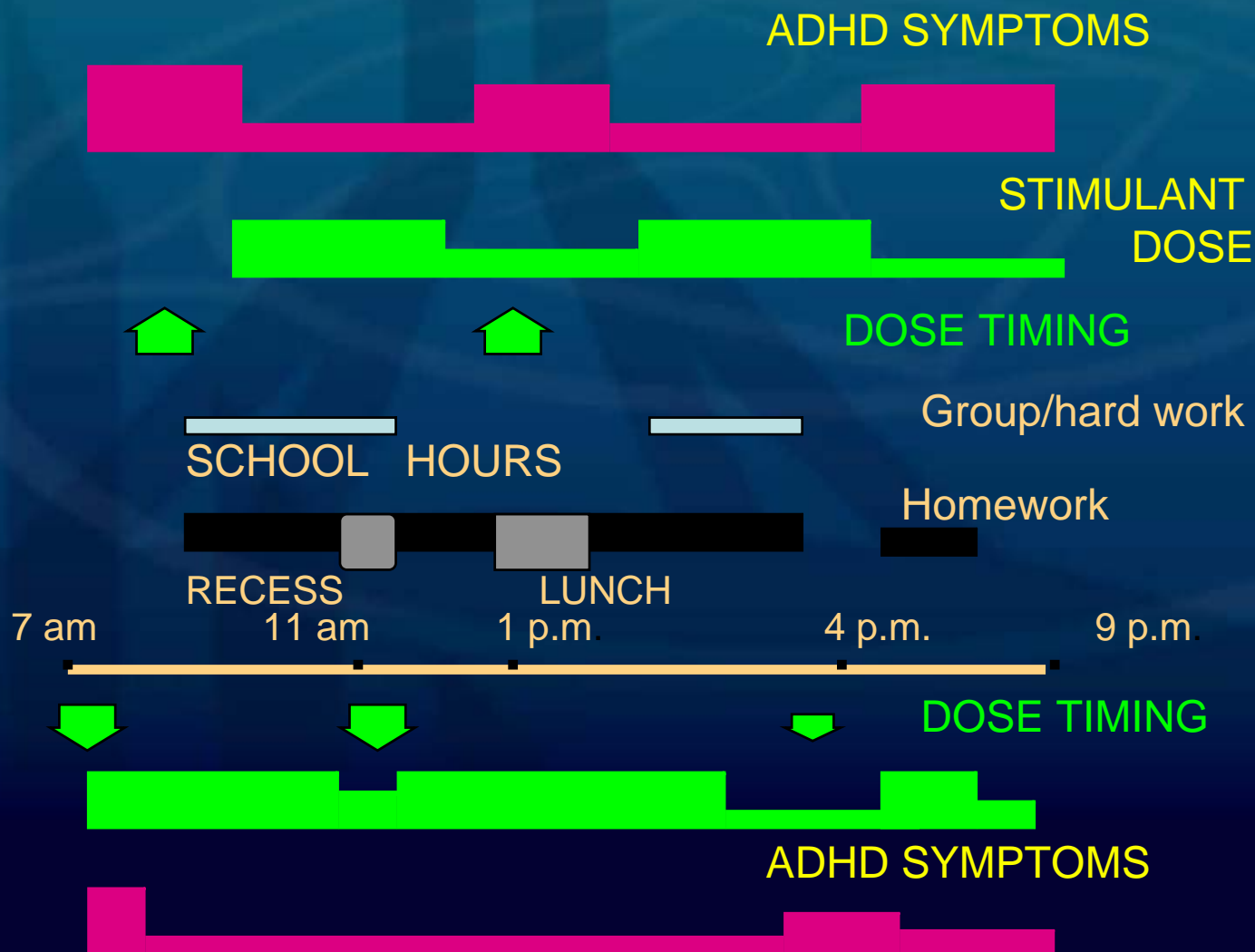
MPH 10 mg +compd 15 mg

- similar

Choice of low dose or surreptitious self-dose at 11 a.m. but forget

NEEDS ONE EXTENDED DOSE STOP MPH

Tuning Medication to Lifestyle



Zoe's medication 4

@ 13 yrs 50 kg

Metadate 30 mg in placebo vs. IR vs. ER trial

similar benefit poorer homework

Ritalin LA 20 mg 8.00 a.m.

- focus in a.m. Mood variable poorer homework & therapy

Ritalin LA 30 mg

- homework better lunch worse mood variable

Concerta 18 mg

- morning focus worse more fun more myself
homework better sleep later

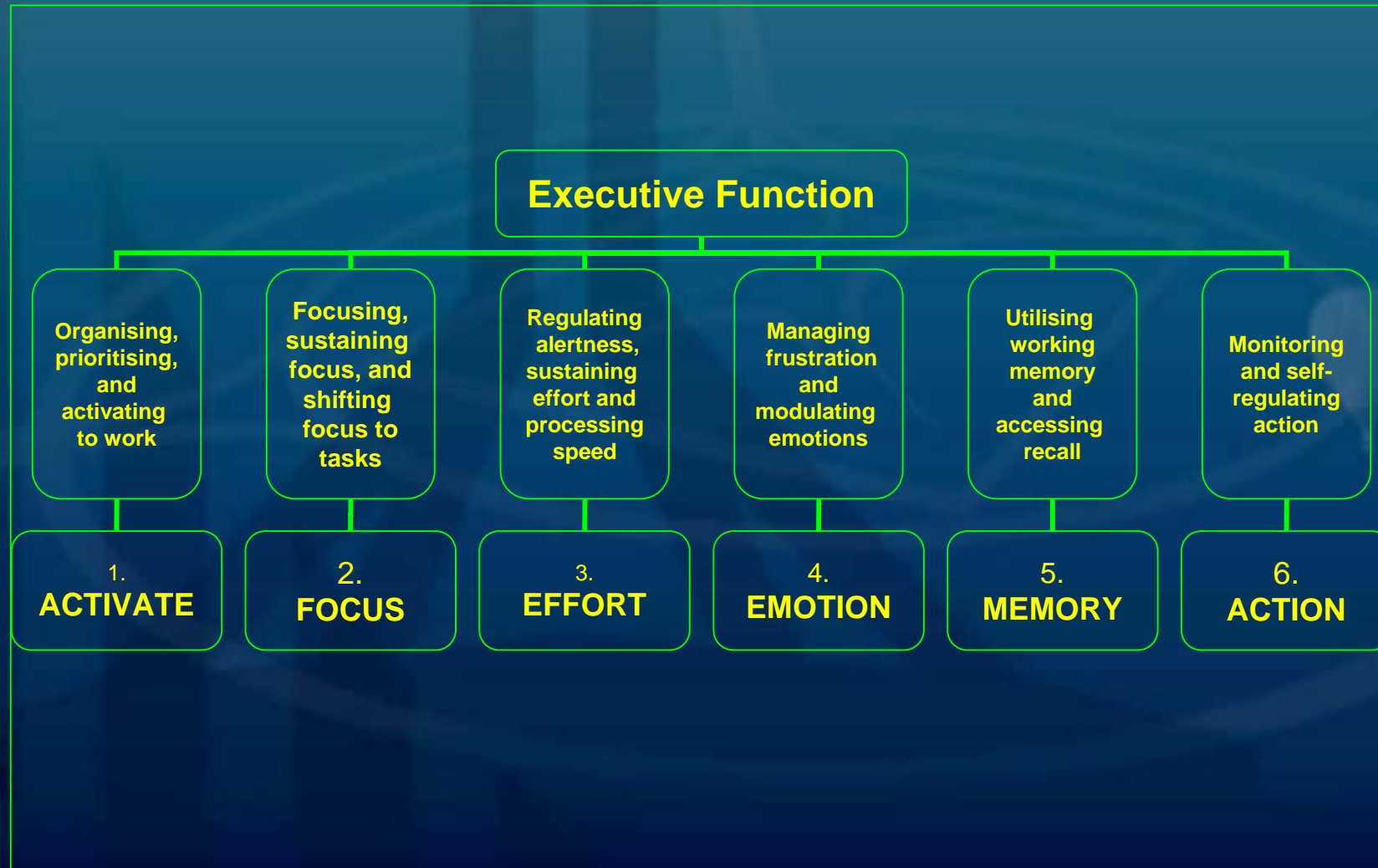
@ 14 yrs 55 kg

? Concerta 36 mg ?? 54 mg

?? Atomoxetine ?40 mg ??60 mg

ADOLESCENCE ISSUES

- Impacts in adolescence of high level language
- Challenges to executive function and inhibition
social academic language risk taking
introspection negotiation relationships
- Overlapping disorders eg anxiety depression
- Realistic outcome data
- Conduct disorder criminality substance use
- Relevance of stimulants duration compliance
- High School Entry senior school post school
- Transition to Adult services and supports



EXECUTIVE FUNCTIONING and Higher Language and ADHD

WORKING MEMORY Hold idea to elaborate clarify USE

- Recall answer and remember question
- 1st and last sounds to decode and blend
- Retell and summarise narrative Carry numbers

ATTENTION focus switch sustain

Inhibition Long and short memory Processing Speed

- Poorer inference explanation compr longer passages
- Recognise errors in a sequence
- Arithmetic computation poor in ADHD all types
- Poor Visual Span and WM assoc with IA symptoms

Rucklidge and Tannock JCPP 2002 43 988-1003

Genetic overlap ADHD +RD with INATTENTIVE symptoms

MAIN ACCOMMODATIONS

specific substantiated sustained support

- CONTENT

Understanding research reasoning structure

- OUTPUT

essays extra time computer reader writer

- MEDIUM

MCQ aural tape video then book cartoon

- THERAPY language behaviour relaxation

HIGH SCHOOL 6 YEARS TO DEFINE + REFINE

ADAM 18.0 yrs Aug 2002

“English is one of my most difficult subjects . I often know the answers but don't know how to express it in words. This gets in the way during exams for other subjects. My organisation and study skills are not well developed . I have a keen interest in computers. but find my learning disability prevents me from getting the marks that I want.”

Benefits of Stimulants (Tannock)

- Rate of colour naming and word naming

Bedard et al JAAACP 2003

- Rapid automatic naming speed in ADHD+RD
- Verbal WM Spatial WM and Span
- Quality of narrative

Francis S et al J Ch Adol Psychopharm 200211 217-28

- Maths productivity finger counting
- All Frequency comparison threshold poorer off Stim
- **(Sutcliffe and Bishop)**
- Synchronise with academic support
- **Kastner et al 2000**

ADHD LANGUAGE and LEARNING

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

ADOLESCENT ISSUES- Practice

- Importance of allocating time
- Importance of having all the information available
- Gather collateral information
- Ask the school to take ownership of difficulties
- Take time with explanation of difficulties
- Communicate the diagnosis, or combination of difficulties to the school
- Take time in discussion of medication options with the family

**NEW MEDICATIONS
FOR ADHD
steps into the unknown
for all**

EXTENDED RELEASE MEDICATION in ADHD

- Biphasic IR + ER **methylphenidate** (MPH)
- Once daily dose ? smoother ? longer
- Different products **Ritalin LA Concerta Metadate**
IR-ER split vehicle duration price
- in USA for 3 years (recent speakers in Oz)
- **Atomoxetine** (ATX) **Strattera** is NA Reuptake Inhibitor
- low affinity for other neurotransmitter receptors
- Rapid absorb (T_{max} 1 hr) Plasma half-life 5 hrs?brain

NEW EXPERIENCE FOR ALL

- **3 more drugs to individualise** not a school panacea
compare with DEX in Oz - 50% receiving DEX / MPH
NO ER DEX (Adderall) SR only compounded not biphasic
IR / ER split ?a.m. effects ? mood effects ?comorbidity
? extended side effects ? abuse ? diversion
- **Individualised effects and lifestyle**
Child carer prescriber pharmacist other professionals
- **Implications for policy & regulation**
Schedule 8 or not MPH >2 mg/kg/day ? GP prescribe
?? PBS ? public hospital clinic and pharmacy costs
- **Prescribing practices**
 - ? emulate US experience
 - Psychotropic Rx in Aus **Efron D et al Pediatrics 2003 111: 372-37**

EXTENDED RELEASE MPH

| | DURATION | IR / ER | DOSE | COST(min) |
|-------------------|------------------|--------------------|--------------------|---------------------|
| RITALIN LA | 6 - 9 hrs | 50% | 20 30 40 mg | \$38- 47- 58 |
| 2003 | | Granules of IR /ER | ? need IR later | |

| | | | | |
|-------------------|-------------------|-------------------------------|--------------------|---------------------|
| CONCERTA | 9 - 12 hrs | 22% | 18 36 54 mg | \$87-105-135 |
| (Nov 03) April 04 | | (54 mg ?now Oz ?? 72 mg ever) | | |

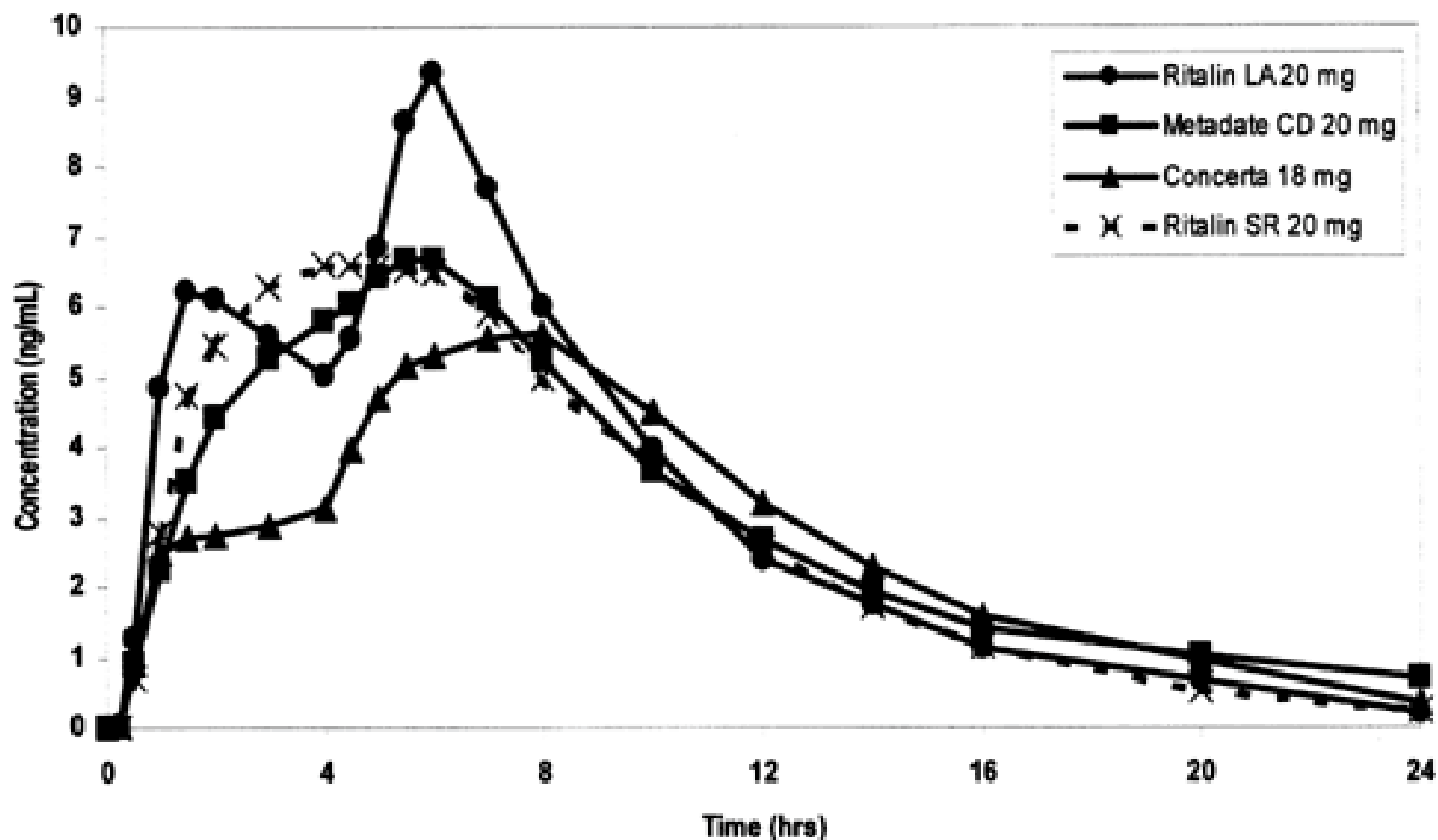
Capsule IR coat + gel pump more in p.m. ? titrate on a.m.

Wolraich M et al. Pediatrics 2001 108 (4) 883 -892

| | | | | |
|----------------------|---------------------------------|---------|--------------------|----------------|
| METADATE CD | 5 -7 hrs | 50% | 20 30 40 mg | trial only |
| 19/44 centres in Aus | placebo 46 | MIR 133 | MMR 139 | 3 wk crossover |
| Granules | school day only - need IR later | | | |

DEX MPH Compounding costs approx \$20 per 50 capsules \$30 per 100

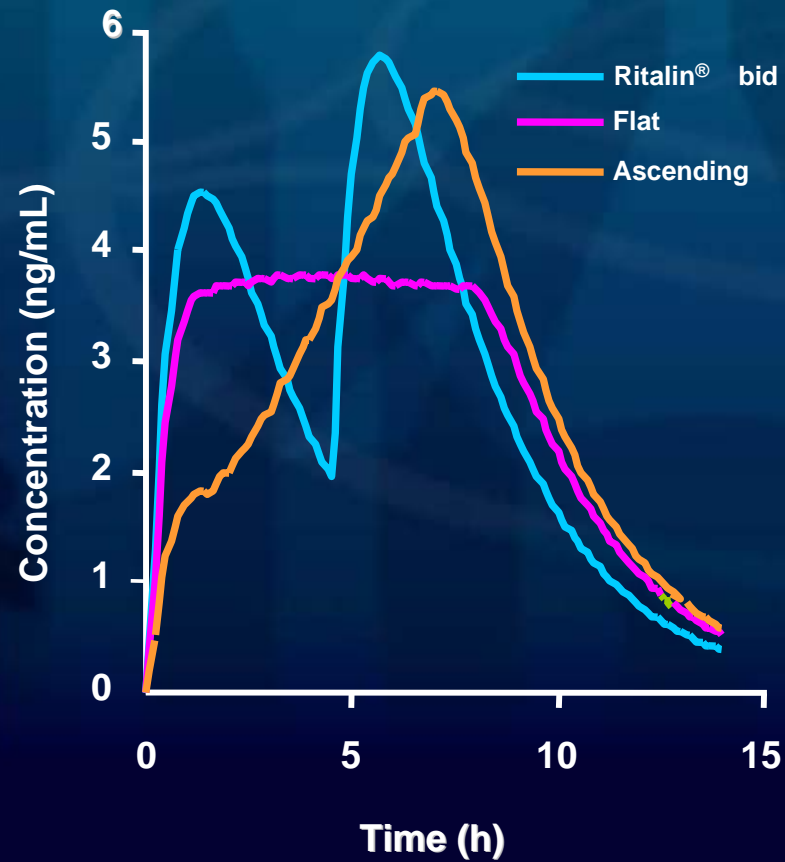
ER Methylphenidate Formulations



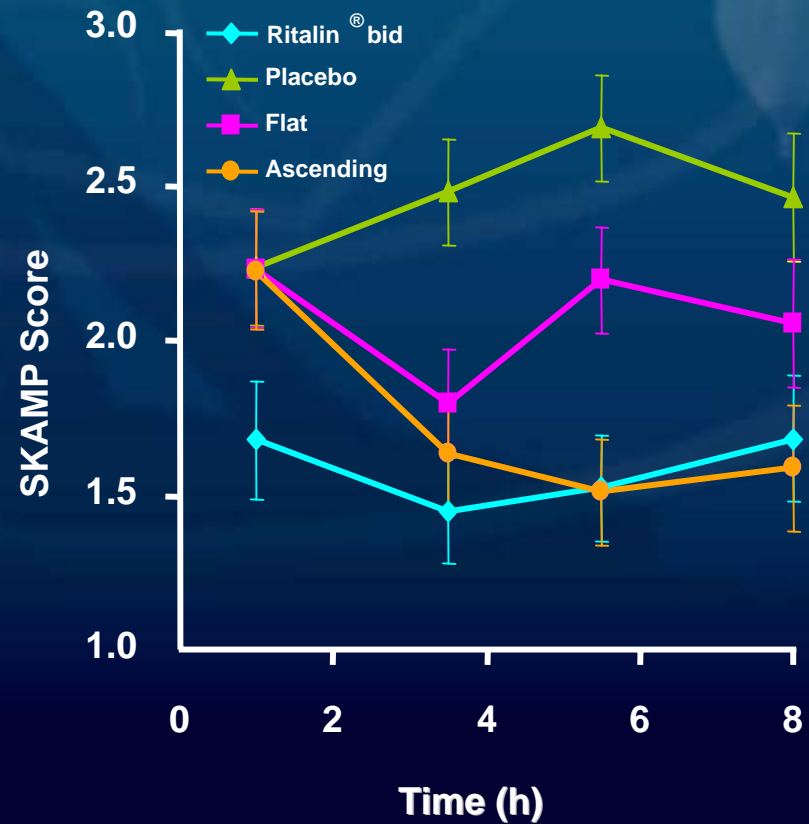
*Data presented are intended for illustrative purposes only and are not derived from a single cross-over study. These pharmacokinetic profiles represent the superimposition of data generated in three previously published bioavailability studies of MPH dosage formulations at similar strengths administered to healthy adult volunteers.^{102,105,107}

Rationale for Ascending Profile

Simulated Plasma Profiles



Impact on SKAMP Combined Attention



CONCERTA[®] Summary of research

CONCERTA vs. MPH t.d.s. vs. PLACEBO

Classroom 118 subjects x 1 week each treatment

- SKAMP ratings showed **sustained improvement in attention and behaviour for 12 hours**

Multicentre 312 subjects for 4 weeks

- Low incidence of insomnia (4%) and loss of appetite (4%)**

OPEN LABEL

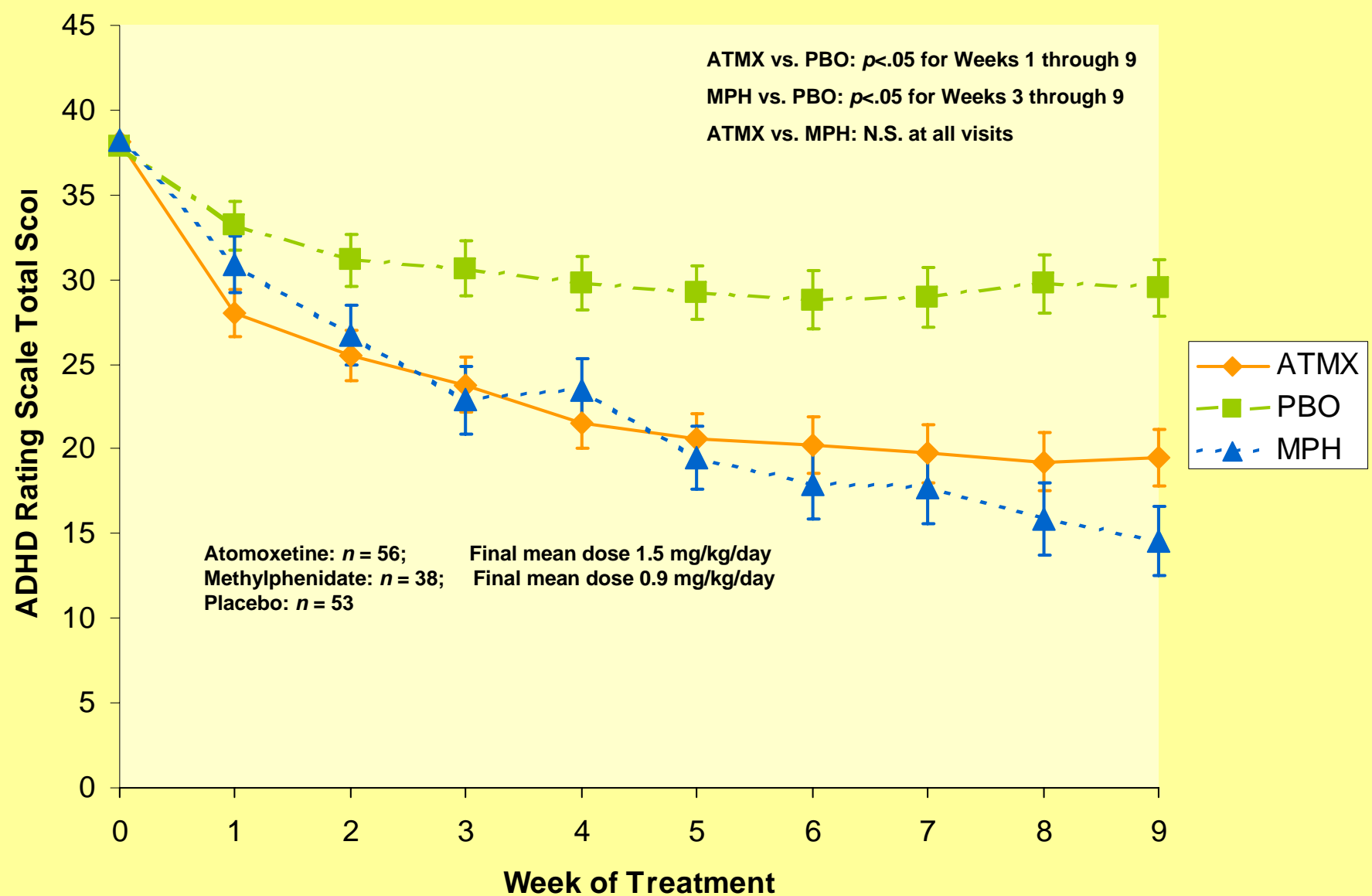
Long term 289 subjects for 12 months

Community 9 months 1083 subjects in 118 centres

- not adversely affect height and/or weight) over 12-month**
- Over 90% of parents highly satisfied with CONCERTA[®] therapy**

Atomoxetine vs. MPH: Blinded Study

ADHD-RS Ratings Over Time



Information is only for those patients who were stimulant naïve.

Using of Atomoxetine (Strattera[®])

- **Dose** 1.2 mg/kg to Max 1.8 mg/kg
- Titrate to higher ? what speed
- **Once daily** in A.M. ? Evening for sedation
- ?b.d. for adverse effects
- ? b.d. late PM/ early AM behavior problems
- All studies **improve at 1 wk** some effects 1 day
- Better response with increased time on drug;
- **at least 4 - 5 weeks** necessary
- **Cross-taper** is recommended if switching
- US data 20% combined + stim ? lower stim dose

POSSIBLE SIDE EFFECTS

- No evidence of drug withdrawal symptoms
- No need for ECG
- **Sedation**: early in treatment, then dissipates
- **GI**: more prominent if taken without food
- Irritability and **mood** lability sometimes
- ? lower dose after few weeks (dbp.org list)

Atomoxetine is potentially useful for

- Any subject with ADHD – efficacy similar to stimulants
- High and low severity
- Inattentive and/or hyperactive symptoms
- Comorbid ODD, mood, tics, possibly anxiety
- Stimulant non-response or intolerance
- Individuals with ADHD + substance use

Atomoxetine may be distinguished by:

- Long duration of clinical activity
- Relative absence of insomnia

USEFUL SOURCES

- CLINICAL GUIDELINES
- Stimulant statistics
- LD / ADHD accommodations
- Recent management overviews

REFERENCES

- GUIDELINES

<http://www.health.gov.au/nhmrc/publications/adhd/contents.htm> Australia

<http://www.aap.org/policy/ac0002.htm> USA

<http://www.nlm.nih.gov/pubs/cbm/adhd.html> USA

NSW GUIDELINES FOR STIMULANT PRESCRIBING

http://www.health.nsw.gov.au/public-health/psb/adhd/children/criteria_children.html

http://www.health.nsw.gov.au/public-health/psb/adhd/criteria_adults_mp.html

NSW 10 YEARS OF STIMULANT PRESCRIBING

<http://www.health.nsw.gov.au/public-health/phbsup/ADHD2002sup.pdf>

MAKING ACCOMMODATIONS

- Pedagogy sources
- Net resources

www.idonline.org www.idresources.com

www.dotolearn.com

isrc.org/learn_db.htm isrc.org:8080/irsc/irscmain.nsf

www.inspiration.com mindjet.com [thatsafactjack](http://thatsafactjack.com)

- Board of Studies Special Provisions
- EACH DAY EACH TASK EACH TOPIC
NOT ONLY EXAMS

ADHD current sources

- Castellanos F X & Tannock R
Nature reviews Neuroscience 2002 (3) 617-628.
- **International Consensus Statement on ADHD Jan 02**

Modern research

34 pages of references

89 signatories

varied countries &

disciplines

Barkley R A (2002) Journal of American Academy of Child and Adolescent Psychiatry 41; 1389 -1390.

Clinical Child and Family Psychology Review 5(2): 89-111; Jun 2002

<http://www.adhs.ch/download/consensus.pdf>

RECENT OVERVIEWS

US Dept Education Office of Special Education programs (2003)
www.ed.gov/offices/OSERS/OSEP/

- Identifying and treating Attention Deficit Hyperactivity Disorder: A Resource for School and Home

<http://www.ed.gov/about/reports/annual/osep/index.html#adhd-res>

<http://www.ed.gov/teachers/needs/speced/adhd/adhd-resource-pt1.pdf>

- Teaching Children with Attention Deficit Hyperactivity Disorder: Instructional Strategies and Practices.

<http://www.ed.gov/teachers/needs/speced/adhd/adhd-resource-pt2.pdf>

ADHD AND PSYCHIATRY

NEURODEVELOPMENTAL DISABILITY

in which ADHD is embedded

DISRUPTIVE BEHAVIOUR which is **not ADHD**

- MOOD DISORDERS

MEDICATIONS

- Stimulants in “non ADHD”
- Non stimulants in ADHD
- Stimulants exacerbating other disorders
- Place of other medications

e.g. SSRI RISPERIDONE