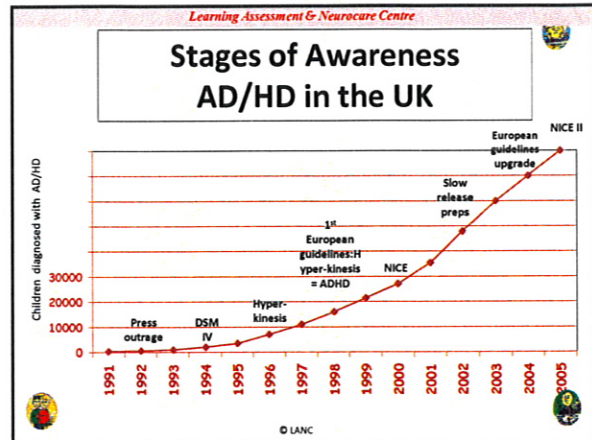


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## ADHD – What Do We Know?

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**Prof G Still, RCP 1902**

- "I wish to discuss a group of conditions which are concerned with an **abnormal defect of moral control** in children. ... they have a very real practical - shall I say social? - importance which I venture to think has hardly been sufficiently recognised."
- "within an **ill-defined range**, a variation which we arguably recognise as normal for age, **there are children in whom moral control falls far below this standard.**"
- "A notable feature in many of these cases...is a quite **abnormal incapacity for sustained attention.**"
- "...it is very important to develop a more widespread knowledge of these "morbid states" particularly as some of them **persist into adult life.**"
- "in the **early years** the influence of the **environment** has not yet become so varied and complicated."
- "The keynote of these qualities is **self-gratification**, the immediate gratification of self without regard either to the good of others or to the larger and more remote good of self."

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## AD/HD

AD/HD is a complex neurobiological disorder of self control characterised by developmentally inappropriate inattention a/o hyperactivity a/o impulsiveness, which is causing functional impairment in major life activities.

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Attention deficit hyperactivity disorder (ADHD) is one of the most common and important childhood conditions.

It frequently persists into adulthood from preschool years.

Untreated it creates a vulnerability to significant educational, social and psychiatric and youth justice difficulties.

However, it can be successfully managed!

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## AD/HD ...

- Not a new condition
- 3-5% incidence
- Males > Females
- Progressive. Disabling
- One of the most common reasons for CAMHS or SEN referral
- Gene/environment both important
- Be aware of the Myth & misinformation.

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## AD/HD - Core Symptoms

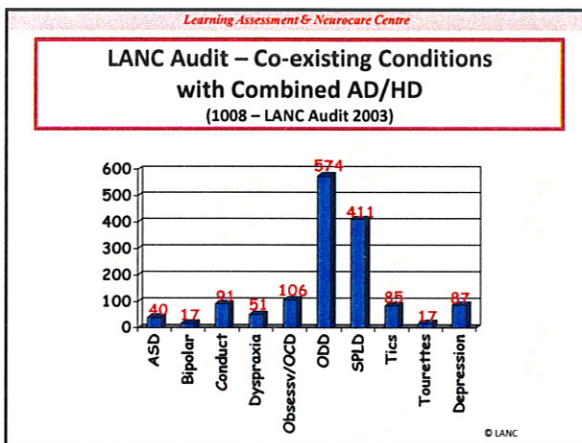
Inattentiveness

Impulsiveness

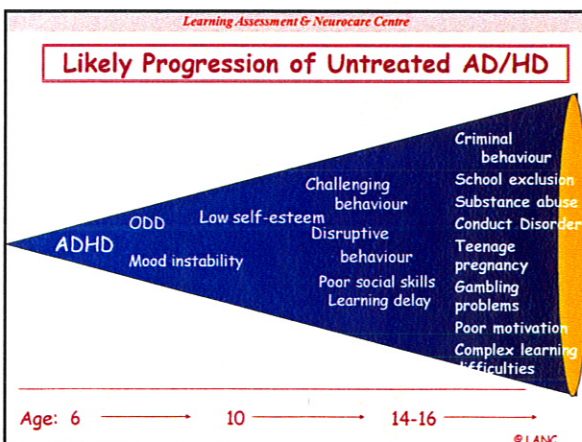
Hyperactivity

Diagnosis requires a Comprehensive assessment of functional impairment and exclusion of other causes.

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- ## Frequently Associated Difficulties
- Low self esteem
  - Social skills
  - Relationships
  - Chronic boredom
  - Time management /Planning/organisation
  - Lack of motivation
  - Variability
  - Hypersensitivity
  - Vulnerability to life's stresses
  - Dogmatism
  - Insatiability
  - Physical symptoms - headache etc.
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- ### Girls with ADHD
- May sometimes be hyperactive but more commonly are daydreamers & inattentive.
  - Often more emotional/verbal impulsiveness-less physical.
  - Brightness may mask & the 'slip under the radar'.
  - Tend to be anxious/depressed/low self esteem especially with senior school transfer.

## AD/HD in Adults

- Highly familial. 2/3 persist to adulthood.
- More marital breakdowns
- Poorer employment record
- More interpersonal problems.
- Effect on parenting/family function. Parenting skills may need enhancing. Difficulty in implementing behavioural management programmes.



"People with childhood AD/HD were significantly more likely to face a wide range of negative outcomes in adulthood, especially in the domains of education, economic status, housing, relationships, crime and health."

*Bassett-Grundy A & Butler N  
30 year British Cohort Study  
[www.ioe.ac.uk/bedfordgroup](http://www.ioe.ac.uk/bedfordgroup) 2004*



## ADHD & Crime

- There is a disproportionately high number of offenders with ADHD in the Criminal Justice System.
- 45% Youth Offenders: 30% adult offenders:10% female offenders. [200,000 enter youth justice annually]
- Effective ADHD management can reduce reoffending rates from 60+% to 10%.
- Recognition of biological causes of crime, in addition to social/environmental is critical.
- Young & Goodwin – Expert Rev:Neurother 10[10]:1497-1500[2010]



"There is the likelihood, nay almost the certainty, that children with the **more profound and permanent disorders of moral control** will, if not protected from themselves, sooner or later bring public disgrace upon themselves and the families to which they belong, and **possibly be punished as criminals** in spite of the evidence that their acts are the **outcome of a mental state.**"

## Sexual-Reproductive Risks

- Begin Sexual Activity Earlier (15 vs 16 yrs.)
- More Lifetime Sexual Partners (13.6 vs. 5.4)
- Less Likely to Employ Contraception
- Increase in Teen Pregnancies (38 vs. 4%)
  - 32% males, 68% females
  - 54% Did Not Have Custody of Offspring
- Higher Risk for STDs (17 vs. 4%)

## Motor Vehicle Driving Risks

- Poorer steering, slower braking reaction time
- More likely to drive before legally licensed
- More accidents (and more often at faults) (2-3x risk)
  - % with 2+ crashes: 40 vs. 6
  - % with 3+ crashes: 26 vs 9
- More Speeding fines - mean 4-5 vs. 1-2)
- Worse cost of accidents.
  - (% having a crash with injuries: 60 vs 17%)
- More Suspensions - % suspended: 22-24 vs. 4-5%.
- Greater adverse impact of alcohol on driving

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**Assessment**

- Comprehensive history – HPI/?core ADHD/coexisting conditions/PH/FH/child interview/Environment.
- CPT
- QEEG
- Cognitive assessment
- Management Plan
- Monitoring

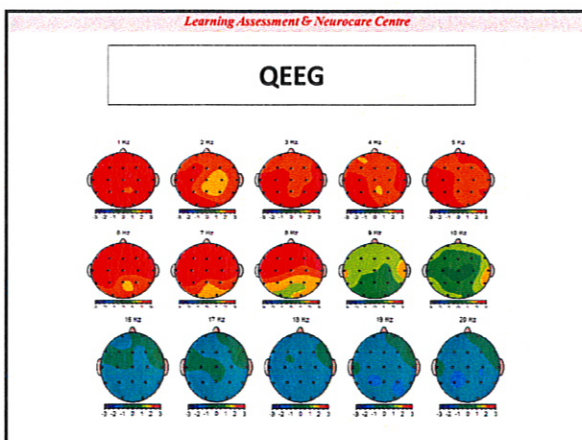
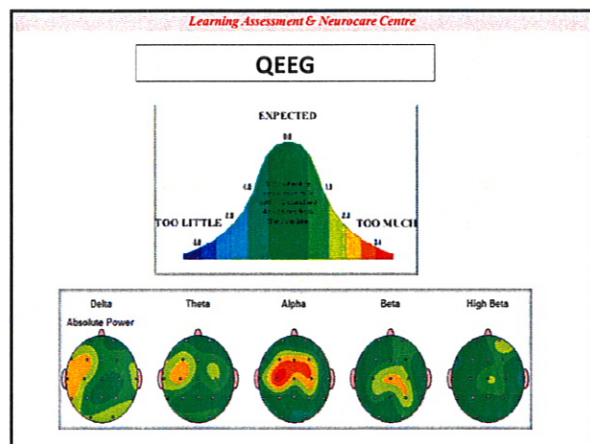


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**Management of AD/HD**

- Adopt a multimodal approach.
- Recognise AD/HD as a valid chronic neurodevelopmental condition.
- Early intervention important.
- Use evidence-based strategies include educational/behavioural support; medication, neurofeedback & education about the condition/treatment as outlined in NICE & peer reviewed literature.

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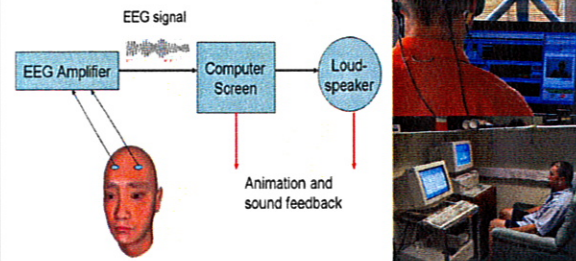
**QEEG**

Behaviour	Typical EEG features	Findings	Symptom feature match
Hyperactivity	Suppressed SMR activity low central region (12-15 Hz) increased beta over central area	Increased high frequency beta over central region but not elevated beta in broad frequency window (normal)	<b>70%</b> Over arousal in central region can induce motor restlessness resulting in fidgeting and restlessness. This can induce sleep problems.
Impulsivity	Increased theta/beta or theta/alpha ratio increased delta & theta Right frontal derangement	Increased frontal decrease (theta/beta ratio) from high frequency beta.	<b>80%</b> Right frontal derangement can lead to some impulsive actions, impulsivity, aggression and at times argumentative and emotional reactivity.
Inattention	Increased slow wave activity in frontal region Left frontal derangement	Decreased slow waves over left frontal region (also elevated theta)	<input checked="" type="checkbox"/> Excess slow waves in left frontal region seen in clients with executive problems, e.g. Poor concentration, sustained attention, planning.
Other observations	(1) Excess beta (ADHD common) (2) Deranged activity near receptive language area (3) Deranged activity near temporal regions - may lead to auditory processing issue (4) Other	Excess high frequency beta over central window	<input checked="" type="checkbox"/> Deranged activity in near the cingulate which is a structure involved in emotional and emotional control. This is often deranged in clients with temper regulation problems.

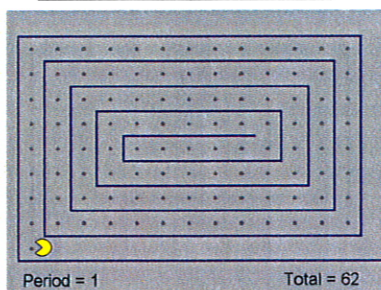
## QEEG Literature

- Chabot and Serfontein (1996) reported children with AD/HD had an increase in theta, primarily in the frontal regions and at the frontal midline.
- Clarke et al. (1998) carried out the first study of EEG differences between children with different DSM-IV types, comparing 20 AD/HD combined type, 20 AD/HD inattentive type and 20 control subjects. The AD/HD groups had increased theta, and reductions in alpha and beta.
- In a follow-up study with larger independent subject groups Clarke et al. (2001) found increased theta but also decreased Beta in combined AD/HD and decreased Alpha in inattentive AD/HD.

## Neurofeedback



## Neurofeedback



## Neurofeedback Literature

- Lubar and Shouse (1976) first reported calming of hyperkinesia after SMR enhancement
- Monastra et al. (2002, 2005) reported comparable effects to medication.
- Gevensleben et al. (2009) RCT study. Found NF more effective than computerised attention training.
- Arns et al. (2009) meta analysis. Found large effect size for inattention and impulsivity, medium effect size for hyperactivity.

## School's Role in Supporting Pupils with AD/HD


- Have a 'top down', whole school approach to SEN generally and ADHD in particular
- Understand that children with AD/HD have problems with neuro-circuitry and neurochemistry – that it is a biologically based, educational disability.
- AD/HD is treatable but not curable. Medication is rarely a panacea.
- However it usually provides a window of opportunity to allow other strategies to be more successful.
- Recognise ADHD is an explanation for certain behaviours and difficulties – not an excuse.
- Remember that ADHD can affect children right across the IQ range



## Better Futures Campaign – School Exclusion

- 66% of permanently excluded, and 75% of those in PRU's have SEN.
- Mainstream costs 4000/yr and PRU 15000.
- Children with ADHD – 100x inc risk permanent exclusion – 40% have had a fixed term exclusion.
- "We recommend that excluded children are assessed for any underlying causal factors. We suggest that schools trigger this assessment in instances in which a pupil displays poor behaviour that does not improve despite effective behaviour management by the school."
- DfE SEN Green Paper March 2011

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**Prof Still:**

- "There is an extraordinary failure of punishment to have any deterrent effect in many of these children – the same misdemeanour would be committed within a few hours of punishment, although extreme fear had been shown at the time of that punishment."

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## AD/HD and Medication

- ▣ Clinical improvement to core symptoms seen in about 20-30 minutes of correct medication at optimal dosage. Careful dosage and timing adjustments are critical.
- ▣ Core symptom improvement seen in 80-95% of cases.
- ▣ Regular monitoring essential.
- ▣ Careful explanation to child & parents.

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## AD/HD and Medication

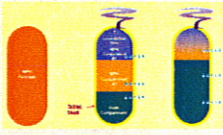
- There should be a 'flow-on' effect to usually improving self-esteem, academic progress, handwriting, and social skills.
- Subsequently other strategies can be selected as appropriate i.e. further specific educational, support particularly for co-existing conditions, social skills training, behavioural management, a mentor etc.

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## Concerta XL

- The longest acting methylphenidate preparation –10 - 12 hours
- 18mg, 27mg, and 36mg tablets
- 22% / 78%
- Once daily




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### MPH preparation

**Equasym XL**

- 10mg, 20mg, 30mg capsules
- Approximately 9 hours



**Medikinet XL**

- 10mg, 20mg, 30mg and 40mg capsules
- Formally less sleep/evening appetite problems

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## ATOMOXETINE (Strattera)

- Noradrenaline reuptake inhibitor thus increasing the availability of Noradrenaline which is important in regulating impulse control, attention + organization
- Not a stimulant and thus not a controlled drug. Drowsiness, GIT symptoms are common side effects
- In 6 USA studies, Atomoxetine improved 80% symptoms of ADHD – effect size 0.6
- Flexible dosing : 1 or 2 x per day – 24hr medication. Slow dosage increase

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### SIDE EFFECTS - Short Term

- Keep in perspective - risk/benefit
- Transient side effects may occur in approx. 10-20% of children treated.
  - Usually improved by dose/timing adjustment or medication change
- Common side effects include:
  - appetite suppression
  - stomach ache/headache
  - insomnia
  - tic exacerbation
  - behavioural rebound
  - transient subduing of personality

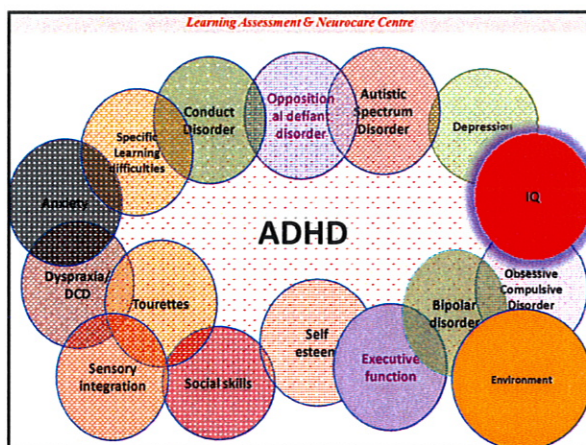
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### SIDE EFFECTS - Stimulants - Long Term ...

*'There are no adverse long term side effects reported - either through the adverse drug reporting systems or peer review journals - of the psychostimulants, despite their having been used for almost 60 years to treat millions of children with AD/HD.'*

D Coghill BMJ 2004



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### Conclusions

- ADHD is a common, valid universal neurodevelopmental disorder
- ADHD has a significant adverse impact on child and family functioning
- ADHD produces a lifelong impact on many domains of major life activities
- Combined treatment, including medication, results in improved child and family functioning

